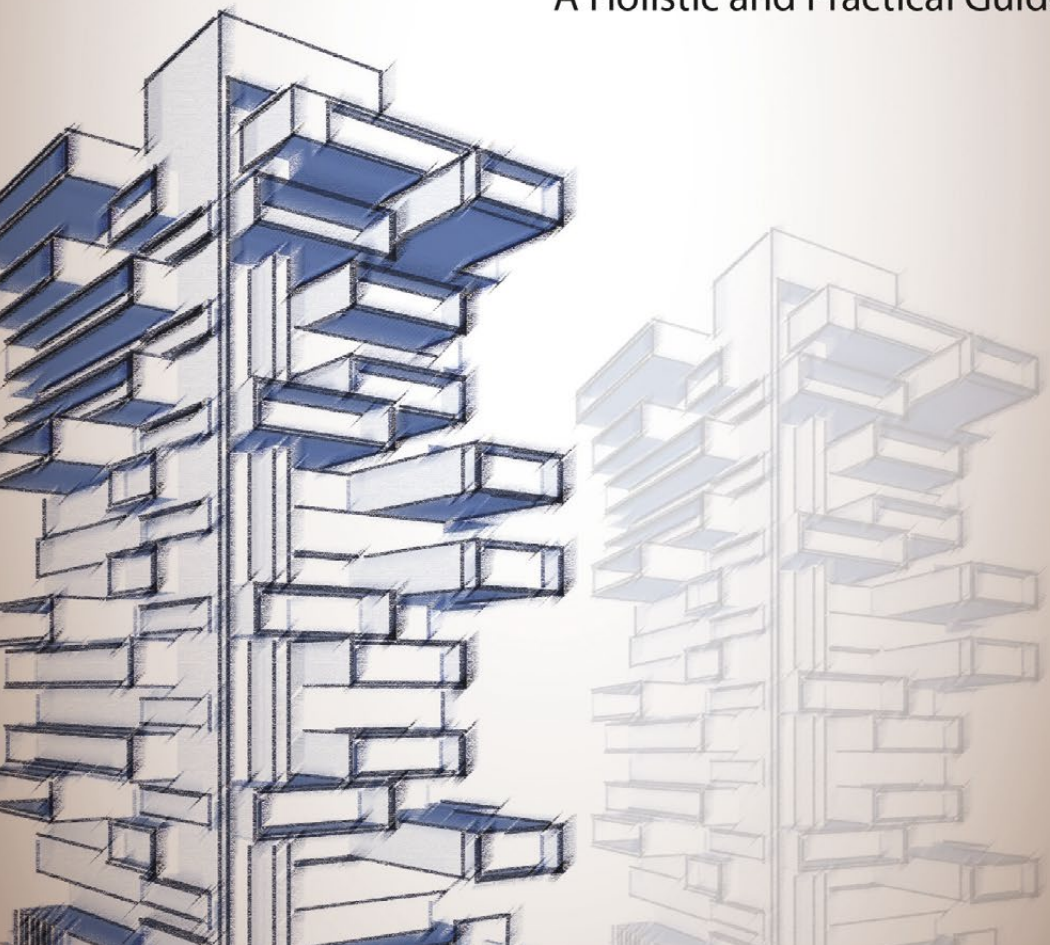
UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT

UNCTAD

BUILDING AND UTILIZING PRODUCTIVE CAPACITIES IN AFRICA AND THE LEAST DEVELOPED COUNTRIES

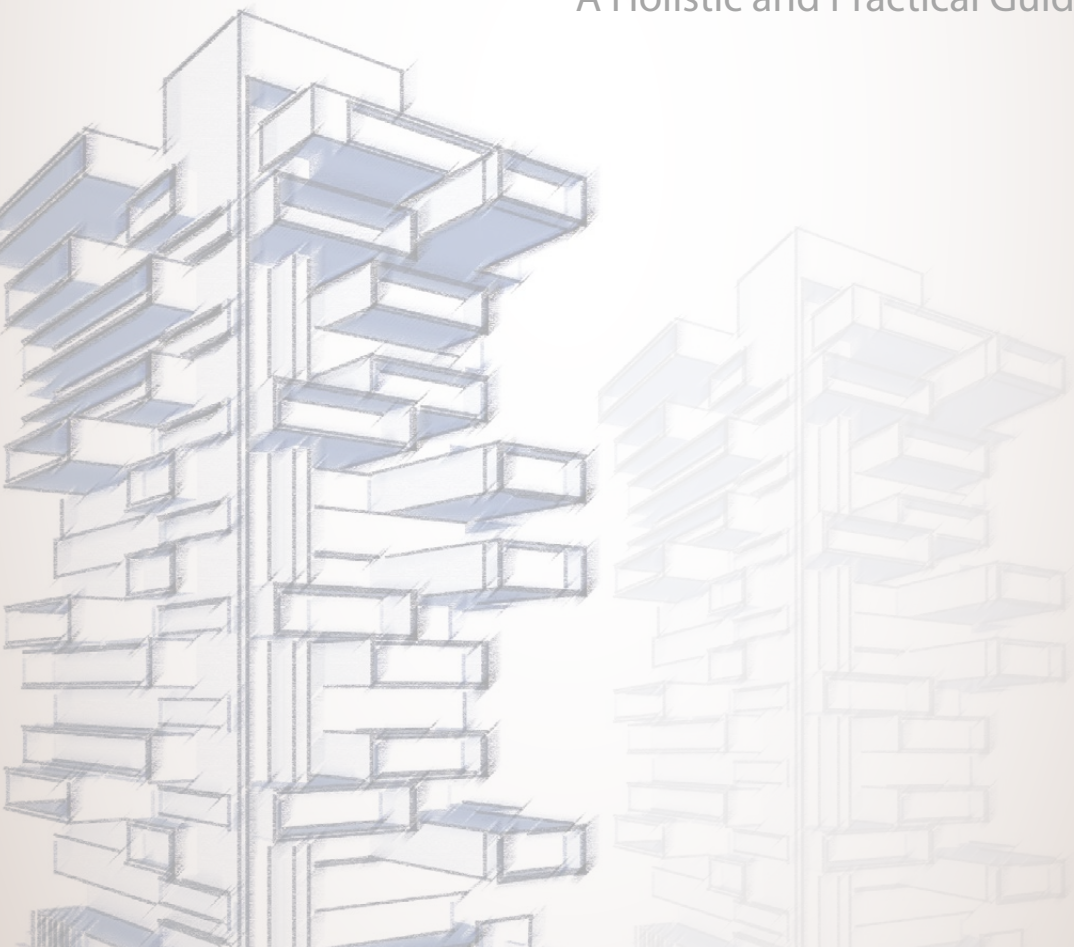
A Holistic and Practical Guide



UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT
UNCTAD

BUILDING AND UTILIZING PRODUCTIVE CAPACITIES IN AFRICA AND THE LEAST DEVELOPED COUNTRIES

A Holistic and Practical Guide



UNCTAD/ALDC/INF/2020/1

Acknowledgements

The report was prepared by UNCTAD as part of its activities aimed at strengthening linkages between Trade and Poverty in Africa and the Least Developed Countries (LDCs), under the guidance of Paul Akiwumi, Director, Division for Africa, LDCs and Special Programmes, UNCTAD, and the direct supervision of Patrick Osakwe, Head, Trade and Poverty Branch. The principal author of the report was Antonio Andreoni (UCL Institute for Innovation and Public Purpose). Chapter 3 was co-authored with Sofia Torreggiani, and Chapter 5 with Julian Boys, with contributions by Jaya Sood. The overall report also benefitted from contributions by Peter Draper.

The report was discussed at a peer review meeting held in Windhoek, Namibia, on 8 April 2019. We thank the following experts who participated in the review meeting and provided comments and suggestions on the report: Laronna Kaisara (Statistics Botswana), Yohannes Kinfu (University of Canberra), Chukwuka Onyekwena (Centre for the Study of the Economies of Africa), Lizl Stoman (Survey Warehouse), and Collin Zhuawu (former Trade Adviser Commonwealth Secretariat). Comments and suggestions by UNCTAD colleagues Mussie Delelegn, Junior Davis, Amelia Santos-Paulino and Rolf Traeger are also gratefully acknowledged.

The report benefitted from dialogues with government officials at the National Capacity-Building Workshop on Indicators for Measuring and Benchmarking Productive Capacities and Structural Economic Transformation, held in Kigali, Rwanda, 24–25 July 2018. The report also benefitted from discussions with participants at Workshops on Productive Capacities, Export Diversification and Structural Transformation in Landlocked Developing Countries, held in Ulaanbaatar, Mongolia, 16–17 October 2018, and in Gaborone, Botswana, 20–21 November 2018.

The report was edited by Michael Gibson. The cover of the report was prepared by Stefanie Garry and the overall layout, graphics and desktop publishing were done by Rostand Ngadjie-Siani.

Paulette Lacroix and Regina Ledesma provided secretarial and administrative support.

Contents

Executive summary

The development of productive capacities is increasingly recognized as a fundamental step in transforming the economies of African countries and the Least Developed Countries (LDCs) and putting them on a sustained development path. Following the global financial and economic crises of 2008/09, there is also growing acknowledgement of the vital role of industrial policy in fostering economic transformation and development, particularly in structurally weak and vulnerable developing countries. The *Least Developed Countries Report 2006: Developing Productive Capacities* (UNCTAD, 2006) was one of the key international reports promoting a "production capacities centred" view of development and stressing how the development of productive capacities could play a role in addressing the trade and development challenges that LDCs and other structurally weak and vulnerable economies face in the medium to long term. Subsequent *Least Developed Countries Reports* and other UNCTAD publications, such as the *Trade and Development Report* and the *Economic Development in Africa Report*, have also made useful contributions to the discourse on productive capacity development and structural transformation.

The present report complements the materials in the *Least Developed Countries Report 2006*, and other UNCTAD publications, on issues related to the development of productive capacities. It provides a comprehensive and operational framework for developing productive capacities in Africa and LDCs. More importantly, it adopts a holistic approach to productive capacity development, which underscores the need to build new productive capacities as well as enhance utilization rates of existing capacities. It also provides actionable policy recommendations and instruments that African countries and LDCs could adopt to develop productive capacities. In this context, the report is a useful and practical guide to Governments engaged in the design, implementation and enforcement of productive transformation policies.

The report focuses on the role of industrial policy in building productive capacities and offers new cross-country evidence and insights that are relevant at different stages of the policy process and cycle. The recognition of the ways in which both technical and political economy factors shape the process of productive capacity-building in Africa and LDCs is another distinctive contribution and approach of this report. Effective industrial policy requires both engaging with the micro- and meso-level production-technical dynamics affecting Africa and LDCs, as well as with the political economy factors determining the feasibility of any transformation in the economy.

African countries and LDCs are facing micro- and meso-level production and technical challenges. The recognition and investment in different and complementary types of productive capacities – including production, technological, organizational and innovation capabilities – is a fundamental step in advancing their industrial competitiveness. Building an industry without industrialization is, however, not sufficient to develop and transform the economy and society in Africa and the LDCs. Since the 1980s, African countries and LDCs have been increasingly involved in international production networks; however, this has not gone hand in hand with a deep process of industrialization at the level of their local production systems. These economies will industrialize only when linkages in their domestic industrial systems develop, leading to productive and inclusive transformations.

Finding technical solutions to these challenges calls for a joined-up industrial policy approach which emphasizes the introduction, coordination and governance of multiple policy instruments beyond policy silos. The development of various institutions providing technical, financial and organizational support to productive firms in Africa and LDCs is also critical in the implementation and enforcement of these instruments.

The allocation of resources and rents through industrial policy is a political economy process that requires technical coordination and effective enforcement solutions. In Africa and LDCs, the limited number of productive organizations and their institutional weaknesses reflect a specific type of political economy settlement, where transformative investments are challenged and discouraged by the distribution of power and incentive structure. This condition must be reverted to make industrial transformation possible.

The report finds that African countries have relatively low productive capacity utilization rates in manufacturing, and stresses that making better use of existing capacities requires addressing binding constraints that make it challenging for enterprises to operate effectively in these economies. These include poor hard and soft infrastructure, lack of availability of key production inputs, high cost of available inputs, and a weak and unstable political economy environment. The report also argues that industrial transformation will only be feasible if both micro- and meso-level technical issues are thoroughly addressed with effective industrial policy, including experimentation and adaptation of lessons learned from today's developed countries. However, these policies will have to consider the political economy context in which they are supposed to be implemented and enforced. Learning to industrialize is a long process, thus incremental change and the right

to fail should be acknowledged. Furthermore, industrializing to transform societies is a complex process to which all productive forces in the public and private sectors must contribute. Therefore, a new policy approach must replace traditional and unproductive contraposition between the private and public sectors. The international and research community also has a role to play in supporting this transformative process towards inclusive and sustainable production transformation in Africa and the LDCs.

Abbreviations

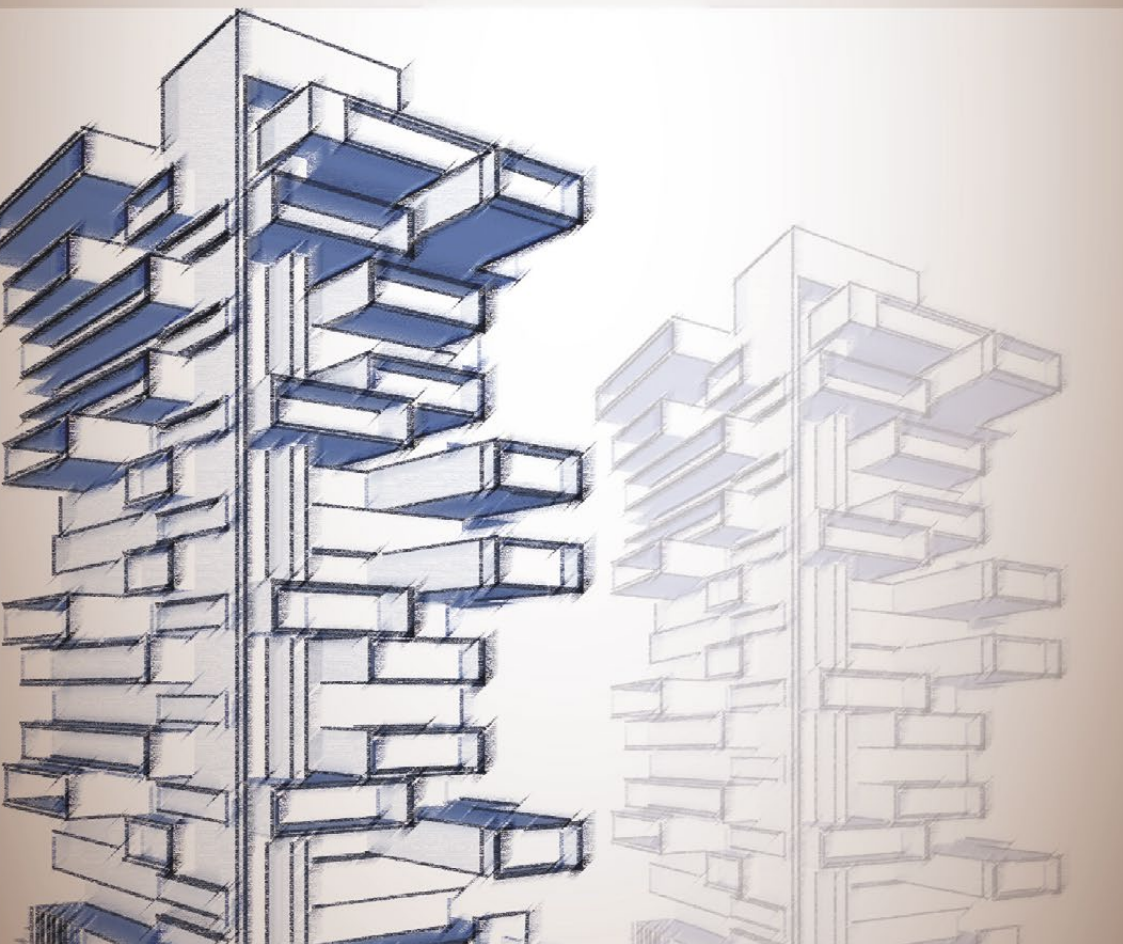
ANRC	Africa Natural Resources Center
CET	common external tariff
COMESA	Common Market for Eastern and Southern Africa
DTI	Department for Trade and Industry (South Africa)
EAC	East African Community
FCh	Fundación Chile
FDI	foreign direct investment
GDP	gross domestic product
GVC	global value chain
HDI	human development index
HIP	Hawassa Industrial Park (Ethiopia)
IBTDP	Industrial Base Technology Development Project
ICT	information and communications technology
IMF	International Monetary Fund
LDC	least developed country
LPC	local content policy
LPS	local production system
M&E	monitoring and evaluation
MCEP	Manufacturing Competitiveness Enhancement Programme (South Africa)
MDAs	ministries, departments and agencies
MVA	manufacturing value added
OECD	Organisation for Economic Co-operation and Development
R&D	research and development
REER	real effective exchange rate
RVC	regional value chain
SAP	Structural Adjustment Programme (IMF)
SEZ	special economic zone
SIC	Standard Industrial Classification of all Economic Activities

SMEELP	SME Empowerment and Linkages Programme (Mozambique)
STEM	science, technology, engineering and mathematics
TNC	transnational corporation
TVET	technical and vocational education and training
UNDP	United Nations Development Programme
UNIDO	United Nations Industrial Development Organization
VETA	Vocational Educational and Training Authority (United Republic of Tanzania)
WBES	World Bank Enterprise Survey
WTO	World Trade Organization

UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT

UNCTAD

Introduction



Introduction

The lack of productive capacities is a key factor limiting African countries' and LDCs' abilities to effectively participate in the multilateral trading system and to improve their social and economic conditions. The UNCTAD *Least Developed Countries Report 2006: Developing Productive Capacities* suggests that the limited development of a country's productive resources, entrepreneurial and institutional capabilities, and production linkages are the root causes of structural challenges and weak economic and social performance in LDCs. In principle, the development of productive capacities, particularly in manufacturing, can be approached from two broad and interlinked angles: first, developing and building capacities where none exist; and second, utilizing and maintaining existing capacities where newly built or already existing. Yet in most countries in Africa and the LDCs, there tends to be more focus on how to build new capacities and less on how to make better use of existing productive capacities. In this regard, there is the need for Governments of African countries and LDCs to adopt a more coherent approach to developing productive capacities than in the past to enhance prospects for achieving their transformation agenda and other national development goals.

Building on the UNCTAD *Least Developed Countries Report 2006* and recent advancements in development research[1], as well as drawing on cross-country evidence, this report provides a comprehensive and operational framework for developing productive capacities in Africa and LDCs. It adopts a holistic approach to productive capacity development which underscores the need to build new productive capacities as well as enhance utilization rates of existing capacities. It also provides actionable policy recommendations and instruments that African countries and LDCs could adopt to develop productive capacities. In this context, the report is a useful and practical guide to Governments engaged in the design, implementation and enforcement of productive transformation policies.

The report starts from offering a "productionist" development framework as well as an operational definition and taxonomy of different types of productive capacities, including different types of production, technological, organizational, innovation and social capabilities (chapter I). Understanding the differences as well as complementarity linking all these different types of capacities and capabilities at the firm (micro) and country (macro) levels is a key step in the identification of African countries and LDCs needs

[1] Some examples of other relevant UNCTAD contributions to the literature in this area include UNCTAD (2018), UNCTAD (2014) and UNIDO and UNCTAD (2011).

and effective targeting of industrial policies. Similarly, the acknowledgement of structural heterogeneity across the economy points to the recognition of special properties of manufacturing industries for development.

Chapter II takes up the question of how well existing productive capacities in Africa are utilized. The focus is on productive capacity utilization in manufacturing because of the strategic importance of this sector and because that is where there are serious problems of capacity utilization. The chapter starts with an overview of the contribution of manufacturing to African economies and provides some facts on manufacturing capacity utilization rates in the continent based on a review of data and selected case studies. It also provides an analysis of why there are low manufacturing capacity utilization rates in the case study countries, and African countries more broadly. Finally, it discusses how to make better use of newly built or existing manufacturing productive capacities in Africa, based on an analysis of the technical and policy constraints inhibiting capacity utilization in African economies.

Chapter III expands the framework developed in chapter I by introducing a meso-level production system perspective which emphasizes the ways in which different types of firms contribute to production transformation. In particular, we emphasize the importance of building local production systems in the era of global value chains by exploiting both vertical linkages as well as horizontal linkages. In the development of linkages, a key role is assigned to domestic medium-sized firms and, thus, the need to address the so-called missing middle in Africa and LDCs.

The following three chapters addressed the “why”, “what” and “how” of industrial policy for building productive capacities in LDCs.

Chapter IV starts from a review of the rationales and historical evidence in support of industrial policy. It updates the classical debate, focusing on new ways to manage policy targeting and the ways in which countries can identify areas for intervention which are both “permissible” and “practicable”, the latter being determined by the mutated global industrial and policy landscape. Chapter V addresses the “what” of the matter, by focusing on policy instruments and their implementation in different contexts. We identify and provide both current and historical country case evidence on seven different areas of policy. These are: development finance and macroeconomics; investment promotion and foreign direct investments; industrial parks and special economic zones (SEZs); trade policy and strategic market development; local content policy; technical and vocational skills development; and agricultural and industrial research.

Chapter VI complements the analysis of specific policy instruments by focusing on the challenges associated with setting up an effective policy process and the development of a governance and coordination framework in Africa and the LDCs. We highlight the importance of embracing a learning model for effective industrial policy design as well as implementation and enforcement. Particular emphasis is given to the role of coordination of different industrial policy instruments within a policy package. We finally stress the importance of monitoring and evaluating policies towards a more adaptive and responsive policy action. The chapter provides a step-by-step model for structuring the industrial policy process as well as mapping tools – policy package matrix – to improve industrial policy governance.

References

UNCTAD (2006). *The Least Developed Countries Report 2006: Developing Productive Capacities* (United Nations publication, Sales No. E.06.II.D.9. New York and Geneva).

United Nations Industrial Development Organization (UNIDO) and UNCTAD (2011). *Economic Development in Africa 2011: Fostering Industrial Development in Africa in the New Global Environment* (United Nations Publication, Sales No. E.11.II.D.14. New York and Geneva).

UNCTAD (2014). *The Least Developed Countries Report 2014. Growth with Structural Transformation: A Post-2015 Development Agenda*. (United Nations Publication, Sales No. E.14.II.D.7. New York and Geneva).

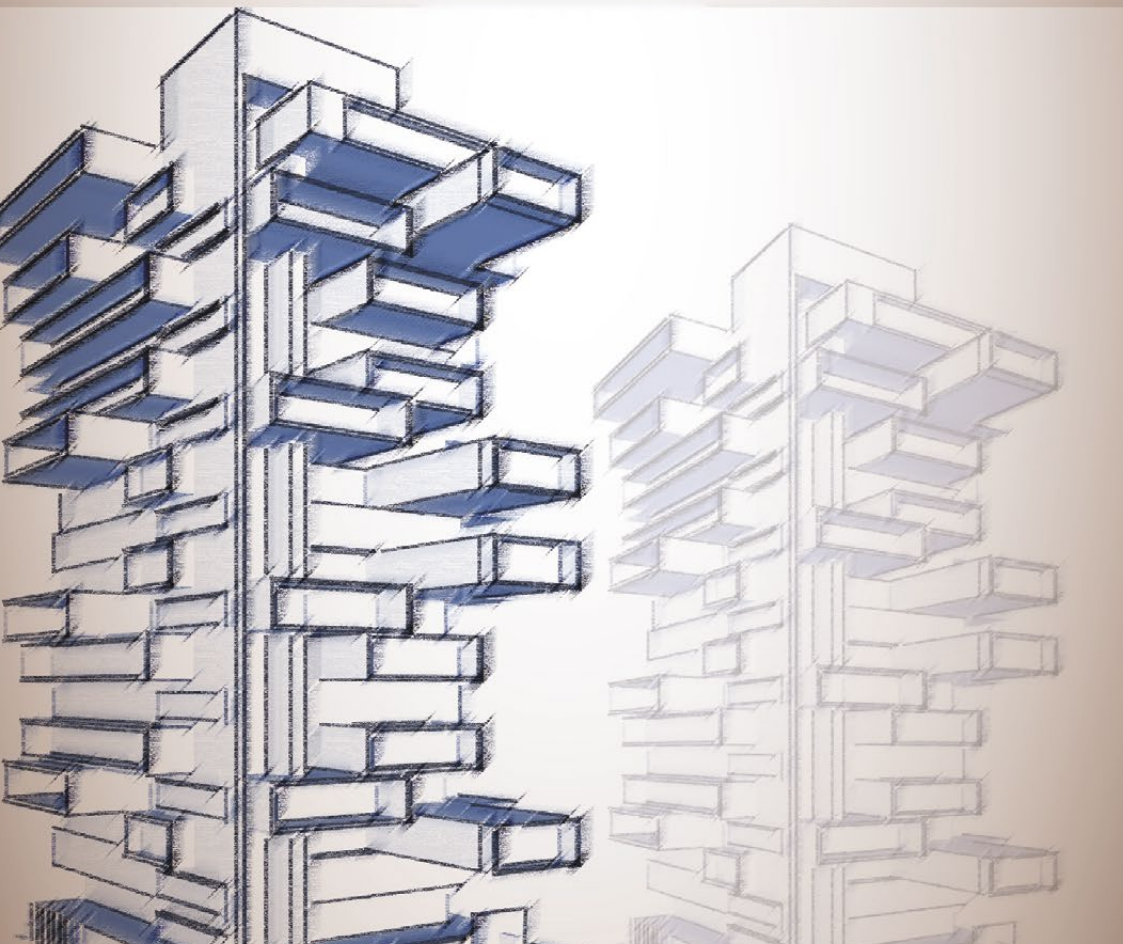
UNCTAD (2018). *Achieving the Sustainable Development Goals in the Least Developed Countries: A Compendium of Policy Options*. UNCTAD/ALDC/2018/4. New York and Geneva.

UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT

UNCTAD

I. Productive capacities:

A framework for development policy



I. Productive capacities: A framework for development policy

This chapter focuses on how economic development is not the same as economic growth or poverty reduction and how the development of productive capacities is central to the process of economic development. An operational definition of productive capacities, building on the *Least Developed Countries Report 2006* (UNCTAD, 2006) and more recent academic literature, is developed to define the perimeter and scope of this report. The proposition of a comprehensive and operational definition of productive capacities is critical in informing policy interventions.

One of the key aspects we highlight here is the fact that the concept of productive capacities refers to a set of different types of capacities complementing each other in production processes. A taxonomy distinguishing different *types of productive capacities* at different levels of aggregation – from the firm to the country level – is therefore introduced here. The identification of these different types of productive capacities is critical to define effective industrial policies because these different types of productive capacities are not substitutable. Instead, each of them complements each other and in doing so they allow productive organizations and institutions to perform different production, technological, organizational and even social coordination functions. We explain why development requires a combination of productive capacities and how these different capacities affect production competitiveness, including price, transaction costs, product quality and productivity.

Building on this definition of productive capacities, we then highlight how different *types* of firm-level productive capacities are the main trigger of circular and cumulative causation dynamics at the meso (sectoral and intersectoral) level of the economy. In framing development as a circular and cumulative process of production transformation triggered by productive capacities and resulting in the sectoral recomposition of the economy, we also emphasize the importance of looking at the economy as a system of linkages and recognizing the critical nodes of this system.

We will highlight the special role of manufacturing and the mechanisms whereby manufacturing growth triggers transformations of production activities in other sectors of the economy (intersectoral transformation). Particular emphasis will be given to the analysis of the way in which manufacturing growth allows the industrialization of agriculture and value extraction in natural resources-abundant

countries (as well as how, in certain stages of development, agriculture output and resource extraction have to be oriented towards the development of manufacturing activities).

Finally, this section will stress how learning processes through which productive capacities are transformed (from the manufacturing shop floor up to production activities in other sectors) trigger and require the development of collective (as opposed to individual) capabilities embedded in various institutions (social capabilities) and, thus, institutional change.

A. Refocusing development and reframing productive capacities

1. Refocusing the development discourse

There has been a long-running debate on the definition of economic development. While most people have considered income level to be the ultimate measure of development, there have always been critics who emphasize that development is something more than providing higher material standards of living. Such critique of the income-based definition of development (and human well-being that it is supposed to enhance) started in the 1970s, with attempts to build a physical quality of life index, but has gained real traction in the last couple of decades. Particularly notable has been the success of the United Nations Development Programme (UNDP) human development index (HDI) and its variations, which try to incorporate things like education, health, and gender equality into the definition and the measurement of development.

According to Andreoni and Chang (2017), this *necessary* emphasis on the "humanistic" dimension of development (and well-being) has been happening at a time when our broader thinking on development has been dominated by neoclassical economics, especially its neoliberal variant. Among other things, the dominant economic theory downplays the role of production in the economy and, insofar as production is discussed, theorizes it in a very simplistic and problematic way. In the dominant neoclassical economics, the economy is conceptualized as a collection of exchange relationships in markets.[2] What goes on in the firm, the farm or the shop, as sites of production activities, are considered to be beyond – or even beneath – economics.

[2] In some extreme versions, even the firm (including the farm and the shop) is conceptualized as an extension of the market – as a "nexus of contracts" – rather than an organization with its internal rules, organizational routines and organizational memories.

In the relative rare occasions when it is discussed, the production process is seen as a mechanical process in which some abstract quanta of factors of production (capital, labour and sometimes land) are combined in predetermined proportions. Technologies that define those proportions are seen as being produced in a totally predictable, equally mechanical process – either as a result of some exogenous "technological progress" in the domain of science (as in the "old" growth model) or as a result of investment in research and development R&D, which has its own well-defined production function (as in some "new" growth models).

The unfortunate (but not deliberate) combination of the "humanistic" redefinition of development and the dominance of exchange-focused neoliberal theories has been the neglect of the dimension of development that used to be at the center of any definition of development until the 1970s, from Walt Rostow on the right and the Dependency Theorists on the left – that is, the transformation of a society's productive capacities. Development has come to be defined essentially as a process of poverty reduction, with very little regard to the need to transform the economy's productive structure – and the productive capacities that underlie that structure (Andreoni and Chang, 2017). The result has been a focus on the "wrong" things – or at least things that are not so relevant for productive capability transformation and thus economic development.

First, insofar as there is a recognition of the need to improve an economy's productive capacities, the focus has been on investing in individuals, rather than on "collective" things, such as organizations, networks and institutions.

Second, insofar as "collective" things are discussed, they are general institutions that are not particularly linked to production activities – such as property rights or political institutions. The firm (including nonconventional types such as the cooperative), network of firms, industrial districts, industry association, trade unions, training institutes, and many other "collective" organizations and institutions that are directly related to the domain of production are hardly ever discussed.

Third, even at the individual level, the emphasis is especially, or even almost exclusively, on formal education. Other dimensions of productive capability accumulation at the individual level – vocational training, apprenticeship, on-the-job training, adult education, retraining – are often neglected.

Refocusing the development discourse is a critical step in moving the productive capacities development agenda in Africa and the LDCs. Since the turn of the century, a number of reports and academic contributions have made important contributions in this direction.

During the 2000s, the *Least Developed Countries Report 2006: Developing Productive Capacities* (UNCTAD, 2006) was one of the key international reports promoting a "production capacities centred" view of development and stressing the challenges that LDCs would have faced in the medium-to-long term. The report argued that developing productive capacities is the key to achieving sustained economic growth in the LDCs in at least two main ways.

First, it is through developing their productive capacities that the LDCs will be able to rely increasingly on domestic resource mobilization to finance their economic growth, to reduce aid dependence and to attract private capital inflows of a type that can support their development process. It is also through developing their productive capacities that the LDCs will be able to compete in international markets in goods and services which go beyond primary commodities, and which are not dependent on special market access preferences.

Second, developing productive capacities was also recognized as the key to reducing pervasive poverty in the LDCs. Although aid transfers to the LDCs are increasingly being used to alleviate human suffering, substantial and sustained poverty reduction cannot be achieved with such expressions of international solidarity alone. It requires wealth creation in the LDCs and the development of domestic productive capacities in a way in which productive employment opportunities expand.

Since the UNCTAD *Least Developed Countries Report 2006*, a number of influential scholars drawing from classical development economic thinking have corroborated this "production capacities centred" view of development.

According to Cimoli, Dosi and Stiglitz (2009: 543), we need to define development as "a process that links micro learning dynamics, economy-wide accumulation of technological capabilities and industrial development", and try to understand the processes of learning and productive capacities accumulation that is at the center of it. More recently, Andreoni and Chang (2017) introduce a new theoretical synthesis that sees development as "a process of production transformation, led by the expansion of collective capabilities and resulting in the creation of good quality jobs and sustainable structural change".

Unless we embrace these new "production capacities-centred" views of development, we are likely to pursue "wrong" goals (such as higher income or higher HDI rather than higher productive capacities), focus on "wrong" institutions (such as general property rights rather than organizational characteristics of productive enterprises), and aim at "wrong" targets (such as Programme for

International Student Assessment test results rather than the quality of vocational training or worker retraining schemes).

2. Framing productive capacities

The economic development of a country is the result of two main interconnected processes of productive capacity-building and structural transformation of the economy. As the classical dualistic model of development proposed by Arthur Lewis shows, **structural change** involves producing new goods with new technologies and transferring resources from traditional activities to these new ones. Thus, the transformation of the economic system is achieved in a gradual shift from activities characterized by low productivity, such as traditional agriculture, towards higher ones such as manufacture and industry.

Productive capacities are the main driver of this transformation of the economic system. They develop as a result of a complex process of **structural learning** at the firm, interfirm and intersectoral levels (Andreoni, 2014). Throughout their development and accumulation, productive capacities co-develop in a circular and cumulative process of mutual reinforcement, in which the introduction of new productive techniques leads to new productive capacities and activities, as well as new opportunities of consumption. In turn, this learning process spurs on new technological innovations and eventually triggers processes of sectoral deepening and sectoral transition. These latter processes of sectoral deepening and sectoral transition open new venues for productive capacity-building within firms and across sectors.

The main actors through which the structural change occurs are **medium and large productive organizations,** operating and diversifying along and across different sectors of the economy, while exploiting productive opportunities in domestic, regional and global markets. These "engines of growth" are not only responsible for technological improvements but are also able to provide the economy with new products and services more and more efficiently through market oligopolistic competition – i.e. with diminishing costs – generating huge "social benefits" (Amsden, 2001; Cimoli et al., 2009; Andreoni and Chang, 2017). Medium and large productive organizations are also important in the development of the local production systems and linking up small enterprises to markets, while enhancing their productive capacities (Andreoni, 2018). For this reason, today's developing countries' chances of catching up are strictly related to the fortunes of their firms and their technological catching up.

Firms operating in different sectors (or in the same sector but in different country contexts) develop different productive capacities. Even when these capacities are similar, they are combined and deployed in different ways to run different production processes and to obtain products with different characteristics and quality standards. Moreover, changes in processes and product upgrading always require a process of learning and, thus, productive capacity-building.

Productive capacity-building is thus the result of purposeful processes of trial and error, reverse engineering and technological absorption, re-engineering and adaptation, scaling up and diversification. These processes are costly and risky, especially when firms attempt to capture value opportunities in complex product systems: that is, by producing products composed by multiple subcomponents whose integration requires accumulated and diverse competences. Therefore, new production opportunities are not simply "self-discovered" – they are continuously searched and constructed within (and between) production organizations in specific historical contexts.

A strategic but also pragmatic approach to production transformation starts from the recognition of the centrality of these learning dynamics, their sectorial and contextual specificity, as well as an awareness of the related challenges and risks of failure. However, firm-level processes of learning and productive capabilities-building are embedded in specific country-level institutional and political economy contexts. Therefore, by defining and enforcing a certain incentives regime and systems of rules, institutions and powerful organizations will shape the firm-level processes of productive capacities development.

(a) Firm-level theories

At the firm level, different definitions of "productive capacities" and "capabilities" have been introduced and adopted to analyse firms' different levels of technological and organizational development. We review some of the key definitions below as each of them shed lights on the complex multifaceted nature of productive capabilities. Drawing on them, we will then provide an operational definition of productive capabilities.

The first contribution in which the concept of **capabilities** has been used to identify the set of knowledge, skills and experiences necessary for carrying out a large number of productive activities is the paper entitled "The Organization of Industry", by G.B. Richardson in 1972:

«It is convenient to think of industry as carrying out an indefinitely large number of activities, activities related to the discovery and estimation of future wants, to research, development, and design, to the execution and co-ordination of processes of physical transformation, the marketing of goods, and so on. And we have to recognize that these activities have to be carried out by organizations with appropriate capabilities, or, in other words, with appropriate knowledge, experience, and skills.»

Here the concept of capabilities is developed starting from Edith Penrose's conception of a firm as a collection of physical and human resources which may be combined in different ways to provide a variety of productive services (Penrose, 1959).

Drawing from the same Penrosian resource-based approach and on empirical analysis in LDCs, 10 years later, Martin Bell distinguished two kinds of firm's fundamental resources:

a. Those needed to "operate" existing production systems – i.e. productive capacities; and

b. Those needed to "change" production systems – i.e. technological capabilities.

This distinction points to the fact that capabilities used to produce industrial goods at a given level of efficiency and given input combinations (the static perspective) are different from those needed to discover, absorb, adapt and change productive and organizational techniques (the dynamic perspective) (see Bell and Pavitt, 1993).

These seminal contributions, together with the first empirical works developed by Sanjaya Lall (1987 and 1992) and many scholars affiliated with the "Katz Programme" in Latin America introduced the concept of technological capabilities and applied it to design industrial policy intervention in LDCs. According to these development economists, technological capabilities are those skills embodied in agents (i.e. human beings and machines) that firms require in order to make investments, to implement the productive processes and to transmit/receive skills, knowledge and information. Technological capabilities thus refer to the firms' abilities to undertake in-house improvements across different functions, such as process and production organization, products, equipment and investments. Building on this idea, Lall (1992:167) identifies three main sets of technological capabilities:

a. Investment capabilities: Those needed to identify, prepare, obtain technology for, design, construct, equip, staff, and commission a new facility (or expansion);

b. Productive capabilities: The skills involved in both process and product engineering as well as the monitoring and control functions included under industrial engineering;

c. Linkage capabilities: The skills needed to transmit information, skills and technology to, and receive them from, component or raw material suppliers, subcontractors, consultants, service firms, and technology institutions.

More recently, extending Lall's framework, the definition of **productive capabilities** proposed by Andreoni (2011a) emphasizes the existence of different sets of tasks and functions that firms have to perform, and thus the need to think about different types of "appropriate" productive capabilities:

« Productive capabilities are personal and collective skills, productive knowledge and experiences embedded in physical agents and organizations needed for firms to perform different productive tasks as well as to adapt and undertake in-house improvements across different technological and organizational functions (Andreoni, 2011a).»

Different technological and organizational functions can be clustered around **different functional areas** and for each of them a number of different productive and technical change activities can been identified (table I.1).

Table I.1

Different types of productive capacities for different types of functions and activities

	Functional areas				
	1.Investment	**2.Product design**	**3.Process organization**	**4.Production process**	**5.Linkage and cooperation**
Productive Activities:	Feasibility studies	Replication of fixed specifications and designs	Production planning and control	Workflow scheduling and monitoring	Exchange with suppliers
	Negotiations and bargaining of suitable terms	Standard design for manufacturing	International certification (ISO 9000)	Manufacture of components	Horizontal cooperation across firms
	Equipment and machinery procurement	Development of prototypes	Automation of processes	Sub-assembly and assembly of components and final goods	Distribution and marketing
	Recruitment of skilled personnel		Adoption of modern organizational techniques (e.g. just in time and total quality control)	Stretching, control and maintenance of machinery and equipment	After sale services
			Flexible and multi-skilled production	Inventory control	
			Architectural services	Productivity and quality control	
Technical change activities:	Search for technology sources	Adaptations to product technology driven by market needs and requests	Selection of technology and organizational formats	Efficiency improvement in tasks execution	Technological transfer and science and technology linkages development
	Equipment design and adaptation	Improvements of product standards and quality	Minor changes to process technology to adapt it to the local conditions	Improvement and cost savings in machinery and equipment	Coordinated R&D and joint ventures
	Engineering training	Development of complementary products (e.g. embedded software) or components	Improvement and development of new organizational techniques	Inverse engineering and development of machinery	Licensing own technologies to others
	Joint ventures	R&D into new product generation	Improvement to layout		
		R&D (basic) into new materials and new specifications	Process-oriented R&D (basic) for radical innovation		

Source: Andreoni, 2011a.

These functions and activities tend to be **sector-specific**: firms in different sectors will rely on different sets of productive capacities to perform the specific combination of functions and activities required in the sector. Moreover, within the same sectors, a number of functions and activities are also **product-specific:** firms will need to equip themselves with specialized productive capacities to be able to produce specific types of products with specific qualities desired by the different markets in which they operate. Finally, even firms producing the same products and specializing in the same product segments of the market can produce the same goods of similar quality in different ways by organizing production processes

differently. This means that, even within the same sector, and for the same product, firms of different sizes tend to operate very different processes by relying on different combinations of productive capacities (Andreoni and Chang, 2017).

The development of these technological and productive capabilities is both the outcome of an endogenous process of building within the firm and the response to exogenous stimuli, such as those arising from foreign direct investment (FDI) made by transnational corporations into the global value chain, as well as State selective industrial policies. In other words, the development of capabilities at the micro and meso level is strongly affected by the presence of collective capabilities at the systemic level.

(b) Country-level theories

As Lall (1992) clearly pointed out, national technological capabilities which arise from an interplay between capabilities, incentives and institutions are crucial factors in the process of catching up, and constitute strong arguments in favour of State intervention through industrial and technology policies. Over the medium-to-long term, economic growth arises from the interplay of incentives and capabilities. The capabilities define the best that can be achieved, while the incentives guide the use of the capabilities and, indeed, stimulate their expansion, renewal or disappearance. Incentives are determined by a given country's institutional, policy and regulatory framework: institutions set rules of the game, as well as directly intervening in the play; they act to alter capabilities and change incentives; and they can modify behaviour by changing attitudes and expectations.

Moses Abramovitz (1986) developed the concept of social capability at the country level to capture those "tenacious societal characteristics" that influence the responses of given societies to economic opportunities. Interestingly, Abramovitz includes in social capabilities not just managerial competencies (especially in the organization and management of large-scale enterprises) and technical competences but, more crucially, the set of political, commercial, industrial and financial institutions with which a country is endowed.

The concept of social capability was introduced with the specific aim of factoring in a series of elements that remained outside mainstream explanations of development and traditional growth models. Abramovitz's most complete systematization of the concept was presented in 1991. His analysis starts from an historical account of different countries' catch-up experiences and technology convergence trajectories (the latter measured in terms of productivity gap reductions).

Looking at a large number of countries, the historical evidence reported by Abramovitz (see Kutznets, 1966; Cornwall, 1977; Maddison, 1989) suggested certain general tendencies. Specifically, he argues that "in the post-World War II years from 1950 to 1980, only among the small set of highly industrialized countries is there a clear tendency for levels of productivity to converge. There was no such clear tendency among the group of partially industrialized, middle income countries. And among the poorest countries, there was even a suggestion of divergent experience" (Abramovitz, 1995: 22).

The historical and comparative national record clearly contradicts the convergence/catch-up hypothesis. To better capture the realities of international differences in economic growth paths and manufacturing development trajectories, Abramovitz focuses on four factors/constraints:

a. Natural resource scarcity;

b. Technology congruence;

c. Factors supporting the rate of realisation of potential; and

d. Social capability.

The relevance of the first factor is considered "hard to appraise a priori", but increasingly "of much diminished importance". Abramovitz also stress that "apparent scarcity may itself be a result of failure to develop the resources available but badly exploited" (Abramovitz, 1995: 26). The second factor corresponds to what Kuznets (1968) called "relevant technology". If we remove the mainstream economic assumption that "technology that represents best practice in the productivity leaders [countries] can [always] be efficiently exploited by the backward economies", we can explain why economies may fail to catch up and converge in productivity levels (Abramovitz, 1995: 14–15). Technological incongruity or irrelevance may result from disparate factor proportions (typically when technologies are capital-intensive and, thus, expensive to apply in a capital scarce/labour abundant context) or from scale problems, both with respect to market size and institutional factors. The third factor is defined by both internal and international policies affecting trade, capital flows, currency exchange rates and employment.

Fourth and finally, the social capability factor is best understood as subdivided into two classes of elements: "people's basic social attitudes and political institutions" and collective "ability to exploit modern technology". The former encapsulates the so-called Kuznets triad (secularism, egalitarianism and nationalism), while the latter comprises the capacity of collectivities to deal with the "three technological feature of modern production – scale and specialisation, capital-intensity, and expanded auxiliary activity" (Abramovitz, 1995: 35).

Although these features might be changed over time, the concept of social capability encapsulates a powerful idea. This is the view that economic

development is not simply a firm-level or State endeavour, but rather is made possible by the convergence of efforts of different actors and institutions operating within the polity. Social capabilities develop in historical time ("normally, but not always" becoming stronger as development proceeds) and are highly context dependent.

The fact that political institutions affect firm-level processes of productive capacities and capabilities development is key in framing an operational definition and understanding of productive capacities. This means that productive capacity-building cannot be understood either without a firm-level granular analysis of learning processes, or without understanding the political economy context – in particular the incentives – in which firms operate. The political economy context is in turn determined by the distribution of organizational power among different players, as suggested in Khan's theory of political settlements (Khan, 2010).

B. Productive capacities: An operational definition and taxonomy

In the *Least Developed Countries Report 2006* (UNCTAD, 2006), productive capacities are defined as the productive resources, entrepreneurial capabilities and production linkages which together determine the capacity of a country to produce goods and services and enable it to grow and develop. This definition captures some of the aspects highlighted in our review of the theories at the firm and country levels. In particular, it emphasizes how productive capacities develop within a country through three closely interrelated processes: capital accumulation, technological progress and structural change.

Capital accumulation is the process of maintaining and increasing stocks of natural, human and physical capital through investment. Achieving technological progress is the process of introducing new goods and services, new or improved methods, equipment or skills to produce goods and services, and new and improved forms of organizing production through innovation. Structural change is the change in the inter- and intrasectoral composition of production, the pattern of inter- and intrasectoral linkages and the pattern of linkages among enterprises. Such change often occurs through investment and innovation, and the emerging production structure in turn influences the potential for further investment and innovation.

The review of the theories framing productive capacities at the firm and country levels have pointed to three main challenges development theorists and practitioners face in conceptualizing the idea of productive capacities and capabilities. First is the fact that different definitions – productive capacities, and technological and productive capabilities – can be used according to the types and functions of activities we focus on. Second, given that these functions and

activities are highly heterogeneous, we expect that productive capacities will tend to be sector-, product- and process-specific. Third, productive capacities are not simply embedded in productive organizations, but also in various types of country-specific institutions and a certain political economy context affecting the social coordination of the economic system, in particular the distribution of incentives and rents. Against this backdrop, in proposing the following operational definition of productive capacities, we take into account these three issues.

Productive capacities are defined as a set of different types of productive, organizational, technological and innovation capabilities embedded in organizations, institutions and infrastructures whose integration determines the capacity of a country to produce goods and services in a competitive global market.

As already highlighted, the concept of productive capacities can be defined at both the productive organizations – firms and farms – and country level, the latter mainly including institutions and infrastructures operating in a given political economy context. Of course, other ways of looking at productive capacities can be considered as well. For example, it is possible to focus on the distinctive set of productive, organizational, technological and innovation capabilities of firms in a specific sector of a country's economy. Similarly, given that productive organizations tend to cluster in specific subregions of a country in both developed and developing countries, it would be possible to focus on the specific productive capacities characterizing a regional ecosystem in the country.

The following corollary definitions of productive capacities are useful in operationalizing the general one provided above.

1. A firm-level operational definition of productive capacities

Firm-level operational definition of productive capacity:
Firms' productive capacities are personal and collective capabilities, skills, productive knowledge and managerial experiences needed to perform different productive tasks at efficient scale (productive capabilities) as well as to adapt and undertake in-house improvements across different organizational (organizational capabilities), technological (technological capabilities) and innovation (innovation capabilities) functions.

From a "static efficiency" point of view, production and organizational capabilities are capabilities, skills, productive knowledge and managerial experiences whereby

productive agents and organizations select, finance, install and maintain capital goods; operate technical and organizational functions; and perform and monitor the execution of a set of interdependent productive tasks given certain time and scale constraints. In fact, performing a set of interdependent productive tasks not only requires capable agents and functioning organizations – that is, individual and collective agents endowed with productive knowledge and relevant skills; it also requires the establishment of a certain scale-appropriate assortment of equipment, machinery and other capital goods.

Throughout history, production activities have been organized by relying on different organizational forms (Andreoni, 2014). The following are the main ones:

a. The job-shop system;

b. The putting-out system;

c. The factory production system;

d. The lean production system; and

e. The global production network system.

Each of them represents a different way of organizing production tasks, complexity and variety of transformation processes and factors proportion. In other words, they present different ways of arranging the production process and addressing its main coordination problems. There are three main coordination problems that all production organizations will have to face independently from the industry under consideration. They are particularly important as they affect firm-level productivity and the efficient use of its productive capacities. Indeed, while expanding productive capacities is critical among firms in Africa and LDCs, it is also paramount to make effective use of them via addressing the following coordination problems in production.

The first coordination problem is related to the synchronisation in time of the production tasks. Given that the execution of each production task involves one or more human beings and that production tasks are interdependent, synchronization in time also means organization and coordination of human beings' capabilities. Of course, production technologies and machineries as well as properties of the materials and flow inputs used in production will impose a number of constraints on the synchronization and organization problems (Landesmann and Scazzieri, 1996). The difficulty of matching the "time sequencing requirements" of all these factors (i.e. tasks, production capabilities and production technologies and machineries) makes perfect synchronization almost impossible. Time gaps and idle time in production processes are often present, especially in Africa and LDCs (Andreoni, 2014).

The temporal arrangements of production may follow different sequential or simultaneous models. For example, production tasks may be arranged in sequence (tasks are activated one after the other with no overlap in time), in line (tasks are activated with some predetermined lag time so that they overlap in part), or in parallel (a number n of tasks are activated at the same time and repeated once completed).

The second coordination problem is related to the definition of the production scale and the existence of indivisibilities. Processes are indivisible when they are not "indifferent to size". The fact that processes are "scale-specific" (in other words, that they are characterized by upper and lower bounds) implies that conducting a process on a smaller or a larger scale can only be done if a law of proportionality is satisfied (Andreoni and Scazzieri, 2014). This means that firms cannot decide to increase and reach efficient operational scale without "making jumps". However, these jumps involve significant investments, financial commitments and risks, especially in countries where both the supply of raw materials and the final demand is very unstable.

The last coordination problem is associated with the definition of the factors combination (and their remuneration), typically the proportion between labour and capital (and the "distribution" of the production output value). Although the price of different factors and their availability are important variables, certain production processes might not be feasible without certain capital investments in machineries and equipment (advanced materials or flow inputs) or the deployment of specific production capabilities of high-skilled workers. In other words, the price of labour and capital becomes a relevant variable only when certain "feasibility conditions" are satisfied.

More generally, the same production process can be performed with different proportions of labour and capital. However, changes in these factors proportions (more capital or more labour-intensive processes) may have contradictory effects on human capabilities and, more broadly, workers' conditions. For example, capital investments in automation technologies may have a positive impact on workers' conditions in terms of reduced physical stress and efforts. At the same time, they may also reduce overall employment in the sector or have a negative impact on the employees as a result of the need for retraining and intellectual efforts to adapt to new technologies, increasing speed of the process, etc.

The variety of production systems we observe today is strictly related to these fundamental coordination problems. In other words, new organizational forms have

historically developed as different responses to (and improvements upon) these fundamental coordination challenges. For example, the most modern lean and network production models have developed as new responses to increasingly complex coordination problems posed by vertically disintegrated production processes, and new outsourcing strategies and technologies (Landesmann and Scazzieri, 1996; Milberg and Winkler, 2013; Andreoni, 2014).

From a "dynamic efficiency" perspective, the absorption, adaptation and improvement of given productive techniques – as well as innovations across different organizational, technological and innovation functions – mainly depend on the availability of two specific subsets of productive capacities owned by firms and other technology/research focused actors. They are *technological capabilities* and *innovation capabilities*. Capabilities needed to generate, absorb and manage technological and organizational change may differ substantially from those needed to operate existing production systems.

A set of "determining factors", such as technical education and R&D spending, works as knowledge ingredients in firms' productive capacity-building. These knowledge ingredients are mainly human capital and investments in the acquisition of codified knowledge (e.g. design and engineering specifications for machineries). These knowledge ingredients must be processed, transformed and adapted by the actors that undertake production in firms. This is the process whereby production, organizational, technological and innovation capabilities develop in firms.

According to the amount and quality of capabilities determinants available in a certain country, and given the ability of its entrepreneurs to identify and capture productive opportunities, productive firms will undertake production processes in a certain combination of sectors and industries. They will also experience cumulative processes of learning and productive capacity-building triggered by "internal compulsions" in production (Andreoni, 2014). As a result, a certain amount of capabilities develops and accumulate, while others are simply transformed or even lost. In turn, the new developed and accumulated capabilities are continuously reinserted into production and affect the same learning processes from which they have been originated – i.e. there are feedback mechanisms.

2. A country-level operational definition of productive capacities

Country-level operational definition of productive capacity:
The productive capacities of a country's institutions and infrastructure are the system of rules and policies determining incentives, rents allocation and investment regimes (subsidies, licencing, taxation, standards, work regulation) as well as the physical infrastructures influencing transaction costs.

The development and deployment of firms' production, organizational, technological and innovation capabilities depend on the existence of a number of institutional and infrastructure capabilities which enable firms' production processes by promoting investments in learning and by reducing transactions costs in the economy.

The firm-level process of capabilities development and accumulation, its speed, effectiveness and multidirectionality, are affected by the presence (or absence) of a series of "mediating/enabling factors" which are country-specific. These mediating/enabling factors – mainly infrastructures such as roads, railways, port, network systems, public research infrastructures and information and communications technologies (ICTs) – rather than directly entering in the firm-level process of capabilities development and accumulation, work as mediating/facilitating factors. In other words, by reducing transaction costs (e.g. transportation costs of machinery or technicians exchange as well as output export) and learning costs (e.g. increasing absorption capacities with ICTs, faster diffusion of productive best practices) these factors enable firm-level processes of capabilities building and accumulation.

The institutional framework is also a key "constraining/enabling" factor in the process of productive capacities development in at least two major ways. First, the institutional framework determines the system of rules and incentives shaping the behaviour of productive organizations. Second, depending on the capacities of the public, private and intermediate institutions in designing, implementing and enforcing these rules and incentives, productive organizations will be more or less able to benefit from a developmental rents allocation process vis-à-vis one affected by unproductive capture of resources.

The institutional framework and the capacities of the institutions operating in a certain country are both determined by the political economy context in which firms operate. For example, the investment regimes in Africa and other LDCs are often in favour of traders more than manufacturers, and the capacities of customs agencies and authorities are limited and vulnerable to corruption.

Despite historical and context specificities, across all countries in the African continent, these political economy forces and dynamics are intrinsically intertwined with the more technological and organizational dynamics discussed at the firm level above (Andreoni, 2018). Firms and farms in countries across Africa tend to be adversely affected by the existing distribution of organizational power in both the public and private sectors – thus, the countries' "political settlement" (Khan 2010, 2018; Whitfield et al., 2015; Khan et al., 2016; Behuria et al., 2017) – typical of a non-industrialized and non-diversified economy where power remains highly concentrated in a few antagonistic factions. In particular, the concentration of power in upstream value chains as well as among traders vis-à-vis domestic manufacturers is a major political economy constraining factor in Africa industrialization today (see, for example, studies on the United Republic of Tanzania: Andreoni, 2017; Nigeria: Roy, 2017; South Africa: Makhaya and Roberts, 2013; and Andreoni and Tregenna, 2018; Ghana, United Republic of Tanzania, Uganda and Mozambique: Whitfield et al., 2015).

3. A productive capacities taxonomy

The operationalization of the general definition of productive capacities provided above – according to which: "Productive capacities are defined as a set of different types of productive, organizational, technological and innovation capabilities embedded in organizations, institutions and infrastructures whose integration determine the capacity of a country to produce goods and services in a competitive global market" – can be further operationalized by organizing the different productive capacities subsets discussed above in the following taxonomy (table I.2). This taxonomy can work as an effective tool for analysing productive capacities and guide policymaking.

Table I.2

Productive capacities taxonomy

Productive capacity taxonomy	
Firm-level productive capacities	
Production capabilities	
Individual capabilities	Skills, experiences and productive knowledge that workers/individuals require to choose, install and maintain capital goods, and to operate various technical functions
Organizational capabilities	Skills, experiences and productive knowledge that organizations require to operate technical and organizational functions, and perform and monitor the execution of a set of interdependent productive tasks given certain time and scale constraints
Scale efficient operations	Scale-appropriate assortment of equipment, machinery and other capital goods
Technological capabilities	Capabilities needed to generate, absorb and manage technological and organizational change
Innovation capabilities	Capabilities needed to innovate across different organizational and technological functions
Country-level productive capacities	
Infrastructure capabilities	Different types of physical and institutional infrastructure reducing learning and transaction costs for the overall economy
Institutional framework and political economy context	System of rules and policies determining incentives, rents allocation and investment regimes (subsidies, licencing, taxation, standards, work regulation)

Source: Author

C. Productive capacities development: The role of systemic linkages and the special properties of manufacturing

Productive capacity-building at the firm micro-level does not happen in a vacuum: it is both constrained and enabled by the broader institutional and infrastructural macro-level context of a given country. However, a meso-level structural dimension

is also important. This is the one pointing to the existence of deep relationships between firm-level productive capacity-building, especially in the form of "technical change", and structural change, especially in the form of "sectoral recomposition", but also "linkages development" across sectors in the economy.

1. Structural change: Some stylized facts

Structural change most commonly identifies the process of change of the sectoral composition of an economic system and, thus, the underlying transformation of its productive and technological structures, as well as demand composition (Pasinetti, 1981; Chenery et al., 1986; Baranzini and Scazzieri, 1990; Andreoni and Scazzieri, 2014). Structural change dynamics are realized both as a process of sectoral transition – i.e. moving across sectors, from low to medium and high productivity sectors – and sectoral deepening – i.e. moving within the same sectors, from low to high value added subsectors.

At different stages of development (measured in real gross domestic product (GDP) per capita, United States dollars, 2005), a country's manufacturing sector is composed of different proportions of resource-based, labour-intensive and skill-/capital-intensive industries. A set of regularities has been observed:

a. Up to US$2,000 a country's manufacturing sector tends to be composed of almost 50 per cent resource-based industries, 20 per cent labour-intensive industries and 30 per cent skill-/capital-intensive industries;

b. Between US$2,000 and US$ 8,000 the ratio of labour-intensive and skill-/capital-intensive industries tends to invert, while resource-based manufacturing industries are unchanged;

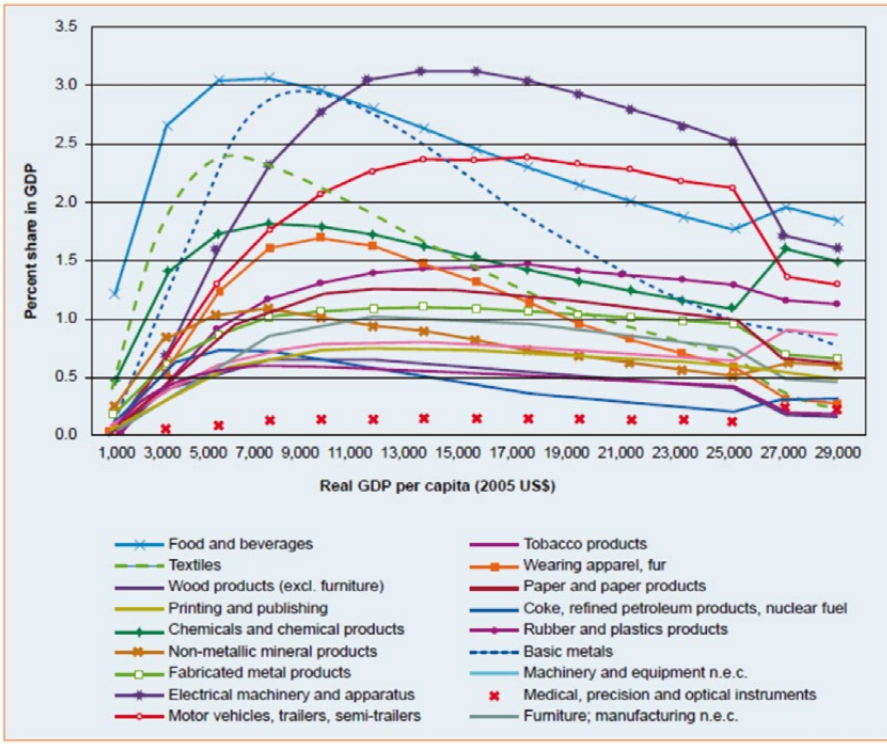
c. Finally, from US$8,000 onwards, there is a tendency for the resource-based industries to become less prevalent, while there is an increase in skill-/capital-intensive industries (such as machinery production, automotive or chemicals) and a strong reduction in labour-intensive industries (such as textiles and apparel).

An analysis at the subsectoral level also confirms the existence of qualitative transformations within the manufacturing sector as countries increase their GDP per capita (see figure I.1). Now, as Sanjaya Lall noted, "there are many roads to heaven", that is, there are various pathways that countries can follow in their structural change. Moreover, the speed at which countries go through sectoral recomposition and deepening within manufacturing sectors varies over time, depending on the pace of their respective technological change.

However, these analyses (see figure I.1) clearly suggest that, while different manufacturing development trajectories are possible, some of them are more likely to occur at certain stages of development than others. In particular, it has been noticed that developing countries seem to follow a certain "normal pattern of structural change", according to which at early stages of development measured in GDP per capita terms, countries tend to specialize on certain combinations of sectors. The cluster of sectors these countries specialize on reach the peak in terms of contribution to GDP and then decline and are substituted by a new sector.

Figure I.1

Normal patterns of structural change and waves of expansion



Source: Haraguchi and Rezonja, 2011; UNIDO 4-digit Database.

In navigating these different waves of structural change, countries and their major firms will specialize, diversify and then specialize again to capture productive opportunities in a transformative economy and according to changes in the

domestic and global markets. In doing so, firms will have to continuously adapt and redeploy their cumulated productive capacities, while developing new ones that will allow them to enter a new wave of expansion. Indeed, while in certain cases the distance between two sectors in terms of the required productive capacities is not so significant, in others, firms will have to equip themselves with almost completely new sets of productive capacities.

While these structural recompositions are a critical stylized fact reflecting changes in the productive capacities of different countries along their development journey, it has also been increasingly acknowledged that a significant part of what we call structural change is not simply related to the shift from agriculture to manufacturing and services (linear view of structural change). Instead, there has been an increasing recognition that the emergence of a system of linkages among firms within and across sectors is a key sign of the "quality" of this structural transformation (Andreoni, 2018).

2. The economy as a system of linkages

Albert Hirschman famously characterized the development process in the following terms: "… development is essentially the record of how one thing leads to another" (Hirschman, 1981: 75).

Manufacturing is linked to the other productive sectors through a bundle of different relationships:

a. Technological: Triggered by the distinctive capacity of manufacturing to "transfer" technological change across sectors (in particular, industrialization of agriculture and resource-based industrialization);

b. Demand/Consumption: Quantitative interdependencies across more or less complementary sectors (intermediate demand) and along vertically disintegrated sectors in global production networks (increasing complexity);

c. Fiscal: Related to the use of rents generated in the resource sector to develop industries which are either unrelated to the resource sector or only marginally related to it;

d. Employment: Related to direct, indirect and induced effects that different sectors may or may not have on the others and the rest of the economy.

These linkages are the main drivers of the processes of qualitative transformation and quantitative expansion of the productive structure of a country. A useful way to visualize developmental linkages is to think of a "matrix of intersectoral interdependencies", that is a matrix defined by both supply side and demand side

linkages among different sectors. Inside the matrix, production activities within the manufacturing sector are characterized by a comparatively higher density of inter-industry and intersectoral forward and backward linkages, albeit to different degrees.

Now these intersectoral linkages are destined to change and "vary according to the particular phase of the development process and as structural conditions and international circumstances change" (Kay, 2009: 116). For example, it has been observed how, with the increase of technological change in agriculture, backward linkages between agriculture and services have been expanding in magnitude and quality. Good examples include post-harvest facilities such as transport, communication, information services for production control in agriculture, marketing services, etc. (Andreoni, 2011b).

Despite these sectoral specificities which change in historical time, all sectoral activities persistently affect the rest of the economy through both direct and indirect linkages which accumulate in successive rounds of intersectoral expansion of the productive matrix. The existence of a "symbiotic" evolution of intersectoral relationships between agriculture and manufacturing has found empirical support in various studies. For example, in the context of Malaysia, it has been shown how an expansion of manufacturing output (associated with a contraction of agricultural output in the short run) is also correlated with a process of agricultural expansion over the long run (Gemmell et al., 2000).

Furthermore, the experience of highly industrialized countries such as Japan and the United States (in which a comparatively higher multiplier effect for the agricultural sector is registered) demonstrates how agro-based industries can effectively emerge from the increasing exploitation of intersectoral synergies and complementarities. In sum, these studies confirm the idea that structural change does not simply imply a process of sectoral transition, but also one of sectoral deepening (that is, a technological transformation of production processes performed in each sector) and intersectoral deepening (that is, an unfolding of increasingly denser linkages between related production activities and sectors).

While at initial stages of development linkages between resources and agriculture on one side and manufacturing on the other are central, throughout their transformation path, countries tend to experience an increasing intensification of manufacturing-services linkages. The bundle of interactions that connects manufacturing and services becomes increasingly dense, given the outsourcing of services activities from manufacturing firms to services providers but also the

changing technological linkages between manufacturing and services (in particular production-related services).

The existence of strong technological linkages and interdependencies between manufacturing and services is something that was originally revealed by input–output analyses performed by Park (1989, 1994), and Park and Chan (1989). The influential work by Se-Hark Park and Kenneth Chan addressed this issue by examining separately the linkages existing between disaggregated groups of services and various manufacturing industries. Their analysis was based on the classification proposed by Gershuny and Miles (1983), which divides service activities into two major groups: marketed services and non-marketed services, and then breaks these down into further subcategories. An important subcategory created by this classification is that of "producer services", which includes specialized technical services that support production processes.

Park and Chan's empirical analysis conducted on 26 countries selected in the UNIDO database confirmed Hirschman's intuition that the manufacturing sector has larger multiplier effects than do services. Specifically, it tends to generate a two- to three- fold greater output impact on the economy because of the denser backward and forward linkages formed within and around it.[3] Reflecting the clear driving role of manufacturing industries, the results highlighted how "the evolution of the intersectoral relationship between services and manufacturing in the course of development is symbiotic, in the sense that the growth of the service sector depends not only on that of the manufacturing sector, but also structural change of the former is bound to affect that of the latter" (Park and Chan, 1989: 212).

Precisely these results have been recently confirmed by Guerrieri and Meliciani (2005). Their analysis has shown that a country's capacity to develop its services sector depends on the specific structural/technological composition of its manufacturing sector. This is because different manufacturing industries require different producer services, and tend to use them with different degrees of intensity. Their analysis also highlights how the cumulative expansion of services can follow both inter- and intrasectoral patterns, as the same service producers are also intensive users of these producer services.

Park and Chan also found evidence of the "catalytic role" that industry could play in fostering employment opportunities in the services sector (the indirect employment effect) and of the fact that "as the industrial base broadens and becomes more integrated, both horizontally and vertically, the employment impact

of industrial activities should also increase substantially" (Park and Chan, 1989: 201). Empirical studies in regional income and employment multiplier analysis (Stewart and Streeten, 1971) had previously shown using input–output techniques that the "the *direct* employment effect of industrial investment is small relative to its *indirect* effects resulting from the inter-industry purchases of inputs and income induced effects of private consumption".

These input–output analyses have provided evidence of the fact that, not only does labour-intensity vary widely across sectors (direct labour absorbing capacity), but also that employment in a given sector is linked to other sectors of the economy which may or may not be labour-intensive (indirect labour absorbing capacity). This implies that, while a certain sector (say, medium-high-tech manufacturing), given its structural and technological characteristics, might show a relatively low direct labour-absorbing capacity, it might indirectly absorb labour by buying from other sectors with high labour-absorbing capacity. While the direct employment absorption of sectors is generally captured by labour-intensity ratios such as labour–capital ratio or labour–value added ratio, employment multipliers are broader measures of labour intensity that allow factoring in indirect employment absorption dynamics.

3. Why manufacturing still matters for Africa and LDCs

Thinking about the economy as a system of linkages permits the framing of productive capacity-building as a process involving multiple structural interdependencies across sectors of the economy. In other words, the building of productive capacities in a certain sector might depend on the development of complementary capacities in other sectors of the economy.

In Africa and LDCs, in order to pay the bill of production transformation, existing sectoral strengths in broadly defined low-tech sectors should not be undermined. In their initial stages of industrialization, developing countries' production structure (and, thus, their export basket) is mainly based on agricultural activities and products. In this context, Arthur Lewis (1958: 433) noted how "it is not profitable to produce a growing volume of manufactures unless agricultural production is growing simultaneously. This is also why industrial and agrarian revolutions always go together, and why economies in which agriculture is stagnant do not show

[3] The input-output analysis conducted by Pilat and Wölfl (2005) reached the same conclusion, stating that "Manufacturing industries interact much more strongly with other industries, both as providers and as users of intermediate inputs. Even though services now contribute as providers of intermediate input to the performance of other industries, their role remains more limited than that of the manufacturing sector" (ibid.: 36).

industrial development." This vision illustrates how increasing productivity in the agricultural sector arises from "manufacturing agrarian change" (Andreoni, 2011b) – that is, through the adoption/adaptation/application to the agricultural sector of those technological innovations which were developed intra- or intersectorally.

This sustainability problem (i.e. guaranteeing a sustained level of agricultural output) is especially critical in the early phases of development, when manufacturing growth is still strongly dependent on the agricultural sector for surplus labour, savings and inputs for industrial processing and demand for manufactured goods. At more advanced stages of industrialization, the manufacturing sector tends to "self-reproduce", while the intersectoral transfer of resources from agriculture to other sectors tends to be balanced and, finally, eventually reversed.

The manufacturing sector is a central node in the system of linkages of an LDC economy, given its special properties (Andreoni and Gregory, 2013; Andreoni and Chang, 2017). Therefore, special attention should be given to those industrial policies supporting manufacturing development through linkages development.

The following are the special properties of manufacturing:

a. **Productivity growth driver**: It is widely recognized that the manufacturing sector is the main source of technology-driven productivity growth in modern economies. It is not much of an exaggeration to say that manufacturing is what has made the modern world. Thanks to the fact that the manufacturing activities lend themselves much more easily to mechanization and chemical processing than do other types of economic activities, the manufacturing sector has been the main source of productivity growth throughout history. Productivity increase in agriculture is highly constrained by nature in terms of time, space, soil and climate. By their very nature, many service activities are inherently impervious to productivity increases. In some cases, the very increase in productivity will destroy the product itself. If a string quartet trots through a 27-minute piece in 9 minutes, we won't say that its productivity has trebled. For some other services, the apparently higher productivity may be due to the debasement of the product. A lot of the increases in retail service productivity in countries such as the United States and the United Kingdom have been brought by lowering the quality of the retail service itself – fewer shop assistants, longer drives to the supermarket, lengthier waits for deliveries, etc. The 2008 global financial crisis has also revealed that much of the

recent productivity growth in finance had been achieved through the debasement of the products – that is, the creation of overly complex, riskier and even fraudulent products.

b. **Technological learning centre**: Many economic historians and economists argue that the manufacturing sector, especially the capital goods sector, has been the "learning centre" of capitalism in technological terms (Andreoni and Chang, 2017). Because of its ability to produce productive inputs (e.g. machines, chemicals), what happens in the manufacturing sector has been extremely important in the productivity growth of other sectors. The increases in agricultural productivity that we have seen in the last century and a half would not have been remotely possible without the developments of manufacturing industries producing agricultural machinery, chemical fertilizers, pesticides and, increasingly, genetic engineering. The rapid increases in the productivity of services such as logistics and retail in the last couple of decades were also made possible by manufacturing industries producing more efficient transport equipment, computers and mechanized warehouses.

c. **Organizational learning centre**: Third, the manufacturing sector has also been the source of organizational innovation. Productivity growth in the last two centuries has been driven not just by technological changes, but also by organizational changes, most of which originated in the manufacturing sector. For example, these days many fast food restaurants use "factory" techniques, turning cooking into an assembly job and sometimes even delivering food on conveyor belts (Yo! Sushi being the most familiar example for United Kingdom citizens). For another example, large retail chains – be they supermarkets, clothes shop chains, or online retailers – apply modern inventory management techniques, developed in the manufacturing sector. Even in the agricultural sector, productivity has been raised in some countries through the application of manufacturing-style organizational knowledge, such as computer-controlled feeding (Dutch agriculture is the prime example here).

d. **Trade balance**: Fourth, the manufacturing sector, producing physical and non-perishable products, has higher tradability than agriculture and, especially, services. At the root of the low tradability of services lies the fact that many services require their providers and consumers to be in the same location. No one has yet invented ways to provide haircuts or house

cleaning long-distance. Of course, this problem will be solved if the service provider (the hairdresser or the cleaner in the above examples) can move to the customer's country, but that in most cases means immigration, which most countries severely restrict. Given this, a rising share of services in the economy means that the country, other things being equal, will have lower export earnings. This, in turn, means that, unless the exports of manufactured goods rise disproportionately, the country won't be able to pay for the same amount of imports as before. Also, the high tradability of manufacturing imparts a crucial resilience to an economy with a strong manufacturing sector, as it can better protect itself from external shocks – as we have seen with the resilience of the German economy, following the 2008 financial crisis.

e. **High-quality employment generation**: Manufacturing is a crucial source of high-quality employment. For example, in the United States, during the period 2008–2010, it was estimated that earnings in manufacturing were some 20 per cent higher than earnings in non-manufacturing industries (Helper at al., 2012).

f. **Demand generation**: The manufacturing sector has been the main source of demand for high-productivity activities in other industries. For example, most of the service activities that have high productivity and have seen high productivity growth – sometimes even faster than those of some subsectors of manufacturing – recently (e.g. finance, transport and business services) are "producer" services, whose main customers are manufacturing firms. Of course, countries can specialize in those services, but in the case of many producer services (e.g. engineering, design and management consulting), their ability to export cannot be maintained in the long run without a strong manufacturing sector. In those services, insights gained from the production process and the continuous interaction between the provider and the clients are crucial. Given this, a weakening manufacturing base will eventually lead to a decline in the quality, and exportability, of those services (Tassey, 2010; Pisano and Shih, 2012).

Governments in today's developed economies and LDCs have recognized these special properties and assigned to manufacturing development a central role in their productive capacity-building strategies. While this sectoral approach is often necessary to kick-start industrialization, an effective way to diversify a country's

production structure is also to focus on cross-sectoral intervention targeting specific technological linkages and potential processes of inter-sectoral learning (Andreoni, 2014).

Within a selective industrial policy approach targeting cross-sectoral dynamics, Governments focus on a limited number of productive capacities, such as firms' production and technology capabilities in food processing, capabilities in advanced materials, capabilities for mechanics and control systems, ICT capabilities or capabilities in production technologies. Each one of these capabilities constitutes a platform of competencies, technologies, productive knowledge and experiences that can be deployed in a plurality of sectors. For example, the agro-food sector might draw on a combination of food processing capabilities, but also capabilities for mechanics and control systems for food packaging; ICT capabilities for food tracking; and, finally, capabilities in advanced materials for smart packaging (Andreoni, 2018).

By nurturing the development of complementary sets of productive capacities, the scope for technological innovation within and across sectors tends to increase and new development trajectories are potentially built. This approach will be articulated in chapter III, where the local production system framework to develop productive capacities will be introduced.

References

Abramovitz, M (1986). Catching Up, Forging Ahead, and Falling Behind. *Journal of Economic History*. XLVI: 385–406.

_____ (1995). The Elements of Social Capability. In: Koo, BH and Perkins, D.H. *Social Capability and Long-Term Economic Growth*. Basingstoke and London: Macmillan: 19–47.

Amsden, A (2001). *The Rise of the Rest: Challenges to the West from Late-Industrialization Economies.* Oxford University Press. New York.

Andreoni, A (2011a). Productive Capabilities Indicators for Industrial Policy Design. UNIDO Working Paper 17/2017.

_____ (2011b). Manufacturing Agrarian Change. DRUID Working Paper Series. 11(13): 1–36.

_____ (2014). Structural Learning: embedding discoveries and the dynamics of production. *Structural Change and Economic Dynamics.* 29: 58–74.

Andreoni, A (2017). Anti-corruption in Tanzania: A Political Settlement Analysis." ACE Working Paper 1:1-58.

_____ (2018). A Generalized Linkage Approach to Local Production Systems Development in the Era of Global Value Chains, with special reference to Africa. In: Noman, A and Stiglitz, J, eds. *Quality of Growth in Africa*. Columbia University Press.

Andreoni, A and Gregory, M (2013). Why and How Does Manufacturing Still Matter: Old Rationales, New Realities. *Revue d'Economie Industrielle*. 144(4): 17–54.

Andreoni, A and Chang, H-J (2017). Bringing production and employment back into development: Alice Amsden's legacy for a New Developmentalist agenda. *Cambridge Journal of Regions, Economy and Society.* 10(1): 173–187.

Andreoni, A and Scazzieri, R (2014). Triggers of change: structural trajectories and production dynamics. *Cambridge Journal of Economics*. (38): 1391–1408.

Andreoni A and Tregenna, F (2018). Stuck in the Middle: Premature deindustrialization and industrial policy. IDTT Working paper. 4:1–30. CCRED and South African Research Chair in Industrial Development. Johannesburg.

Baranzini, M and Scazzieri, R (1990), eds. *The Economic Theory of Structure and Change*, Cambridge University Press. Cambridge.
Behuria, P, Buur, B and Hazel, G (2017). Studying political settlements in Africa. *African Affairs*. 116(464): 508–525.

Bell, M and Pavitt, K (1993). Technological Accumulation and Industrial Growth: Contrasts between Developed and Developing Countries. *Industrial and Corporate Change*. 2(2): 157–210.
Chenery, H, Robinson, B, and Syrquin, M (1986), eds. *Industrialization and Growth: A Comparative Study*. Oxford University Press. New York and Oxford.

Cimoli M, Dosi G and Stiglitz JE (2009). *Industrial Policy and Development: The Political Economy of Capabilities Accumulation*. Oxford University Press. Oxford.
Cornwall, J (1977). *Modern Capitalism: Its Growth and Transformation.* St. Martin's Press. New York.

Gemmell, N and Mathew, M (2000). Agricultural Growth and Inter-Sectoral Linkages in a Developing Economy. *Journal of Agricultural Economics.* 51(3): 353–370.

Gershuny, J, and Miles, I (1983). *The New Service Economy: The Transformation of Employment in Industrial Societies*. Praeger. London.

Guerrieri, P and Meliciani, V (2005). Technology and International Competitiveness: The Interdependence between Manufacturing and Producer Services. *Structural Change and Economic Dynamics.* 16(4): 489–502.

Haraguchi, N and Rezonja, G (2011). Emerging Patterns of Manufacturing Structural Change. UNU – WIDER Working paper, No. 2011/43.

Helper, S, Krueger, T and Wial, H (2012). *Why Does Manufacturing Matter? Which Manufacturing Matters? A Policy Framework.* Brookings Institution. Washington, D.C.

Hirschman, AO (1981). *Essays in trespassing: Economics to Politics and Beyond.* Cambridge University Press. Hanover, Massachusetts, United States.

Kay, C (2009). Development Strategies and Rural Development: Exploring Synergies, Eradicating Poverty. *The Journal of Peasant Studies.* 36(1): 103–137.

Khan, MH (2010). *Political settlements and the governance of growth-enhancing institutions*. Mimeo. SOAS University of London.

_____ (2018). Introduction: Political settlements and the analysis of institutions. *African Affairs.* 117(469): 636–655. Available at https://doi.org/10.1093/afraf/adx044 (accessed 29 September 2019).

Khan, MH, Andreoni, A and Roy, P (2016). Anti-Corruption Evidence: A strategic approach. Mimeo. ACE Anti-Corruption Evidence Research Consortium. Available at https://ace.soas.ac.uk/ (accessed 29 September 2019).

Kuznets, S (1966). *Modern Economic Growth: Rate, Structure and Spread.* Yale University Press. New Haven, Connecticut, United States.

_____ (1968) *Toward a Theory of Economic Growth with Reflections on the Economic growth of nations.* Norton. New York.

Lall, S (1987) *Learning to Industrialize: The Acquisition of Technological Capability by India*. Macmillan. Basingstoke.

_____ (1992). Technological Capabilities and Industrialization. *World Development*. 20(2): 165–186.

Landesmann, M and Scazzieri, R (1996) eds. *Production and Economic Dynamics*. Cambridge University Press. Cambridge.

Lewis, WA (1958). Economic development with unlimited supplies of labour. In: Agarwala, AN and Singh, SP, eds. *The economics of underdevelopment*. Oxford University Press. New York.

Maddison, A (1989). *The World Economy in the 20th Century.* OECD. Paris.

Makhaya, G and Roberts, S (2013). Expectations and outcomes: considering competition and corporate power in South Africa under democracy. *Review of African Political Economy*. 40(138): 556–571.

Milberg, W, and Winkler, D (2013). *Outsourcing Economics. Global Value Chains in Capitalist Development*. Cambridge University Press. Cambridge.

Park, S-H (1989). Linkages between Industry and Services and their Implications for Urban Employment Generation in Developing Countries. *Journal of Development Economics. 30*(2): 359–379.

_____ (1994). Intersectoral Relationships between Manufacturing and Services: New Evidence from Selected Pacific Basin Countries. *ASEAN Economic Bulletin*: 10(3): 245–263.

Park, S-H, and Chan, KS (1989). A Cross-Country Input–Output Analysis of Intersectoral Relationships between Manufacturing and Services and their Employment Implications. *World Development.* 17(2): 199–212.

Pasinetti, LL (1981). *Structural Change and Economic Growth*. Cambridge University Press. Cambridge.

Penrose, ET (1959). *The Theory of the Growth of the Firm*. Oxford University Press. Oxford.

Pilat, D and Wölfl, A (2005). *Measuring the Interaction Between Manufacturing and Services.* OECD Science, Technology and Industry Working Papers 2005/05. OECD. Paris.

Pisano, GP, and Shih, WC (2012). *Producing Prosperity: Why America Needs a Manufacturing Renaissance.* Harvard Business Review Press. Boston, Massachusetts, United States.

Richardson, GB (1972). The Organisation of Industry. *Economic Journal*. 82: 883–96.

Roy, P (2017). Anti-corruption in Nigeria: A Political Settlement Analysis. ACE Working Paper. 2: 1–45.

Stewart, F, and Streeten, P (1971). Conflicts between Output and Employment Objectives in Developing Countries. *Oxford Economic Papers*. 23(2): 145–168.

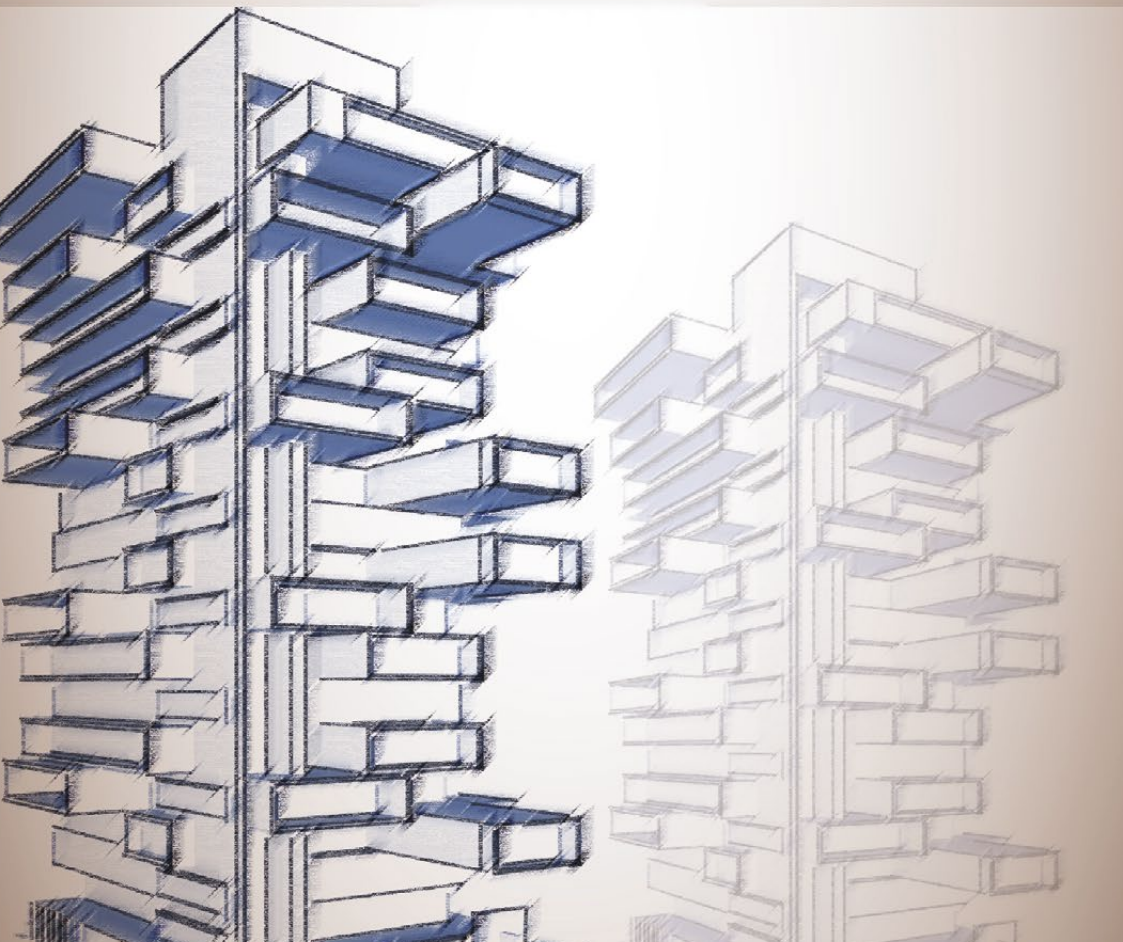
Tassey, G (2010). Rationales and Mechanisms for Revitalizing US Manufacturing R&D Strategies. *Journal of Technology Transfer.* 35: 283–333.

UNCTAD (2006). *The Least Developed Countries Report 2006: Developing Productive Capacities* (United Nations publication, Sales No. E.06.II.D.9. New York and Geneva).

Whitfield, L, Therkildsen, O, Burr, L and Mett, SA (2015). *The Politics of Industrial Policy in Africa.* Cambridge University Press. Cambridge.

UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT
UNCTAD

II. The manufacturing sector and utilization of productive capacities



II. The manufacturing sector and utilization of productive capacities

A major challenge facing African countries and LDCs in developing and maintaining productive capacities is how to make better use of existing productive capacities through increasing capacity utilization rates. The underutilization of productive capacity, or excess capacity, is of concern because it has consequences for the achievement of national development goals. Given the fact that African countries and LDCs have very limited capital or investment to address their development challenges, the operation of enterprises far below installed capacity represents a waste of resources, and should be corrected to maximize development results. Another channel through which excess capacity can affect development in Africa and LDCs is the rate of technology adoption. When firms hold latent or idle capacity for long periods of time, they are unlikely to adopt new technologies, which in turn widens the technology gap between African countries or LDCs and other developing countries, and makes them uncompetitive relative to their competitors. Excess capacity also means that enterprises are likely to hire less labour, resulting in lower output and employment, with severe negative consequences for efforts to reduce poverty.

This chapter is on how African countries can effectively address the challenge of developing productive capacities by enhancing utilization rates of existing capacities. The focus is on productive capacity utilization in manufacturing because of the strategic importance of this sector, and because that is where there are serious problems of capacity utilization in Africa. The chapter is structured as follows: Section A presents an overview of the role of manufacturing in African economies. Section B sets out key facts on manufacturing capacity utilization rates in Africa, from a review of data and selected case studies. Section C provides an analysis of why there are low manufacturing capacity utilization rates in the case study countries, and African countries more broadly. The last section (D) discusses policies on how to make better use of newly built or existing manufacturing productive capacities based on an analysis of the technical and policy constraints inhibiting capacity utilization in Africa.

A. Contribution of manufacturing to African economies: An overview

1. Manufacturing plays a very limited role in African economies

The manufacturing sector is expected to play a crucial role in the transformation of African economies, and this is reflected in the fact that the development of the

sector is on the priority list of most countries on the continent. Despite this recognition of the vital role of manufacturing in the development process, the sector plays a very limited role in African economies (UNIDO and UNCTAD, 2011). For example, in 2015 the contribution of manufacturing value added (MVA) to Africa's gross domestic product (GDP) was only 10.5 per cent, compared with 32.2 per cent in China, 16.9 per cent for Asia and the Pacific (excluding China), and 12.8 per cent in Latin America (table II.1). What is quite interesting is that the contribution of MVA to Africa's GDP in 2015 is about the same as in 2005, while in China, for example, it increased significantly between 2005 and 2015. Among African countries, there is a wide variation in the role of manufacturing in the economy. For example, it plays a relatively more significant role in countries such as Eswatini and the Central African Republic, but plays a less significant role in countries such as Djibouti and Sierra Leone. In 2015, the share of MVA in GDP was 35.9 per cent in Swaziland (now known as Eswatini), 17.9 per cent in the Central African Republic, 3.2 per cent in Djibouti and 2.2 per cent in Sierra Leone.

The low level of manufacturing development in Africa can also be seen from an examination of data on per capita MVA. In 2015, per capita MVA in Africa was US$201, compared with a global average of US$1,638. Africa's per capita MVA is also low relative to what is observed in other developing countries and regions. For example, in 2015 per capita MVA was US$2,048 in China, US$1,176 in Latin America, and US$414 in Asia and the Pacific (excluding China). With a per capita MVA of US$92, LDCs are the only group with a level of manufacturing development lower than that of Africa.[4]

[4] The limited role of manufacturing in African economies is also reflected in employment data. For example, International Labour Organization estimates suggest that, in 2017, the sector accounted for 7.7 per cent of employment in Africa. In Asia and the Pacific, the sector accounted for 14.5 per cent of employment, and in Latin America, it accounted for 12. 3 per cent.

Table II.1
Shares of MVA in GDP and levels of MVA per capita (at constant 2010 prices)

Group	Share of MVA in GDP			Per capita MVA in 2015 (US$)
	2005	2010	2015	
Africa	10.6	9.9	10.5	201
Asia and the Pacific (excluding China)	16.1	16.6	16.9	414
China	29.1	31.9	32.2	2048
Latin America	15.1	13.8	12.8	1176
Europe	13.7	14.4	15.0	1452
North America	12.4	12.0	11.6	5947
LDCs	11.4	11.3	12.3	92
World	15.3	15.8	16.1	1638

Source: Compiled based on data in UNIDO (2017).

2. Africa accounts for a low share of global manufacturing relative to its share of global population

Africa accounts for a relatively high share of global population, but a very low share of global manufacturing value added. Africa's share of global population increased from 14 per cent in 2005 to 16.2 per cent in 2016. However, its share of global MVA has hovered around 2 per cent (table II.2). This contrasts with the situation for the Asia and the Pacific region, whose share of global population has been around 60 per cent, and its share of global MVA increased from 36.5 per cent in 2005 to 49.5 per cent in 2016. The only developing country group that has similarly low shares of MVA given its share of global population is the LDC group. What these data suggest is that African countries and LDCs are underperforming in the global market for manufactures, which is not surprising in the light of their very low level of productive capacities.

Table II.2
Distribution of world MVA and population (%)

Group	MVA at constant 2010 prices			Population		
	2005	2010	2016	2005	2010	2016
Africa	1.7	1.8	2.0	14	14.9	16.2
Asia and the Pacific	36.5	44.1	49.5	60	59.7	59.2
Europe	31.4	27.4	25.1	12.3	11.8	11.1
Latin America	8.0	7.5	6.2	8.6	8.7	8.6
North America	22.4	19.2	17.4	5.0	5.0	4.9
LDCs	0.5	0.6	0.7	11.2	11.8	12.6

Source: Compiled based on data in UNIDO (2017).

B. Manufacturing capacity utilization rates in select African countries

This section presents some facts on capacity utilization rates in the manufacturing sectors of African economies, with a view to understanding the state and magnitude of the challenges facing policymakers in these economies. It uses data from both the World Bank Enterprise Surveys (WBESs) and information from selected African countries, namely: Ethiopia, Kenya, Mozambique, Nigeria, Rwanda, South Africa and the United Republic of Tanzania. The seven countries were selected based on the availability of reliable national data and contemporary studies on manufacturing capacity utilization in the country. Furthermore, the selected countries capture important features of African economies and are therefore representative of the types of countries in the continent. For example, it includes LDCs (Ethiopia, Mozambique, Rwanda and the United Republic of Tanzania), landlocked countries (Ethiopia and Rwanda), an oil exporting economy (Nigeria), and an economy with a relatively advanced industrial base (South Africa). Table II.3 presents information on the level and growth of per capita MVA in the selected countries. It indicates that South Africa has the highest level of manufacturing development, followed by

Nigeria and Kenya. The LDCs in the sample (Ethiopia, Rwanda, Mozambique, and the United Republic of Tanzania) all have very low levels of manufacturing development. Nigeria had the highest average growth of per capita MVA in the period 2010–2015, followed by Ethiopia. The other countries had relatively low average annual growth of per capita MVA, with Mozambique posting negative growth rates (table II.3).

Table II.3

Levels and growth of per capita MVA for selected African countries (at constant 2010 prices)

Country	Per capita MVA in 2015 (US$)	Share of MVA in GDP		Annual growth of per capita MVA	
		2005	2015	2005–2010	2010–2015
Ethiopia	20	4.1	4.5	6.9	10.8
Kenya	119	12.4	10.5	-0.1	1.0
Mozambique	43	14.1	8.5	-2.0	-0.3
Nigeria	254	5.9	10	5.8	12.0
Rwanda	34	6.0	4.9	2.6	2.2
South Africa	952	14.0	12.5	-0.4	0.0
United Republic of Tanzania	55	6.0	6.8	5.7	3.0

Source: compiled based on data in UNIDO (2017).

The capacity utilization rate of an industry has been defined as the "ratio of the actual level of output to a sustainable maximum level of output, or capacity" (Corrado and Mattey, 1997). It is also expressed as the recorded annual output of a firm divided by its installed manufacturing capacity,[5] although the exact measure depends on the methodology used in the study. Data from surveys of manufacturing enterprises are the most common source of information on manufacturing capacity utilization rates. The World Bank conducts these surveys in many countries, and some national statistics offices also conduct similar surveys. The core findings or messages from these studies on the issue of capacity utilization rates are discussed below.

Regional capacity utilization rate in sub-Saharan Africa is lower than the global average, but higher than the average for the Middle East and North Africa

The World Bank conducts firm-level surveys of the private sector in most countries, which provides a dataset on business environment indicators. The WBES seeks to satisfy two objectives: to ascertain the investment climates of individual economies, and how this climate affects firm performance with one of the variables being capacity utilization rates. The WBES establishes a firm's capacity utilization rate based on comparison of the current output with the maximum output possible using current inputs. The WBES data are the single most comprehensive source of data on capacity utilization rates, particularly for countries that do not conduct national enterprise surveys but rely on third party studies.[6] According to the WBES, the average manufacturing capacity utilization rate for all countries included in the survey is 72.1 per cent (table II.4). This is the average for the last available surveyed year, for each country included in the WBES. This global average figure is higher than the average capacity utilization rate for all sub-Saharan countries included in the survey, at 69.9 per cent, and for Latin America and the Caribbean (71.6 per cent). But the global average is much lower than the average for East Asia and the Pacific (79.2 per cent) and South Asia (77.6 per cent). The only region in the survey with (substantially) lower capacity utilization rates than sub-Saharan countries is the Middle East and North Africa (63.4 per cent).

---

[5] This is an engineering term that describes the production capacity of a plant based on its rated (nameplate) capacity, or the potential output which could be produced if capacity was fully used.

[6] It should be noted that, for some African countries and LDCs, the data coverage is limited.

Table II.4

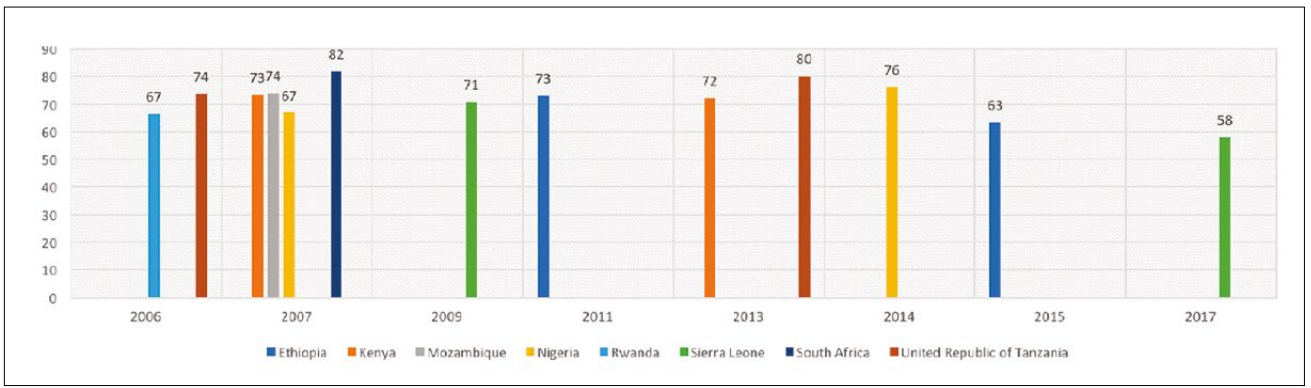
Regional average capacity utilization rates (%)

	East Asia and the Pacific	Europe and Central Asia	Latin America and Caribbean	Middle East and North Africa	South Asia	Sub-Saharan Africa	World
Capacity utilization rate (%)	79.2	71.2	71.6	63.4	77.6	69.9	72.1

Source: Compiled based on data in WBES (2018).

These regional averages obtained from the WBES dataset mask significant differences across countries. For example, among the seven African countries selected as case studies for this chapter, three have had capacity utilization rates below the global average of 72.1 per cent: Rwanda in 2006, Nigeria in 2007, and Ethiopia in 2015 (figure II.1). The remaining four countries had capacity utilization rates above the average, with South Africa and the United Republic of Tanzania leading, with capacity utilization rates above 80 per cent. However, these capacity utilization rates are derived from a methodology which assumes that respondents to the questionnaire have an accurate estimation of their capacity utilization rate. In the South African case, the figure also predates the financial crisis, potentially reflecting a capacity utilization peak rather than being representative of the post-financial crisis picture.

Figure II.1
Capacity utilization rate in select African countries (%), 2006–2017



Source: Compiled based on data in WBES (2018).

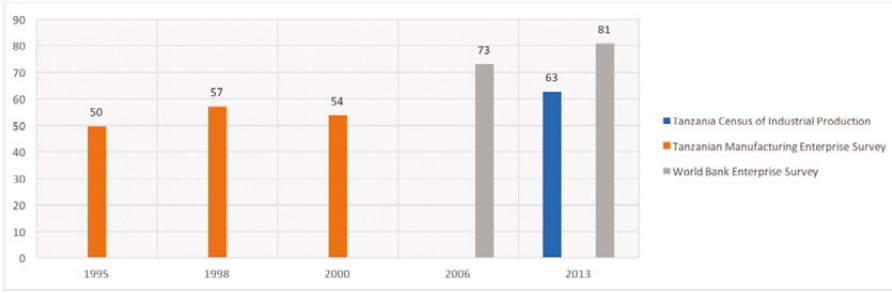
In the rest of the section, we compare the estimates of capacity utilization rates from the WBES to those obtained from national studies that provide capacity utilization rates, for our scope countries. The definitions of manufacturing capacity utilization in the surveys and studies are similar, albeit technically different. Nevertheless, a comparison of estimates from the different sources should provide useful insights into the magnitude and range of capacity utilization rates in African countries. We begin the comparison of estimates of capacity utilization rates from the WBES and those of national studies with examples of the United Republic of Tanzania and Mozambique.

Manufacturing capacity utilization rates for the United Republic of Tanzania are shown in figure II.2. They were sourced from three publications. The WBES (the 2006 and 2013 data points), the 2013 Census of Industrial Production (2013 data point) and the Tanzanian Manufacturing Enterprise Survey (1995, 1998 and 2000 data points). The Tanzanian Manufacturing Enterprise Survey results are presented in a paper by Harding, et al. (2002). Two key messages from the table stand out. The first is that the United Republic of Tanzania has low capacity utilization rates, and the second is that the estimates of capacity utilization from the WBES are higher than those from national surveys or studies. For example, according to the WBES, the capacity utilization rate for the United Republic of Tanzania in 2013 was 80.8 per cent, while the estimate from the Tanzania Census of Industrial Production suggests it was 62.7 per cent.

A report by Andreoni (2017), in conjunction with the Tanzania National Bureau of Statistics, reproduced the data collected in the 2013 Census of Industrial Production, specifically on manufacturing. The report noted that the average production capacity utilization was 63 per cent among major industries, but capacity utilization rates among these industries varied greatly. Manufacturing of tobacco products, electrical equipment, machinery and chemicals (more precisely the processing of salt) had capacity utilization rates above 70 per cent, while industries with lower capacity utilization rates, all below 55 per cent, included the manufacture of coke, refined petroleum products and nuclear fuel; wearing apparel, dressing and dyeing of fur; wood and products of wood; and food products and beverages. Andreoni (2017) also highlighted the large heterogeneity in respondents to the survey and noted that larger firms reported higher capacity utilization rates than smaller firms, suggesting some industries' capacity utilization was correlated with firm size.

Figure II.2

The United Republic of Tanzania capacity utilization, (%), by data source

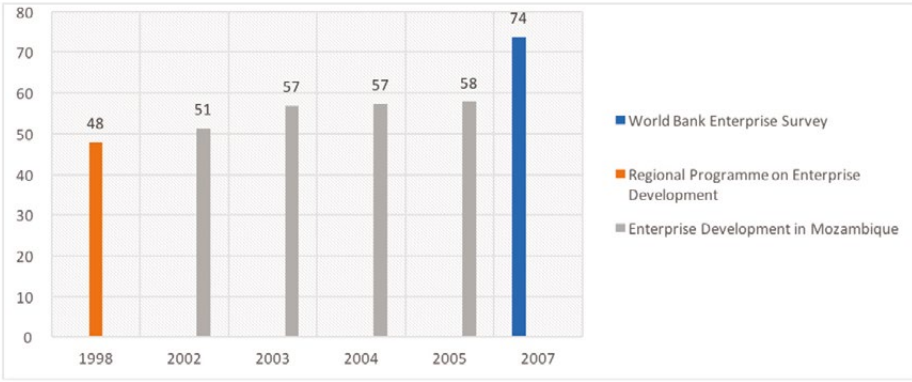


Sources: The 2013 Census of Industrial Production (see NBS and MITI, 2016); Manufacturing Enterprise Survey, 2002; and WBES (2018).

Turning to Mozambique, estimates of the manufacturing capacity utilization rates are shown in figure II.3. They were sourced from three publications: the World Bank Enterprise Surveys (the 2007 data point), the Regional Programme on Enterprise Development (the 1998 data point) and the Enterprise Development in Mozambique (2002 to 2005 data points). The Enterprise Development in Mozambique survey results for the period 2002 to 2005 are presented in a discussion paper by Cruz, Mafambissa and Sulema (2007). They discuss the findings of a survey conducted in 2006 that sought to assist in policy research on firm dynamics, and to inform about the challenges faced by manufacturing firms, as well as to examine the opinions of managers regarding the business environment in Mozambique. The results in figure II.3 suggests that Mozambique has low capacity utilization rates and that the WBES estimates are much higher than those of national surveys or studies.

Figure II.3

Mozambique capacity utilization, (%), per source, 1998–2007



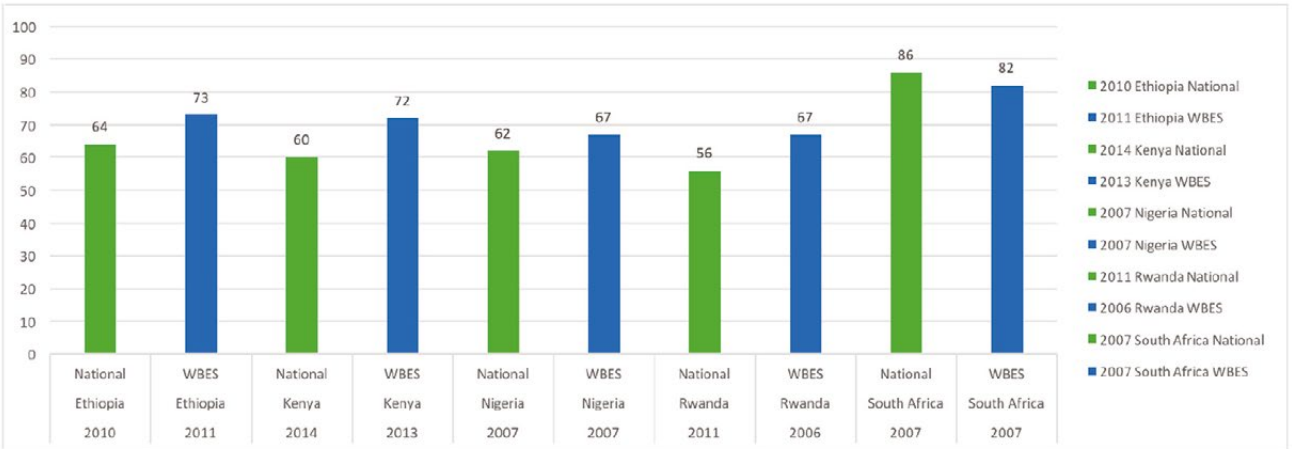
Sources: Regional Programme on Enterprise Development, 1999; WBES (2018); Enterprise Development in Mozambique, 2007.

Figure II.4 presents estimates of capacity utilization rates for the remaining countries included in our case study: Ethiopia, Kenya, Nigeria, Rwanda and South Africa. It compares the results from the WBES and the closest comparable years[7] from national surveys and consultative studies measuring capacity utilization. As with the case of the United Republic of Tanzania and Mozambique, figure II.4 confirms that capacity utilization rates are low in the five African countries. It also confirms that the WBES estimates are higher than the estimates from national studies. In sum, the manufacturing sectors in the case study countries seem to have substantial latent capacity. Compared with the WBES result for East Asia and the Pacific (79.2 per cent), South Asia (77.6 per cent) and the Latin American and the Caribbean (71.6 per cent) groups of countries, sub-Saharan African countries are lagging with regard to manufacturing capacity utilization.

[7] Where possible WBES studies and selected national statistics offices plus academic studies results are no more than one year apart.

Figure II.4

Capacity utilization rates in selected countries by source, (%)



Source: Compiled by authors.

In the following section, the reasons for low capacity utilization in the select case study countries are presented and discussed. This should provide some insights into what challenges African countries face in maximizing their installed manufacturing capacity utilization.

C. Understanding manufacturing capacity underutilization in African countries

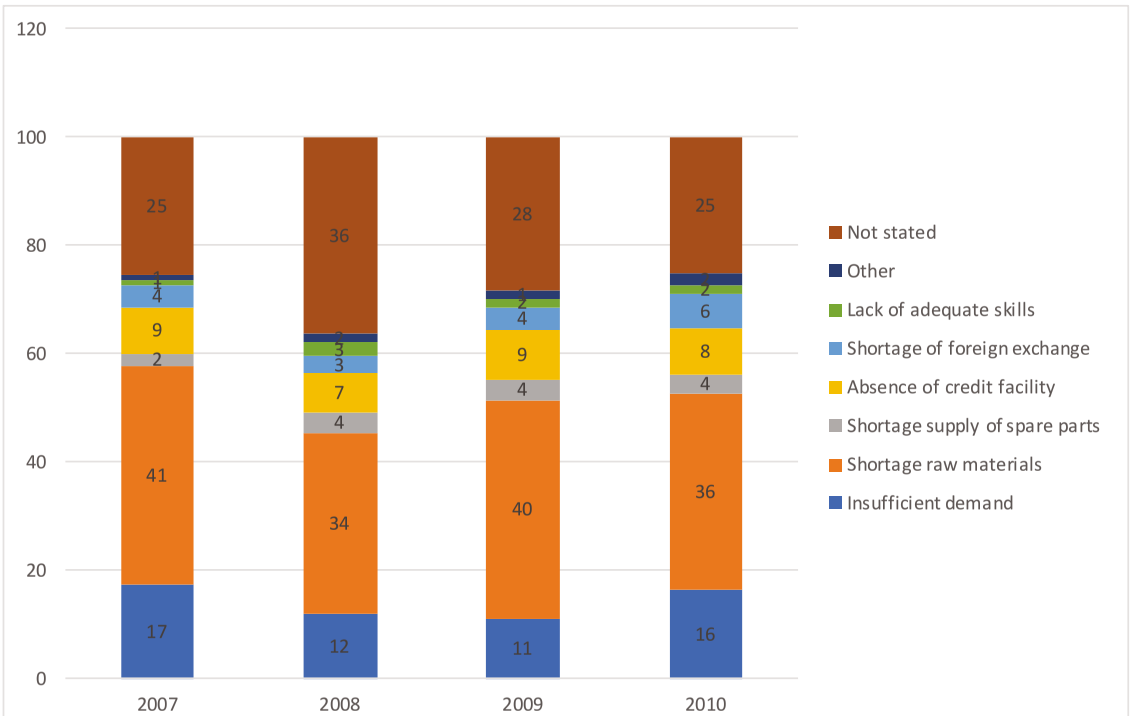
This section provides insights into the reasons for the relative lack of capacity utilization in the case study countries reviewed in the previous section, drawing on results of national surveys and information contained in the literature. It also synthesizes the cross-country insights to draw out commonalities, and differences, with an eye on offering generalizable observations and recommendations for African policymakers.

1. Ethiopia

Surveys conducted by the Ethiopia Central Statistical Agency provide insights into the reasons for the relatively low rate of capacity utilization of enterprises in the country. Figure II.5 displays the most prevalent reasons for underutilization of manufacturing capacity as reported by respondents to the Ethiopia Central Statistics Agency surveys. Most firms consistently stated that the shortage of raw materials was the single most prevalent reason, for underutilization, across all years from 2007 to 2010. This was followed by insufficient demand and thereafter an absence of credit facilities. There is variability across the years, but the results are fairly consistent. By manufacturing subsector (International Standard Industrial Classification of All Economic Activities (ISIC) category), the shortage of raw materials (aside from the reasons “not stated”) was also identified as the most prevalent reason for underutilization. Insufficient demand and the absence of credit facilities followed as the other dominant reasons, their degree of prevalence varying between sectors (figure II.6).

Figure II.5

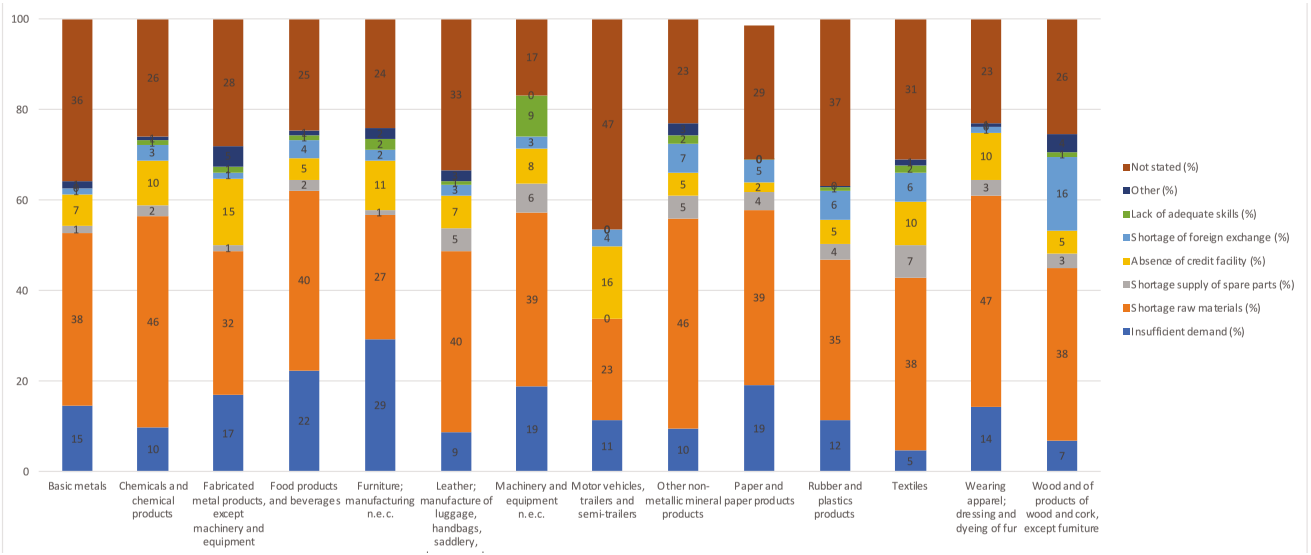
Ethiopia, annual average, reasons for underutilization, share of total, (%)



Source: Central Statistics Agency (2012), Ethiopia.

Figure II.6

Ethiopia, reasons for underutilization per ISIC category, average 2007–2010, % share



Source: Central Statistics Agency, Ethiopia.

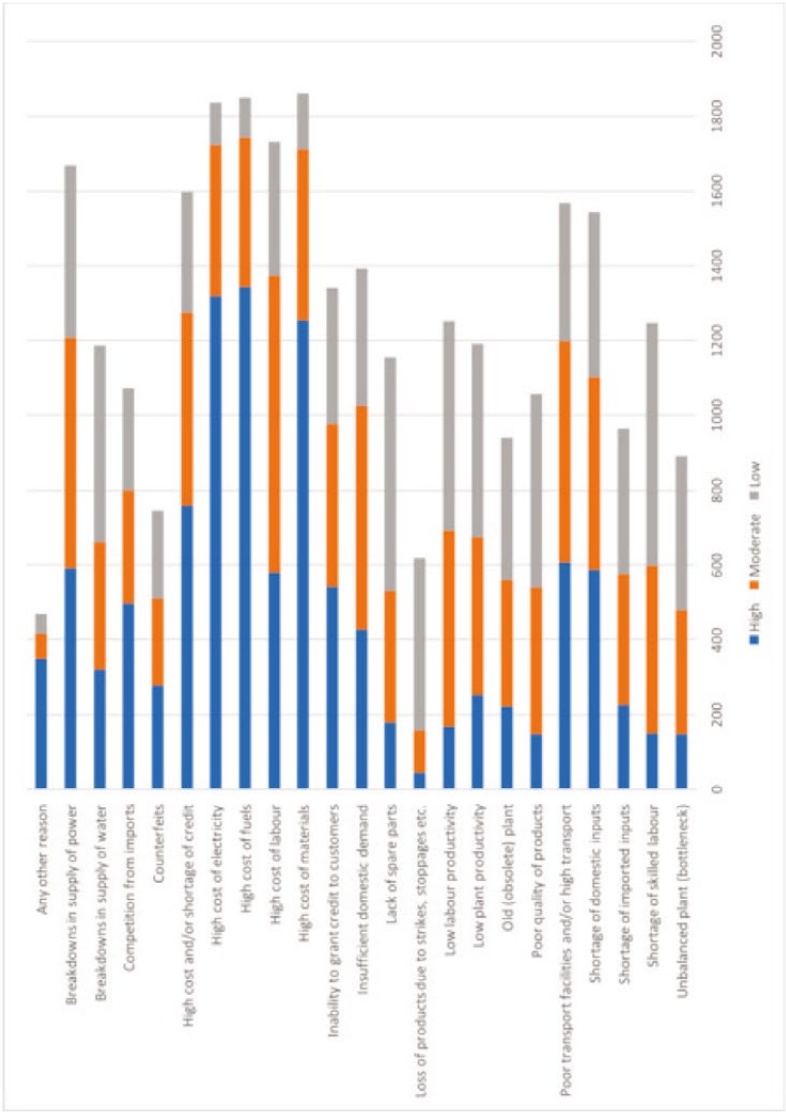
2. Kenya

The study published by the Kenya National Bureau of Statistics (2013) provides information on the reasons behind inability of firms to make full use of their existing production capacities in 2009 (figure II.7). More than half of the enterprises reported three major constraints on capacity utilization, relative to a range of other constraints: high costs of electricity, the high cost of fuel, and high costs of materials. In their study, Wamae and Kungu (2014) find that Kenyan manufacturing firms suffer from the following issues: (a) the functioning state of machinery and equipment; (b) delays in sourcing spare parts from abroad and specialized maintenance support from machinery and equipment suppliers; (c) human resource issues, in particular highly specialized skills in some critical areas, such as product development; (d) perceptions of locally manufactured products by some market segments; and (e) lack of policy coherence (ibid.: 5).

Muhu (2005) also provided the following reasons for low capacity utilization rates in Kenya: a lack of good management, volatile demand, and unreliable power constraints. In addition, it mentions instances of uncompetitive practices, such as dominant firms temporarily using spare capacity that would discourage new entrants and deter competition, productivity and economic growth within the manufacturing sector. The study also showed that firms reliant on imported inputs had lower capacity utilization, owing to constraints in getting intermediate inputs on time. The study notes that policies which ensure fewer delays at ports, reduction in corruption costs at ports of entry, and the creation of better rail and road infrastructure connectivity, would ensure a smooth transition of intermediate inputs thereby boosting capacity utilization.

There is some significant overlap in the reasons for underutilization mentioned in the three studies. The most binding seems to be the high cost of materials, which may be synonymous with the high costs of intermediate inputs, some of which are spare parts from abroad. Infrastructure deficiencies also constrain productive capacities, as inputs do not arrive on time, being constrained at ports, for instance. This is worsened by the high cost of fuel and electricity, and unreliability of power supply.

Figure II.7
Major reasons affecting capacity underutilization, number of industrial firms[8]



Source: Kenya National Bureau of Statistics, 2013.

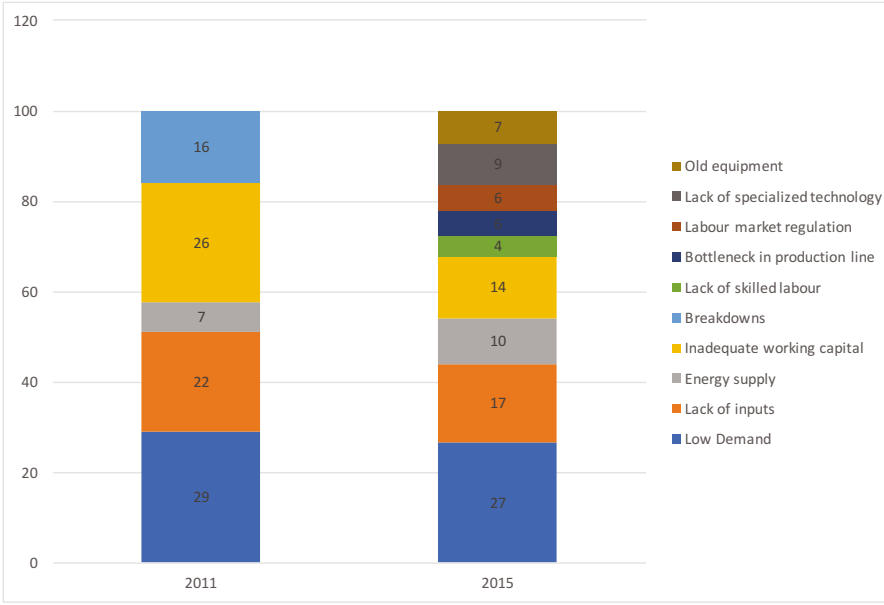
[8] To get to these results, firms were asked the following in a research-administered questionnaire: "If your company's production capacity was not fully utilized, rank the most important reasons for underutilization of capacity using a scale of [High, Moderate, Low, N/A]." This figure reports the reason ranked High, reflecting those to highly affect operations.

3. Rwanda

The key reasons for the low capacity utilization in Rwanda are presented in figure II.8. The Integrated Business Enterprise Survey 2016 published in June 2018 by the National Institute of Statistics of Rwanda (NISR) found that low demand, followed by unreliable supply of inputs and a lack of adequate working capital, were the three dominant reasons for capacity underutilization in manufacturing firms in 2015. Lack of skilled labour was the least reported reason in the survey. These reasons were consistent with those reported in the 2011 period; however, the 2011 results had fewer categories for underutilization in the questionnaire. Comparing the two sets of results, it is evident that energy supply, breakdowns, and lack of specialized technology were also important contributors to capacity utilization. Based on figure II.8 respondents noted that over 25 per cent of capacity underutilization is a result of low demand. This was followed by the lack of inputs in the 2015 case, while inadequate working capital was the second most common reason reported in the 2011 period.

Figure II.8

Rwanda, annual average, reasons for underutilization, % share, 2011 and 2015



Sources: National Institute of Statistics Rwanda (2018); the 2011 Rwandan Industrial Survey 2011 (MINICOM 2012).

4. United Republic of Tanzania

The United Republic of Tanzania emerged from a socialist developmental period, since 1967, and embarked on a structural adjustment programme under the auspices of the International Monetary Fund (IMF) and World Bank in the mid-1980s. This programme led to a focus on private sector development, including the privatization of many State-owned enterprises (Egbert, 2007). The 1980s were characterized by low levels of capacity utilization, which was a prime concern for the manufacturing sector. This was allegedly due to "an over-investment in large-scale capital-intensive production processes as a result of artificially low capital costs with many industries benefiting from preferential loans from State-owned investment banks" (Harding, et al., 2002: 27).

The 1990s proved difficult for manufacturing firms. The low levels of capacity utilization were attributed to the uncertainty characterizing the business environment during the 1990s, and higher domestic competition from international markets, after markets were liberalized under the structural adjustment programme left many firms operating below their potential – a continuation of underutilization since the 1980s. Firms' dependence on imports of raw materials and intermediate inputs, combined with exchange rate fluctuations creating volatility in prices of imported goods, negatively affected firms' costs and levels of productivity. The difficulty of sourcing intermediate inputs due to regulatory changes and other bottlenecks may also have disrupted production processes (Harding, et al., 2002).

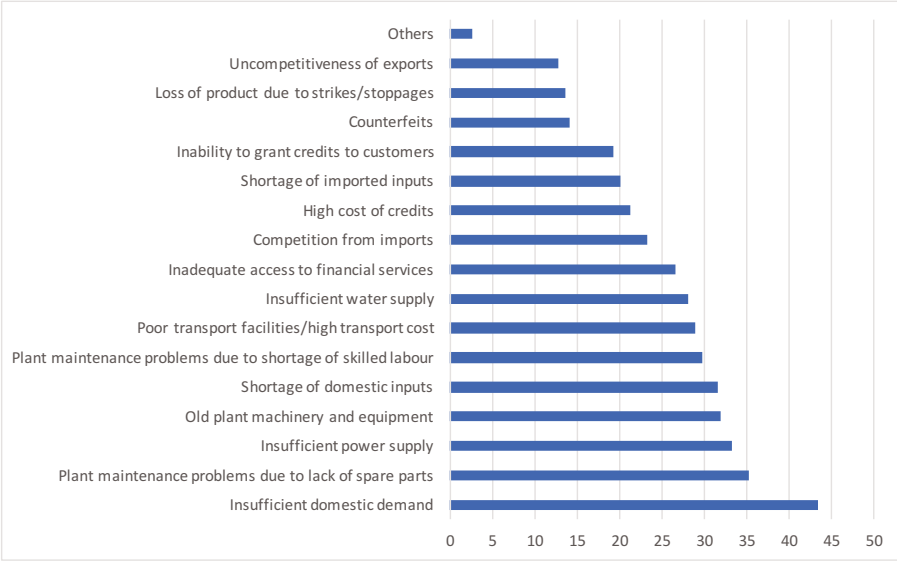
Low capacity utilization persisted for a long period after the 1980s, with privatized companies having slightly higher rates but not significantly different, notwithstanding firm size, industry sector or ownership. This led to persistently low returns to investment in the country, a consequence of what the World Bank termed "fatal" low capacity utilization (Egbert, 2007: 6). Egbert mentions that the industrial capacity surfacing from a socialist economy was sluggish to adjust to an open market economy, which led to some persistent structural inefficiencies. As most firms were State-owned in the socialist era, skilled managerial capacity was lacking as appointments were political and not based on merit. Limited access to foreign exchange resulted in difficulty accessing imported inputs, which the country was heavily depended on, and any failures to access planned inputs from domestic suppliers constrained productivity. Capacity utilization rates therefore took time to rise and did not switch simultaneously with the liberalization strategy. In addition, privatization of State-owned firms was delayed further into the late 1990s and consequently these firms continued to operate but suffered from a lack of competitiveness, resulting in reduced demand for products, suppressing utilization rates during the 1990s.

Recessions can also affect capacity utilization rates and – as the United Republic of Tanzania was dependent on imported inputs, including oil – the high oil prices of the late 1990s led to high input costs, dampening capacity utilization rates. In addition, energy supply restrictions such as electricity rationing, and water shortages delayed production processes. Tanzanian firms also suffered from the lack of working personnel, as absenteeism was a major problem, citing social obligations, especially within State-owned firms (Egbert, 2007).

The results from the 2013 Tanzania Census of Industrial Production reflect the survey results from the other case study countries (figure II.9). In particular, the primary constraints on capacity utilization are: a lack of demand, a lack of inputs and spare parts, unreliable power supply, and use of old plant machinery and equipment.

Figure II.9

The United Republic of Tanzania, reasons for underutilization, share of respondents citing a high or moderate constraint, 2013



Source: The 2013 Census of Industrial Production (NBS and MITI, 2016).

5. Mozambique

Owing to the paucity of data on capacity utilization in Mozambique, and associated lack of survey responses addressing the reasons for underutilization, here we briefly reflect on some of the key political economy dynamics that have shaped the evolution of the manufacturing sector as sourced from some literature. This offers broad insights into how policy choices, and political economy, can shape economic growth and the build-up of productive capacity.

The manufacturing sector today still mirrors legacies of the colonial past and the civil war. Immediately after independence, the State took control of many firms, centralizing production and ownership. These policies led to a reduction of the supply of basic materials to industry and reduced demand for products. The post-independence civil war exacerbated the situation via destruction of infrastructure, damaging international and domestic production channels and destroying various productive capacities. Biggs et al. (1999: 22) noted that Mozambique had one of the lowest technical efficiencies in Africa, far below the world average, making firms uncompetitive. This was a major factor behind reduced levels of capacity utilization in the 1980s.

However, the 1992–1993 period saw a shift when the civil war ended, a privatization strategy followed, macroeconomic and trade policies were reformed, and growth in the manufacturing sector improved significantly (Biggs, et al., 1999). Import liberalization and increased availability of foreign exchange improved access to raw materials and reduced production bottlenecks. Domestic demand also increased after the end of the civil war. Biggs et. al (ibid.) note that one of the most substantial gains was the increase in capacity utilization, as well as increased investment and productivity growth. However, underutilization remained a problem. A third of firms in the sample identified lack of working capital as the major problem. This constrained purchase of materials, which resulted in lower production. The alternative was to use trade credit; however, this was not widely available (ibid.).

Capacity utilization within Mozambican manufacturing firms has increased since the 1990s, albeit not in a manner that is consistent across all sectors. For instance, the difficulties that depressed the textiles industry particularly sabotaged efforts for improved capacity utilization. This highlights the importance of developing the general business climate where different sectors operate (Cruz, et al., 2007).

6. South Africa

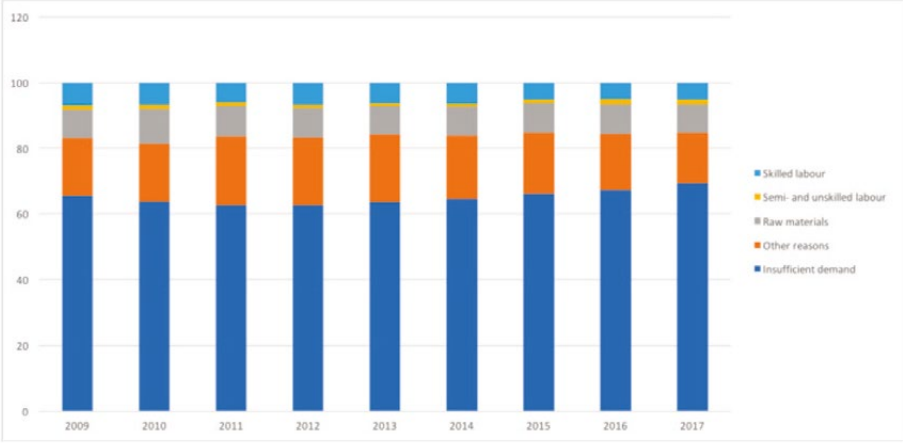
South Africa is quite different from the other countries examined, given its much more diversified economy, well-established industrial base and long history of

industrialization. Figure II.10 presents the most prevalent reasons for underutilization as a share of total underutilization. Most firms identified insufficient demand as the most important reason for underutilization, across all years from 2009 to 2017. This was followed by "other reasons" (downtime due to maintenance, changes in productivity and seasonal factors), then the shortage of raw materials, shortage of skilled labour and shortage of semi and unskilled labour.

Notwithstanding these reasons for underutilization, capacity utilization rates in South Africa are high relative to other regional averages and much higher than our case study countries. Perhaps key to understanding this is that only large firms are surveyed, in contrast to the other countries that do not have private sectors comparable to South Africa's in terms of firm size, longevity and sophistication.

Figure II.10

South Africa, annual average, reasons for underutilization, share of total, 2009–2017



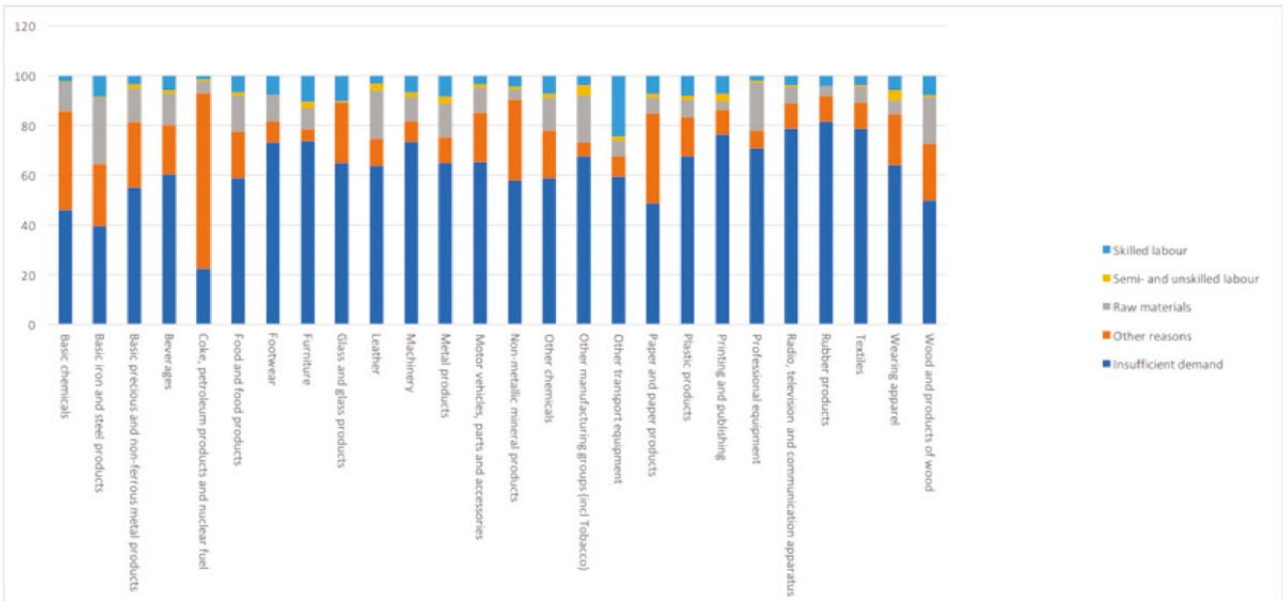
Source: Author's calculations, based on data from Statistics South Africa (2018).

Reasons for underutilization, represented in figure II.11, were also collected across industries using the Standard Industrial Classification of all Economic Activities (SIC) breakdown. Total underutilization is a weighted average of the underutilization reported in the SIC breakdown. Respondents were asked to rank in order of importance (1, 2 or 3) up to three reasons for underutilization, in each of the SIC sectors, where five options were presented, as shown in the legend below. These reasons were weighted, relative to the importance of the reasons presented, by the respondents. If respondents provided three reasons for underutilization, the

following weights applied: 0.5 for the most important reason; 0.33 for the second-most important reason and 0.17 for the least important reason. The percentage of underutilization for each reason was arrived at by multiplying these weights by the total underutilization reported by the respective respondent (Statistics South Africa, 2017). Most industry sectors reported insufficient demand as the most important reason for underutilization, except for the coke, petroleum products and nuclear fuel sector, citing “other reasons” as their largest constraint. “Other reasons” and the shortage of raw materials are the next dominant constraints, varying between sectors.

Figure II.11

South Africa, reasons for underutilization per SIC category, average, % share of total, 2004–2017



Source: Author's calculations, based on data from Statistics South Africa, 2018.

7. Nigeria

Since we do not have survey data setting out the reasons for manufacturing capacity underutilization in Nigeria, we provide a brief political economy discussion of the main factors that have shaped the statistics presented in the previous section. The 1970s were characterized by sharp increases in oil revenues, sparked by the 1973 OPEC embargo and the 1979 Iranian Revolution. As an oil export-dependent nation, Nigeria was able to accumulate windfall wealth and was therefore able to carry out a large-scale public investment programme that sought to expand and improve its infrastructure and social services, in a period of just over 10 years (World Bank, 1994).

Initially, Nigeria's public investment campaign relied on international debt financing, and so the country was exposed to major exchange rate risk. When the United States Federal Reserve hiked interest rates in 1981 to curb inflation, Nigeria was subjected to high interest payments on United States dollar-denominated debt. In 1984, the Government attempted "budget-tightening" mechanisms, which led to a slowdown of economic activity, but instead of adopting a flexible exchange rate regime (allowing the exchange rate to depreciate), to boost demand, the Government opted to sustain an appreciated currency to curb inflationary pressures. However, inflation increased, and the competitiveness of non-oil sectors such as manufacturing decreased (ibid.). When the international oil price fell in December 1985, Nigeria's export revenues tumbled. The combination of dwindling export revenues and higher interest payments on foreign debt led to Nigeria becoming embroiled in the emerging markets debt crisis of the 1980s, and adoption of an IMF Structural Adjustment Programme (SAP). This entailed exchange rate policy adjustment (to depreciate the currency), trade policy liberalization, and "stabilization" policies to restore economic efficiencies and invigorate the private sector. Some implementation of these policies continued throughout the SAP era (1986–1992), though some were implemented inconsistently. This is shown for instance, in the repeated pattern of spending by the Government in the 1990 period, once oil prices recovered, which led to larger fiscal deficits, requiring further macroeconomic interventions (ibid.).

In relation to these significant macroeconomic developments, Mojekwu and Iwuji (2012) noted that Nigeria's manufacturing woes began in the 1970s after the sharp increase in international oil prices, and the government's adoption of an import substitution strategy.

Clearly macroeconomic forces played a major role in the problems experienced by the manufacturing sector, negatively impacting capacity utilization. Simon-Oke and Awoyemi's (2010) report examined the impacts of capacity utilization in Nigerian industry from 1970 to 1998. They noted that the manufacturing capacity utilization rate in the late 1970s was as high as 78.70 per cent but plummeted to 43.80 per cent in the 1980s, only recovering in the late 1990s (ibid.: 267). They ascribe the precipitous decrease to inadequate infrastructure and the lack of proper incentives to boost manufacturing activity in Nigeria. They argued that the SAP at the time did not improve matters but led to an inflationary period that decreased the competitiveness of domestic manufacturers (ibid.). In their view, this led to knock-on effects such as scarcity of raw materials, high production costs and large inventories of unsold goods, resulting from a decrease in purchasing power. By contrast, the World Bank (1994) notes that the 1986 fall in world oil prices was the major cause of the further depression of the economy, rather than the SAP per se. Furthermore, because the assembly-based manufacturing sector relied on imported inputs, it contracted during the SAP era reducing competitiveness (ibid.).

In addition, the import substitution policy, which was generally favoured by some in the country, relied on importation of inputs. The use of imported inputs resulted in high production costs for manufacturers, especially during a time of high inflation and a depreciated currency. Subsequently, the bulk of manufacturing capacity remained unutilized and the provision of public utilities deteriorated alongside other social services (Simon-Oke and Awoyemi, 2010: 268). Turning to broader, horizontal considerations, the empirical analysis by Simon-Oke and Awoyemi (ibid.: 272) shows a long-run positive relationship between industrial productivity (development) and the present rate of manufacturing capacity utilization. This is because improved industrial development, in the long run, creates an environment for higher levels of manufacturing capacity utilisation. In this regard, the study by Mojekwu and Iwuji (2012) suggests that power supply has a positive and significant impact on capacity utilization, and that the Government should play a role in improving the reliability of power supply. Some recommendations include looking at alternative sources of power (i.e. wind, coal, biofuel and solar energy) and privatization of the sector by adopting a comprehensive independent power supply strategy.

Adeyemi and Olufemi (2016) performed an empirical analysis to establish the determinants of capacity utilization within Nigerian manufacturing firms from 1975 to 2008. They argued that low production in the sector could be ascribed to "high cost of imported raw materials, machinery, and spare parts owing to increased

interest rate and exchange rate" (ibid.: 29). In addition, infrastructure facilities performed poorly especially due to the volatile electricity supply. Furthermore, "the gross under-utilization of resources in the Nigerian Manufacturing Sector has been attributed to the… lack of adequate funds to procure inputs and fallen demand for manufactured goods" (ibid.: 21).

A report by Allinson (2010) mentions that the manufacturing sector is constrained by a number of factors, including: (a) heavy reliance on imports of finished goods, leading to closure of manufacturing firms, as this decreases demand for locally produced products; (b) smuggling and dumping of restricted goods; (c) prevalence of fake and mediocre products; (d) high taxes and levies (aggressive taxation was an initial reason for production to shut down and operationalize exits to other countries); (e) poor administration and management at ports; and (f) insufficient financial support for the sector.

In sum, the review of the reasons for low capacity utilization of enterprises in the seven countries studied suggests that both demand and supply factors contribute to the excess capacity in the manufacturing sectors of African economies. While these constraints are in general similar across countries, their relative importance varies from country to country. For example, low or volatile demand seems to be the dominant factor in the case studies of Rwanda, the United Republic of Tanzania and South Africa. In Ethiopia, the dominant factor is the shortage of raw materials, and in Kenya it is the high costs of electricity, fuels and other inputs. The next section discusses how to address these and other binding constraints to the use of existing productive capacities in Africa.

D. Enhancing utilization of existing manufacturing capacities in Africa

The discussions in the previous section suggest that weak demand and availability, as well as the high costs, of inputs are key constraints to capacity utilization in the case study countries. This means that manufacturing firms in case study countries have latent capacity, mostly due to a lack of demand and inefficient supply chains. Concerning the lack of demand, three factors seem relevant, and can operate separately or in concert: either firms' prices are too high which suppresses demand, or the purchasing power of their market is limited, or more competitive manufactured goods are available in their markets.

Subject to the constraints on their cost bases, manufacturing establishments can adjust the price of their goods to increase demand, which should see the latent capacity absorbed. As demand increases, the establishment would react to supply outputs at the new equilibrium. Pricing strategies have a medium-to-long-term

outlook, as markets might react slowly to gradual price adjustments. In cases where the purchasing power in markets is limited, a price adjustment strategy may not achieve the desired result. African LDCs have preferential market access[9] to large developed markets which, in theory, means that the purchasing power of their markets is mostly limited by non-tariff barriers, private standards and value chain requirements.

Beyond non-tariff barriers, the competitive advantage of substitutable manufactured goods can arise from a number of factors, such as more efficient value chains that allow suppliers to better respond to demand, lower input and operating costs, more productive labour or capital, or better marketing and market segmenting strategies. Manufacturing establishments also tend to choose their rate of capacity utilization. If demand is seasonal or low, factories could choose to taper their output to save costs on labour, utilities and maintenance on machines; or factories could take the time to overproduce in anticipation of future demand. Rather than thinking of capacity utilization as a measure to maximize, it should be thought of as an adjustable preference available to managers and factory owners. However, to have this preference, manufacturing establishments require an enabling environment with several supportive cross-cutting factors. From the case study analysis to this point, several cross-cutting issues can be identified. While there are industry-specific, and often country-specific, impairments to manufacturing capacity utilization, there are some general requirements (or policies to be adopted) for the manufacturing sector to improve capacity utilization (table II.5).

[9] Notably under the General System of Preferences Plus (GSP+) and Everything but Arms schemes.

Table II.5

Summary of constraints on capacity utilization and proposed remedies

Constraint	Proposed remedies
Availability and appropriate cost of key inputs	• Facilitate access to critical imported spare parts and advanced machinery • Provide labour market information and make it easier for employers to access skilled workers to install/maintain equipment, particularly that from other African countries • Ensure appropriate costs of key inputs • Identify and address seasonality constraints, notably in agroprocessing
Stable political economy environment	• Maintain macroeconomic stability • Promote an investment environment conducive to productive capacity development • Maintain peace and stability • Avoid policy reversals in order to promote investor confidence
Weak and volatile demand	• Enhance export competitiveness of domestic firms • Change mindsets of consumers regarding local manufactured goods • Increase local purchasing power • Adopt pricing strategies that adjust to demand
Hard and soft infrastructure	• Ensure steady supply of cost-effective electricity • Exploit the potential of regional cooperation for infrastructure development

Source: Authors

1. Enhance access to key inputs at affordable prices

Manufacturing firms require stable and reliable access to inputs at affordable prices to fully utilize their installed capacities. The lack of required raw materials or semi-manufactured components are often listed as critical factors contributing to

manufacturing underutilization in Africa. This stems in part from unreliable and seasonal availability of inputs from the domestic market, which is a problem for agroprocessing establishments. But it is also a consequence of the fact that manufacturing firms in the continent often rely heavily on imported intermediate inputs, and do not have easy access to foreign exchange for import contracts. The lack of specialized skills in high value added manufacturing industries is a constraint to manufacturing capacity utilization. Lack of managerial skills, and access to new and more efficient manufacturing technologies (especially in high value added industries) also impose large constraints on increasing and using productive capacity. Delays in delivery or receipt of imported goods can also severely impact manufacturing capacity utilization. These delays are attributed to poor hard infrastructure and delays at ports and borders affecting the transport of goods. Against this backdrop, African Governments should enhance access to key production inputs at affordable prices to create an incentive for firms to better utilize their installed capacities. Some of the specific actions they could take to achieve this goal include: giving priority to manufacturing firms in the allocation of foreign exchange so that they can import key equipment and spare parts necessary for production; providing incentives to manufacturing firms to increase the percentage of inputs sourced locally; providing labour market information to ensure that skilled workers are aware of available employment opportunities; making it easier for employers to hire skilled workers from other African countries; facilitating movement of goods at ports and borders; and reducing costs of key inputs used by manufacturers through, for example, targeted subsidies. Regarding agroprocessing, there is the need for manufacturing firms to better integrate seasonality of supply into their planning processes, and also invest in storage facilities, to reduce the uncertainty associated with supply of agricultural raw materials.

2. Maintain a stable economic and political environment

A stable economic and political environment is vital for successful operation of manufacturing firms in an economy. It reduces uncertainty, thereby affecting investment decisions of firms, as well as the degree to which they make use of installed manufacturing capacities. Some of the actions that African Governments can take to reduce uncertainty and maintain a stable political economy environment include: adopting macroeconomic policies that promote price and exchange rate stability; avoiding policy reversals to reduce policy uncertainty and promote investor confidence; and promoting peace and security. There is also the need for Governments to promote an investment environment conducive to better utilization of productive capacities through, for example, ensuring that monetary policy is not so tight that prevailing interest rates are prohibitive. This is important because, if

firms cannot have access to credit at reasonable rates, they will not be able to fully utilize their installed manufacturing capacities.

3. Ensure stable supply of cost-effective electricity

As most manufacturing operations require electrical machinery at some point in their processes, the lack of basic utility services was another common factor cited as affecting capacity utilization in African manufacturing. Costly and unreliable utility services, together with aging and comparatively less efficient manufacturing plants and equipment, puts African manufacturers at a disadvantage. Manufacturers facing these issues struggle just to maintain productive capacity, let alone build more. Incessant power outage is a common challenge experienced by manufacturers in most African countries, and some respond to the challenge by investing in generators, thereby increasing production costs with dire consequences for output, employment and the development of the manufacturing sector. In addition to the unpredictability of electricity supply, the high cost of electricity was also mentioned as a major concern in regard to capacity utilization. Together with the often-high cost of fuel and input materials, the high costs of electricity can dampen establishments' cost competitiveness. Osakwe (2019) stresses that finding a long-lasting solution to the energy challenge faced by African manufacturers requires diversifying the energy generation mix and, more importantly, the adoption of a holistic approach to the design and implementation of energy policy. Such an approach involves addressing challenges in all segments of the power sector value chain: generation, transmission and distribution. It also requires involving more stakeholders in policy formulation and implementation to enhance transparency and ownership of the process.

4. Boost demand for African manufactured products

Manufacturing establishments in African countries face substantial competition from both developing and developed countries, often in an environment where the most influential factor behind consumer choice is price of goods. The volatility in, and/or lack of demand is pervasive through most of the capacity utilization studies, particularly lack of local demand. While African LDCs can export to other countries under special non-reciprocal trade preference schemes – such as the European Union's Everything but Arms and GSP+, Canada's Least Developed Country Tariff scheme and many extra General System of Preferences (GSP) schemes for LDCs – they still face strong competition in foreign markets. Furthermore, in the domestic market, consumer demand, or market share, is often eroded by imported competing substitute products. There is also the constraint to demand imposed by the fact that, in most countries, consumers have a preference for imported rather than local manufactured goods. Clearly, an effective solution to these demand-side

challenges will require enhancing the competitiveness of African products through, for example, reducing the costs of doing business and provision of better-quality infrastructure. It will also require firms adopting pricing strategies that adjust to demand, and changing the mindsets of African consumers to encourage them to buy goods made in the continent. On the export side, there is the need for adoption of better-quality control systems in manufacturing firms to enhance their export competitiveness and boost demand for their goods in export markets.

5. Exploit the potential of regional cooperation for infrastructure development

The general poor state of infrastructure in many countries in Africa makes utilization of productive capacities challenging and constrains manufacturing development. It also makes it difficult for manufacturing firms to access regional markets, thereby constraining demand for their products. Given the limited financial resources of individual African countries and the magnitude of the infrastructure gap, regional cooperation seems to be the most effective way that African countries could quickly address their infrastructure development challenges (UNIDO and UNCTAD, 2011). African Governments have recognized this reality and have launched several initiatives to promote infrastructure development, such as the Program for Infrastructure Development in Africa. However, implementation of these initiatives has been slow and so the expected impact on trade and manufacturing development has been very limited. In this regard, African Governments should strengthen efforts to build regional infrastructure by expediting action on implementation of existing initiatives to reduce trade and transactions costs, enhance manufacturing capacity utilization, and unleash the potential of the private sector for industrialization and development.

In sum, the effective utilization of productive capacities in African countries requires addressing binding constraints that make it challenging for enterprises to operate effectively in these economies. While the constraints to capacity utilization discussed in this chapter are in general similar across the case study countries, the causes underpinning these constraints are likely different from one case to another, and may differ within States as well. Similarly, not all States are equally capable of pursuing any given policy option or strategy to address the constraints, as countries have different institutional capacities and endowments, and geographical and political constraints. Hence the policy measures discussed in this section should be regarded as a guide to be applied considering country specific circumstances and political realities.

References

Adeyemi, PA and Olufemi, OB (2016). The Determinants of Capacity Utilization in the Nigerian Manufacturing Sector. *Journal of Economics and Sustainable Development*: ISSN 2222-1700 (Paper) ISSN 2222-2855 (Online).

Allinson, O (2010). The Impact of Manufacturing Capacity Utilization on the Economy of Nigeria: An Empirical Analysis. Online. Available at www.academia.edu/1762422/The_Impact_of_Manufacturing_Capacity_Utilization_on_the_Economy_of_Nigeria_An_Empirical_Analysis (accessed on 30 September 2019).

Andreoni, A (2017). *Mapping industrial production in Tanzania: A disaggregated analysis based on the 2013 mainland census.* United Nations Industrial Development Organization. Vienna.

Biggs, T, Nasir, J and Fisman, R (1999). *Structure and Performance of Manufacturing in Mozambique*. World Bank. Washington, D.C.

Central Statistical Agency (2012). Report on Large and Medium Scale Manufacturing and Electricity Industries Survey. The Federal Democratic Republic of Ethiopia Central Statistical Agency. Addis Ababa.

Corrado, C and Mattey, J (1997). Capacity Utilization. *Journal of Economic Perspectives*. 11(1), Winter: 151–67.

Cruz, AS, Mafambissa, F and Sulema, J (2007). Enterprise Development in Mozambique: Results Based on Manufacturing Surveys Conducted in 2002 and 2006. National Directorate of Studies and Policy Analysis. Maputo.

Egbert, H (2007). Capacity Utilization of Enterprises in *Tanzania. Tanzania Journal of Development Studies*. 7(1, 2007): 16–26.

Harding, A, Söderbom, M and Teal, F (2002). The Tanzanian Manufacturing Enterprise Survey 2002, s.l. Centre for the Study of African Economies (CSAE) University of Oxford.

Kenya National Bureau of Statistics (2013). Basic Report on the 2010 Census of Industrial Production (CIP) Kenya National Bureau of Statistics. Nairobi.

Ministry of Trade and Industry (MINICOM) (2012). Rwanda Industrial Survey 2011. Kimihurura, Gasabo.

Mojekwu, JN and Iwuji, II (2012). Factors affecting Capacity Utilization Decisions in Nigeria: A Time Series Analysis. University of Lagos.

Muhu, NH (2005). Determinants of Capacity Utilization among Kenyan Manufacturing Firms. University of Nairobi. Nairobi.

National Bureau of Statistics (NBS) and the Ministry of Industry, Trade and Investment (MITI) (2016). The 2013 Census of Industrial Production: Statistical Report, Dar es Salaam, United Republic of Tanzania.

National Institute of Statistics of Rwanda (NISR) (2018). Integrated Business Enterprise Survey report 2016. Kigali.

Osakwe, PN (2019). Unlocking the Potential of the Power Sector for Industrialisation and Poverty Alleviation in Nigeria. In: Wamboye, EF and P. J. Nyaronga (eds.) *The Services Sector and Economic Development in Africa. Routledge:* London

Simon-Oke, OO and Awoyemi, OV (2010). Manufacturing Capacity Utilization and Industrial Development in Nigeria: An Assessment (1976 – 2005). *African Research Review.* 4:265–275.

Statistics South Africa, 2017. Manufacturing: Utilisation of production capacity by large enterprises (Preliminary), s.l.: Statistics South Africa.

UNIDO (2017). *International Yearbook of Industrial Statistics 2017*. United Nations Industrial Development Organization. Vienna.

United Nations Industrial Development Organization (UNIDO) and UNCTAD (2011). *Economic Development in Africa 2011: Fostering Industrial Development in Africa in the New Global Environment* (United Nations Publication, Sales No. E.11.II.D.14. New York and Geneva).

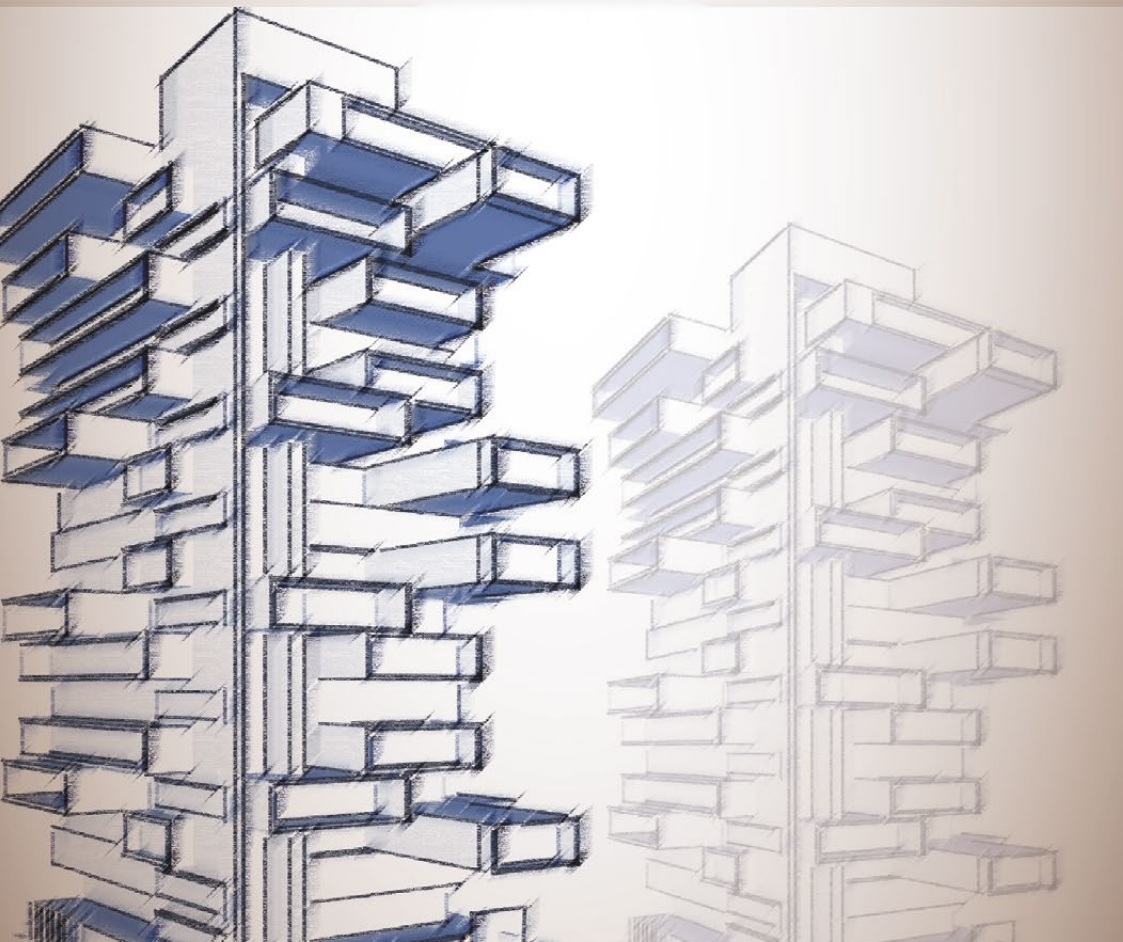
Wamae, W and Kungu, JK (2014). Pharmaceutical manufacturing in Kenya: key trends and developments, s.l.: African Centre for Technology Studies.

World Bank Enterprise Survey (WBES) (2018). Performance. Online. World Bank. Available at www.enterprisesurveys.org/data/exploretopics/performance#all-countries (accessed on 30 September).

World Bank (1994). Nigeria Structural Adjustment Program, s.l.. World Bank.

UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT
UNCTAD

III. Local production systems development in the global value chains era



III. Local production systems development in the global value chains era

Since the mid-1990s, African countries and LDCs have experienced an increasingly backward and forward integration into regional and global value chains (RVCs and GVCs), mainly led by the penetration (investment and value extraction) of transnational corporations (TNCs). Within the new global production landscape, particular attention has been given to the learning and industrialization opportunities offered by the integration of domestic companies into GVCs and their specialization in specific tasks (vis-à-vis sectoral development, both in the import substitution or export-oriented industrialization models).

However, in many LDCs, and in the majority of the African economies, this new industrialization model – integration into GVCs – has not led to increasing domestic value addition (particularly lacking in manufacturing industries). It has also failed to create any significant transformation of the local production systems: there is still a skewed distribution of productive organizations and the "missing middle" phenomenon continues. In fact, a number of African economies have been de-industrializing, and their dependence on primary commodity exports has even increased.

The chapter engages with the specific practical challenges that LDCs and, more specifically, African countries face today in developing productive capacities and building up their local production system. It builds on the discussions in the previous chapters by introducing inter-firm level productive capacities development dynamics, with a specific focus on the need to develop horizontal supply chains in the domestic economy, while promoting strategic vertical integration in GVCs. Particular emphasis will be given to the importance of structural and firms' heterogeneity, thus the need to selectively support companies and sectors in their different productive capacities development processes.

A. Global and regional production networks: Opportunities and challenges

1. The new wave of globalization

The global business revolution and the emergence of RVCs and GVCs since the early 1990s have been made possible by a number of technological advances (such as falling transport costs, and advances in technology, enabling more interconnectedness via ICTs), cost reduction opportunities associated with offshoring labour-intensive manufacturing processes, and increasing trade and investment liberalization (Nolan, 2001; Milberg and Winkler, 2013; Neilson et al., 2014; Gereffi, 2014; Kaplinsky and Morris, 2015).

Although GVCs already existed in the 1960s, when economies such as the Republic of Korea and Taiwan Province of China were starting to industrialize,[10] since the 1990s there has been a leap in the degree of internationalization of production (Chang et al., 2016). The unprecedented scale and scope characterizing what Baldwin (2014) called the "second unbundling" is mirrored in both the large volume of flows in intermediate goods, which in 2014 amounted to more than 46 per cent of world merchandise exports (UNCTAD, 2016), and in a substantial reconfiguration of world trade in terms of participants. Indeed, from GVCs' moderate start in the textiles and electronics sectors in the late 1960s, North–South exchanges within international production networks have now spread to many other industries and encompassed multiple countries involved in different segments of production, with increasing South–South linkages (ibid.).

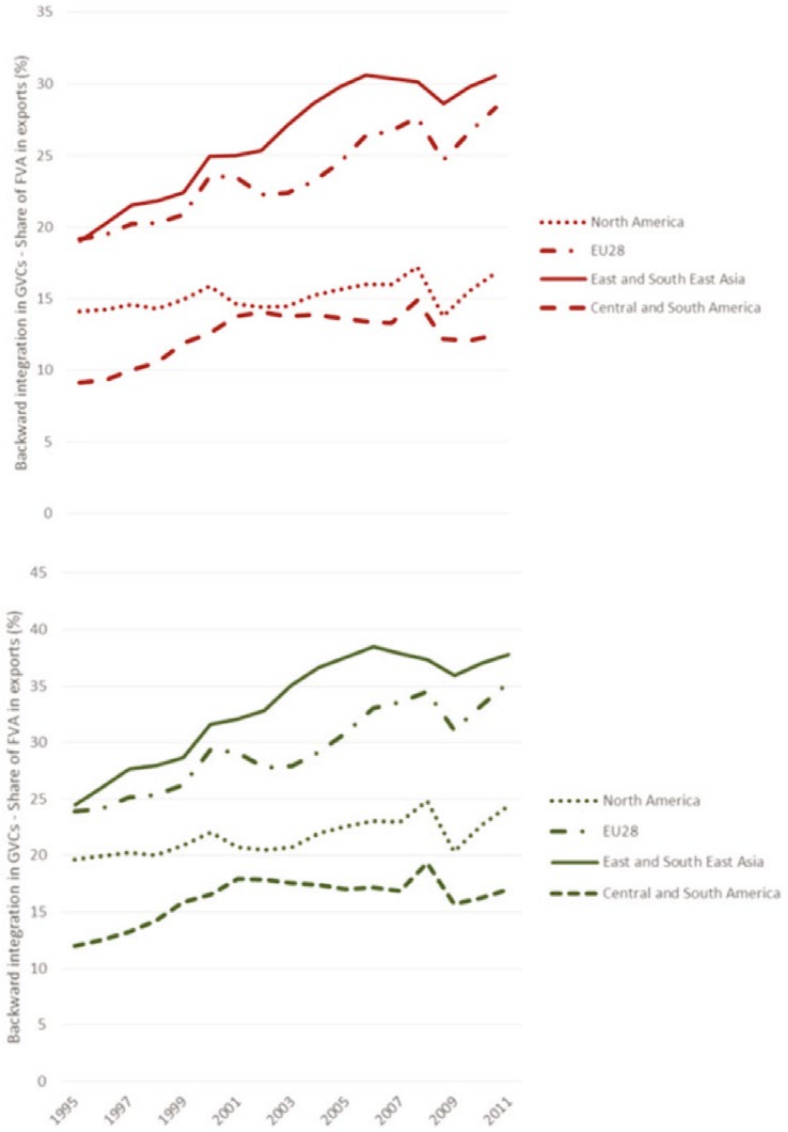
But GVCs still remain mainly a regional phenomenon, limited to "Factory North America", "Factory Europe", and "Factory Asia" (Baldwin and Lopez-Gonzalez, 2015). Since the mid-1990s, South American and, to a lesser extent, African countries started to show increasing inter- as well intra-regional integration. Figure III.1 reports trends in backward participation in GVCs, proxied by the foreign value added content of gross exports, by macroregions (red and green lines represent data for total economy and total manufacturing, respectively). Figure III.2 shows trends in backward participation in GVCs in total manufacturing for some important emerging economies in terms of world share of manufacturing value added.

From 1990 to 2013, FDI inflows in developing countries have risen from $35 billion to $778 billion (from 17 per cent to 54 per cent of world FDI inflows). In Africa, FDI inflows have increased roughly 20-fold during the same time frame, from $3 billion to $57 billion (from 1.4 per cent to 4 per cent of world FDI inflows), although this increase has been mainly concentrated in a few sectors (e.g. services and mining) and countries (South Africa, Nigeria and Egypt among the major economies, and Ethiopia, the United Republic of Tanzania, Mozambique and Congo among the LDCs). Although from 2014 to 2016 developing economies registered a decline in FDI inflows (from $704 billion to $646 billion), with Africa moving from $71 to $59 billion, forecasts suggest a recovery in the coming years (UNCTAD, 2017).

[10] For example, until the late 1980s, Nike outsourced almost all production activities to the Republic of Korea and Taiwan Province of China (Chang et al., 2016).

Figure III.1

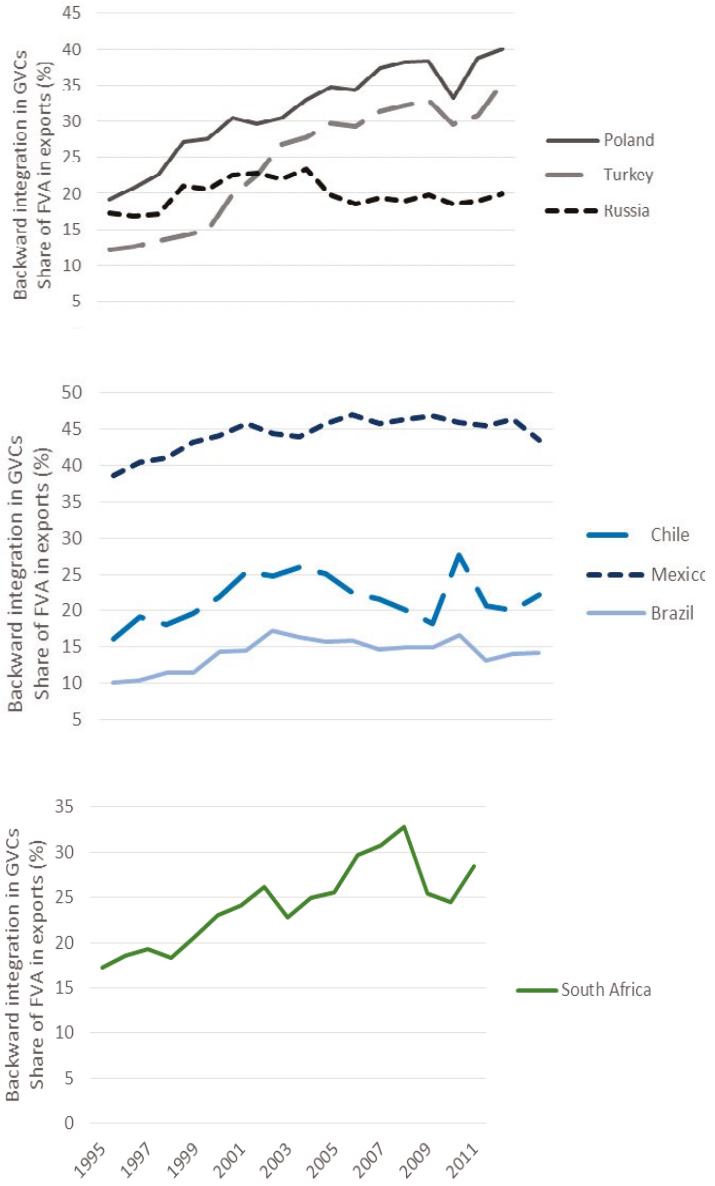
Backward integration in GVCs by macroregions: (a) total economy, (b) total manufacturing



Source: OECD Trade in Value Added.

Figure III.2

Backward integration in GVCs in total manufacturing for selected emerging countries.



Source: OECD Trade in Value Added.

2. Opportunities and challenges for low- and middle-income countries

From a development standpoint, integration in GVCs offers new opportunities and challenges for development in Africa and LDCs. On the one hand, GVCs might represent an attainable first step towards integrating into regional and global markets and industrialization, while diversifying and upgrading in specific tasks and new products. According to this view, indeed, rather than having to develop an entire product, countries can specialize in specific tasks or components of a multitude of value chains, starting at the relatively accessible bottom. Through the exposure to learning processes, technology transfer and informational flows, these countries might then benefit from knowledge spillovers and start upgrading within GVCs (for a description of the different types of economic upgrading see box III.1).

On the other hand, while joining GVCs might represent an important learning and development channel, the risk in being stuck in low value added activities with little scope for progress toward higher tiers in the value chains exists. Despite GVCs' lower barriers to entry at the bottom of the value chain, making it relatively easier for developing countries to enter the global markets than in the past, the conditions that facilitate access might also act as constraints for upgrading. More accessible parts of the value chain are associated, indeed, with limited forward and backward linkages and little possibility for knowledge spillovers in the wider economy, which might result in "thin industrialization" (Gereffi, 2014) and "enclave effects" (Gallagher and Zarsky, 2007; Plank and Staritz, 2013). Within this context, GVCs may merely constitute, indeed, global profit-maximizing operations led by powerful multinational companies, also associated with waves of financialization, which extracts the profits from the lower tier of GVCs, with little consideration for local value added or decent job creation (Milberg and Winkler, 2013; UNCTAD, 2016; Lee et al., 2017).

Box III.1

Which type of upgrading?

The notion of upgrading represents a central concept in the GVC framework, originally defined by Gereffi (1999) as "the process of improving the ability of a firm or an economy to move to more profitable and/or technologically sophisticated capital and skill-intensive economic niches".

This notion has been extended to the now widely-accepted four-fold categorization of upgrading typologies as product, process, functional and intersectoral upgrading (Kaplinsky and Morris, 2001; Humphrey and Schmitz, 2002).

1. Process upgrading typically refers to improved production methods that transform inputs into final products more efficiently through the reorganization of production or the introduction of superior technology (e.g. footwear producers in the Sinos Valley: Schmitz, 1999).
2. Product upgrading is moving into more sophisticated product lines in terms of higher unit value products rather than moving to a different part of the value chain (e.g. the apparel commodity chain in Asia upgrading from discount chains to department stores: Gereffi, 1999).
3. Functional upgrading involves performing new, superior functions in the chain, such as design or marketing, or abandoning existing low value added functions to focus on higher value added activities (e.g. Torreon's blue jeans industry upgrading from maquila to ''full-package'' manufacturing: Bair and Gereffi, 2001).
4. Intersectoral upgrading is applying the competence acquired in a particular function or industry to move into a new sector. For instance, Taiwan Province of China used its competence in producing televisions to make monitors and then to move into the computer sector (Guerrieri and Pietrobelli, 2004).

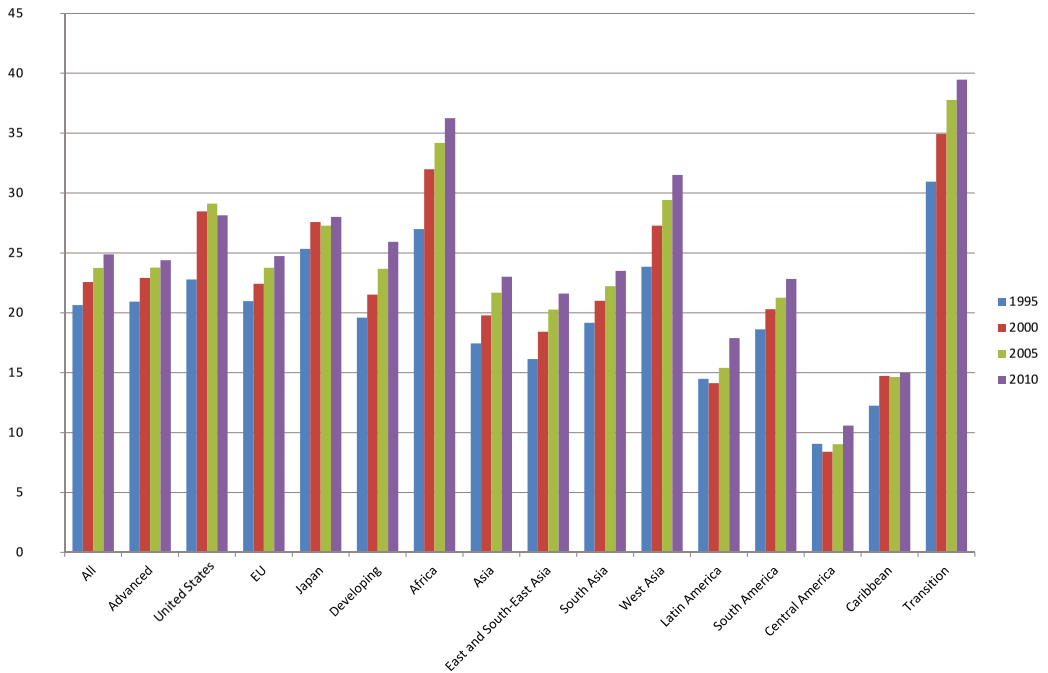
(a) GVCs integration in Africa: Some evidence

From 1990 to 2010, African countries experienced limited gains from GVC integration. As shown by Foster-McGregor et al. (2015), while the value of world imports has more than doubled during the 2000s, with intermediate goods making up 65 per cent of world imports in 2011, much of Africa's participation in GVCs has

developed in upstream production (see figures III.3 and III.4). This upstream GVC specialization has been coupled with a declining downstream integration since 1995. Mauritius, Ethiopia, Botswana, Kenya and the United Republic of Tanzania have been able to move into some downstream production; however, even these economies are still facing significant challenges in increasing value addition in GVCs.

Figure III.3

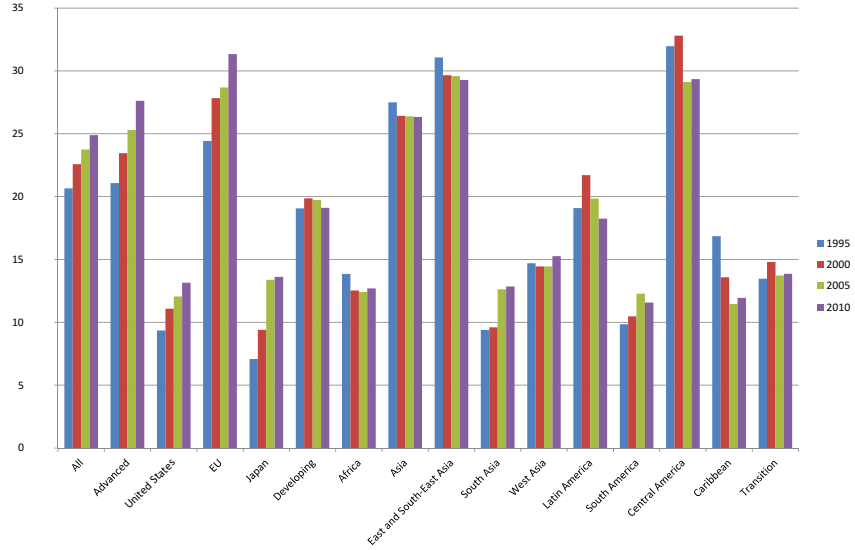
Upstream integration in GVCs by macroregions. Figures report the DVX indicator (Foster-McGregor et al., 2015) which is the ratio of the value added supplied to other regions' exports to gross exports.



Source: UNCTAD-EORA database, Foster-McGregor et al. (2015).

Figure III.4

Downstream integration in GVCs by macroregions. Figures report the FVA indicator (Foster-McGregor et al., 2015) which is the ratio of foreign value-added used in a region's own exports to gross exports.



Source: UNCTAD-EORA database, Foster-McGregor et al. (2015).

Furthermore, data on the export value performance and export basket composition across the continent seem to suggest that a number of sectors, in many respects, are experiencing a process of deindustrialization. For example, if we look at countries in the East African Community between 2000 and 2014, while manufacturing export per capita has increased overall, this has happened at a lowering speed, from 12.4 to only 1.7 per cent.

Moreover, in all African countries, the increase in value addition across manufacturing sectors has remained limited, while industries such as mining and quarrying, and financial intermediation, are those that have picked the most alongside transport, wholesale trade and utilities. The overdependence on commodity exports and the lack of manufacturing development and diversification in these economies confirm the limited quality of growth registered by these countries over 15 years of GVC integration.

Finally, recent studies (Goger et al., 2014; Cramer and Chang, 2015; Bernhardt and Pollack, 2016) have raised several concerns and shown mixed results with respect

to social upgrading trajectories. Indeed, GVC integration has led to some form of economic upgrading in certain sectors (for example, horticulture) in a limited number of countries in Africa. However even among successful country/sector cases, economic upgrading has not always translated into better working conditions.

(b) GVCs integration in middle income countries: Some case study evidence

Also, middle-income countries face the difficulty of moving into more technologically sophisticated segments of GVCs, often remaining stuck in the middle-income trap. While the emergence of middle-income traps has various causes, joining RVCs or GVCs, focusing on the production of low value added parts and components, might exacerbate the risk of "delinking domestically" and "hollowing out" of the domestic manufacturing sector. Under these conditions, a combination of weak productivity growth and rising labour costs, or the emergence of alternative lower cost locations, might lead to declining profitability, disengagement by the lead firm and a further weakening of domestic productive capacity.

For countries such as Mexico, for example, the globalization of production has not resulted in greater long-term domestic investments, capital accumulation, domestic value creation and international value capture.

Analysing the 1990s FDI-led expansion of the high technology sector in the Mexican State of Jalisco, Gallagher and Zarsky (2007) discover that the benefits of the investment flows were largely limited to the Jaliscan "enclave", finding that foreign investments "crowded out" domestic ones, resulting in minimal net gains. Large IT TNCs from the United States with operations in Jalisco also imported 98 per cent of inputs, and as a result the domestic manufacturers that supplied Mexico's high-tech firms prior to the foreign penetration declined by 80 per cent. Furthermore, Mexican electronics workers typically received only temporary contracts and basic training, and subsequently little development of human capital occurred. Given the fragility and the isolation of the Mexican electronics cluster, an American economic slowdown coupled with an exodus of IT manufacturing to China was sufficient to cause a 25 per cent decrease in Jalisco's high-tech employment, shortly after 2001. The causes behind these disappointing performances lie in the barriers to entry for domestic firms, combined with policies favouring foreign over domestic investment, and in the inadequate R&D spending by both government and firms. While partly constrained by NAFTA's chapter 11, complementary government policies designed to include domestic firms in supply chains and develop human capital could ensure that foreign investment contributes more to development.

A study by Plank and Staritz (2013) similarly reveals that the potential positive effects from TNCs' investment in the electronics sector in Hungary and Romania, as reflected in the relevance of local linkages and knowledge spillovers, have remained extremely low. The authors argue that, on the one side, the strategic interest of TNCs may have not allowed for an involvement of local suppliers that went beyond the provision of non-core products and services and, on the other side, that geographical isolation of foreign-owned plants have constrained the potential demonstration effects. Furthermore, the scarcity of local business actors in some industries in Central Eastern European countries, heavily dominated by foreign-owned companies, has prevented the absorption and the spread of potential spillovers.

(c) GVCs' integration in fast catching-up economies: Some evidence

Admittedly, for a limited number of fast catching-up economies, the internationalization of production has resulted in concrete opportunities for entering into technology-based markets and capturing value from advanced manufacturing technology. For instance, China became the largest producer of machine tools in 2002, and in 2012 consumed four times the number of machine tools as the United States, while the United States share of global production of machine tools declined from 20.4 per cent in 1980 to 9.8 in 2000, and to 5.3 per cent in 2012 (Andreoni and Gregory, 2013; Tassey, 2014). The backward integration of China in GVCs in total manufacturing has started to decline since the early 2000s, revealing increasing domestic value addition in manufacturing exports. However, total manufacturing trends hide very important subtrends. Relevant structural change has occurred over the last two decades in the country, with China transitioning from being predominantly an exporter of textiles to an exporter of high-tech products (i.e. ICT and electronics). Moreover, across nearly all manufacturing subsectors, this structural transformation has been paralleled, starting from the early 2000s, by a significant increase in the domestic value added content of China's exports, possibly reflecting an increased specialization in higher value added activities, increased participation in domestic value chains by upstream intermediate suppliers, or a mix of the two. In 1995, for example, around three quarters of the total value of ICT exports represented foreign content, but by 2011 this had dropped to just over half, with similar large declines seen in other hi-tech sectors, such as electrical machinery and transport equipment (see figure III.5).

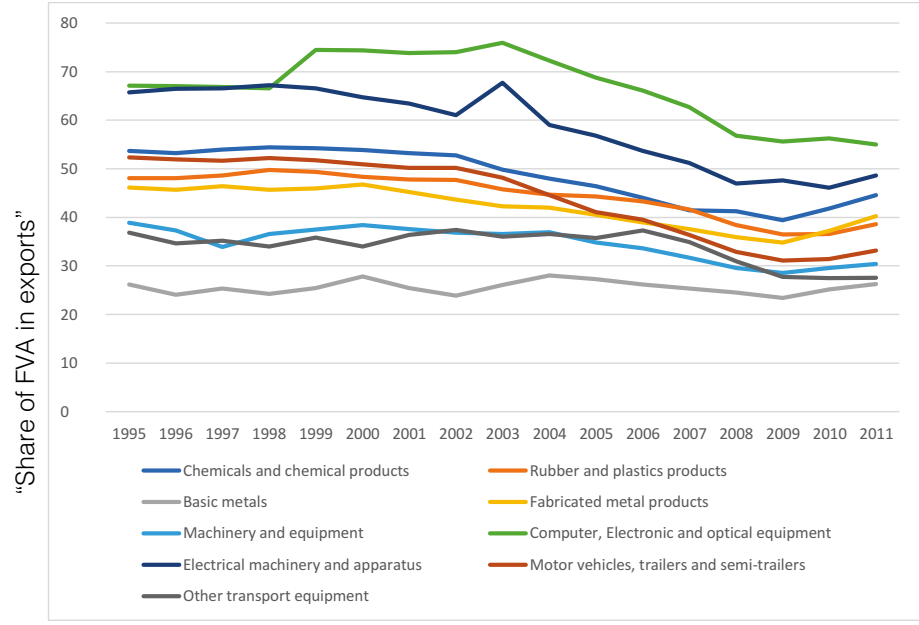
Indeed, not only China, but also the Republic of Korea and Taiwan Province of China, from 1970 to 1990, started their industrialization by linking (backward) to

global supply chains and adding value (forward) in electronics and other industries, starting from those characterized by short-technology cycles (Amsden, 1985, 1989; Wade, 1990; Chang, 1993; Milberg and Winkler, 2013; Lee, 2013; Chang et al., 2016).

However, these success stories are often built on a variety of factors, including the domestic market dimension, the strategic use of industrial policies placing limits on FDI flows, and the targeted use of special economic zones for the development of domestic industry, as in the case of China (Milberg et al., 2013). Also, East Asian success involved strategic State intervention through the use of targeted credit and export subsides, strict conditions on inward FDI and import protection to expand output, productivity and export competitiveness, exports and economic growth (Amsden, 1989; Evans, 1995; Wade, 1990; Milberg et al., 2013).

Figure III.5

Backward integration in GVCs in selected manufacturing subsectors for China



Source: OECD Trade in Value Added.

(d) Creating local values out of GVCs: Some firm-level evidence

Building on firm-level evidence from the Republic of Korea and Brazil, a recent contribution by Lee et al. (2017) points out that upgrading requires some effort of seeking a temporary separation from existing foreign-dominated GVCs, and that only after establishing their own local value chains, firms and economies might have to consider integrating back into GVCs. However, moving beyond the lower tier of GVCs to high-end segments is not easy and involves risk and challenges.

Researches on latecomer SMEs in the Republic of Korea have identified several cases of risky but successful transition from dependent or subcontracting original equipment manufacturing firms into independent or original brand manufacturing. Aurora World, Shimro Musical Instruments and HJC Helmets, which produce toys, musical strings and helmets, respectively, eventually caught up with leading brands in the global market, such as Ty for Aurora World, Suzuki for Shimro Musical Instruments and Shoei or Bieffs for HJC Helmets. The challenges faced by these companies involve the marketing capability to sell products independently, counterattacks by incumbent firms, including a sudden disruption in their supplier relationships, litigation over intellectual property rights, price wars and dumping (Lee et al., 2015; Lee et al., 2017). Furthermore, firm-specific, often tacit, knowledge (obtained mostly by trial and error) is recognized as an important source of competitiveness and an ex post entry barrier (Lee et al., 2015).

Despite these outstanding examples from SMEs' catch-up experiences, the success of the Republic of Korea in overall industrial development beyond the middle-income trap has been made possible mainly by big businesses' functional upgrading. A remarkable example is Hyundai Motors, established in 1968 as an assembler for Ford. With the aim of becoming an independent brand manufacturer, the company decided to end its business relationship with Ford and in 1975 started to produce its own branded cars, Pony, with licensed production of the Mitsubishi engine. Later, after the 20 per cent equity holding Mitsubishi refused to transfer to Hyundai the know-how to design and produce engines, the Republic of Korea company decided to pursue another risky road for developing its own technology independently, that eventually resulted in upgrading within GVCs (Lee and Lim, 2001; Lee, 2005; Lee et al., 2017).

After a 30-year growth phase, the footwear production in the Sinos Valley in southern Brazil, started to experience a decline from the mid-2000s, mostly caused by China's competition and limitations associated with the market power of large TNCs. Within this context, a first group or producers maintained its subordinated position with respect to large global buyers in the United States and Europe, and remained

specialized in low price and low-end segments, exhibiting passive learning strategies, limited innovative capacity and low interaction with other local actors. According to Lee et al. (2017), these companies have faced drastic reductions of the orders during recent years. On the contrary, a second group of manufacturers (Grendene, Alpargatas and Arezzo) looked for a position in premium and higher-end markets through productive improvement, design investment, effort to establish new market niches and commercialization channels, and the development of their own brand. These leading companies now account for most of the value of Brazilian footwear exports (Vargas and Alievi, 2003; Lee et al., 2017).

Thus, while GVCs may offer initial technology transfer and learning channels at the low-income stage for firms in developing countries, there is still little, fragmented and context-specific evidence that they have been conducive to the development of a vibrant industrial domestic environment over the past 20 years. Successful cases often were built up on temporary separation from GVCs, creation of horizontal cross-sectoral linkages in the domestic economy and, more generally, strategic use of industrial policies.

As shown by case studies and examples, one needs to carefully analyse the specific conditions required for countries and companies to benefit from GVC integration, as well as the potential risks associated with this relatively new GVC-led industrialization model, especially when dealing with countries in Africa that have been to a large extent experiencing deindustrialization, dramatic import penetration, and increasing competitiveness pressures from emerging industrial giants.

3. A critical appraisal of the GVCs-led industrialization model

In light of the discussion and evidence presented in the paragraphs above, when evaluating the potential opportunities associated with GVC integration, six main arguments must be critically taken into account (Andreoni, 2018b).

Firstly, TNCs' leading regional and global value chains are extremely powerful organizations, whose economic size can be comparable to the GDP of many developing countries. Their power relies on the creation of entry barriers in the forms of patents, quality standards, copyrights and trademarks. As in the cases of the Jalisco's IT cluster or the Central Eastern European electronics one, the produced value might be concentrated and retained by TNCs, with little scope for positive knowledge spillovers across the domestic economy.

Secondly, the sectoral value chains LDCs tend to be integrated with (or the GVC stages they perform) are not those with high value opportunities or margins for

manufacturing development. Within the African context, for example, GVC integration has mainly involved upstream resource-based sectors. While there are some encouraging cases of successful integration in sectoral value chains – such as the flower and leather industry in Ethiopia, fruit industry in South Africa (Cramer and Sander 2015; Andreoni and Tregenna 2018) – without developing a number of key manufacturing industries delivering production technologies for the other sectoral value chains, these will not be able to transform these economies and trigger cumulative processes of intersectoral learning (Andreoni 2011, 2014).

Thirdly, from a learning perspective, the risk of committing scarce resources in specific assets to perform relatively unsophisticated activities (basic processing or assembling) can lead to a situation of "production lock-in" or "value-chain de-link" in case of unmet technology and quality standard requirements or emerging competitors, respectively (Kaplinsky and Morris, 2015). As a result of these processes, industrial systems in developing economies in the early stages of economic transformation are generally characterized by foreign-owned companies that establish few backward and forward linkages with local suppliers and processors generally lacking the capabilities to perform activities other than basic assembling. Existing small enterprises lack the scale and skills to provide reliable intermediate products, as well as the resources to invest in technological upgrading. Particularly problematic, therefore, is the lack of medium-sized manufacturing firms that can do those things – the so-called "missing middle" phenomenon. The few domestic companies engaged in large-scale production face the same constraints and rely on imports of semi-processed raw materials and capital goods, as well as on the re-export of assembled products, rather than being successful in creating backward and forward linkages.

Partly because of the risk of "production lock-in" or "value-chain de-link" mentioned above, care is needed in interpreting upgrading trajectories with respect to the well-known "smile curve", originally developed by Acer's CEO Stan Shih to describe the position of Taiwan Province of China in the electronics value chain (Shih, 1996). The smile curve, indeed, illustrates the decomposition of value of a given product into the underlying stages (tasks) of production. According to the traditional, partly simplistic, interpretation of the smile curve theory, in order to upgrade their position, firms and countries should seek to move to tasks at the extreme ends of the curve, typically those that extract a higher share of the overall value. However, this view ignores that multidimensional upgrading (such as functional, process, product and intersectoral) goes beyond existing firms specializing only in a limited and isolated sets of tasks. In order to capture "high value niche" opportunities along the value

chain via tasks specialization, companies often have to develop multiple sets of complementary production capabilities, cutting across multiple stages of the value chain. This is especially true in the case of complex high-tech high-value products or components (Andreoni, 2018a). For example, the task specialization in design often requires the direct access (often in the same location) of specific production capabilities for prototyping and manufacturing to scale-up products and processes.

Task specialization requires the identification of complementary sets of capabilities, which constitute the technology platform underpinning the task or set of related tasks (Andreoni, 2014, 2018a). The specialization only in limited and isolated sets of tasks/capabilities will lead to reduced learning and diversification opportunities for firms and countries. In today's advanced economies' industrial districts, such as the Boston route (Best 1990, 2001) and the Emilia Romagna region (Andreoni et al., 2017; Andreoni 2018a), these complementary capabilities have been developed along different cycles of industrial transformation and renewal of vertically integrated firms, supported by a dense network of local specialized suppliers and contractors.

Furthermore, discussions on GVC integration narrowly focus on "vertical linkages" along value chains, while missing the important role of cross-sectoral "horizontal linkages" among different firms at each node of the value chain. As shown by the Republic of Korea firms' experience, leveraging a bigger piece of the pie from global profit critically requires building and upgrading local chains for value and knowledge creation (Lee et al., 2017). More in general, export-led industrialization and successful GVC integration in several East Asian countries has advanced hand in hand with the development of horizontal cross-sectoral linkages in the domestic economy and the resulting incremental domestic value addition in trade (Chang, 2010). Another related notable example is the emergence in the 2000s of globally competitive but domestically owned Indian automotive companies, such as Tata and Mahindra that, supported by the presence of competitive local components producers, were able to export Indian branded cars (Khan, 2015). The successful transfer of technological and organizational capabilities transforming the competitiveness of the Indian automobile sector has been made possible by an agreement signed by Maruti Udyog Ltd. and Suzuki in 1982. The Indian Government decided to open up the protected domestic market, ensuring significant rents, to a foreign investor, if the latter committed itself to making a substantial investment in transferring capabilities. The resulting incentive convergence between the State and Suzuki allowed the Indian Government, not yet constrained by World Trade Organization (WTO) rules, to insist on significant domestic content. The joint venture agreement with Suzuki, indeed, provided for the 70 per cent non-company value addition, of which at least 60 per cent was to be locally procured (Khan, 2015).

Finally, when considering opportunities and risks associated with GVCs' integration, it is crucial to address context-specific political economy dynamics. Firms in countries across LDCs tend to be adversely affected by the existing distribution of organizational power in both the public and private sectors – namely, the countries' "political settlement" (Khan, 2010, 2018; Whitfield et al., 2015; Khan et al., 2016; Behuria et al., 2017). Given a certain political economy context, participation in GVCs might lead to entrenching power even more upstream and consolidate an incentive structure biased towards importers more than producers.

B. Local production systems: Vertical integration and horizontal supply chain development

As evident from the discussion above, in view of a more strategic and ultimately beneficial participation of LDCs into the contemporary global economy, it is crucial to reintegrate analyses of horizontal supply chains characterizing domestic production systems into the development discourse on GVC-led industrialization. Recently, indeed, several authors have started to recognize the urgent need for increasingly integrated frameworks that analyse how GVCs and local clusters are connected through a variety of globalization processes (Gereffi and Lee, 2016; De Marchi et al., 2018).

This section presents a framework for economic development in LDCs proposed by Andreoni (2018b). Such a framework suggests the need to understand production transformation from a multi-linkages perspective, with a focus on both the regional and global value chains, as well as – and more critically – the system of interdependencies in the domestic economy, referred to as the local production system (LPS) and defined as the structural configuration of multiple types of linkages in a given economy. The fundamental idea behind this novel approach is that the quality of growth in the LPS critically depends on the incremental and cumulative process of increasing domestic value addition and linkages development and on the strategic and selective integration into regional (first) and global (later) value chains.

Strategies of LPS development must then take into consideration the following four key elements: (a) the different types of interconnections between LPS' actors (e.g. production, consumption, fiscal and technological linkages); (b) their balanced or unbalanced configuration (e.g. prevalence of horizontal or vertical integration); (c) the different linkage effects – that is, the incentive and constraining mechanisms with a focus on those related to learning dynamics; and (d) the relationship between political economy factors and linkages effects – that is, the way in which power distribution affects rents allocation as well as value creation dynamics.

1. Types of linkages

Building on the classification proposed by Hirschman (1977) and expanding it, it is possible to distinguish four main varieties of linkages representing important sets of interdependencies to consider in the LPS: “production”, “consumption”, “fiscal” and “technological” linkages.

Production linkages are further classified into backward (or upstream) and forward (or downstream). The former corresponds to the growth stimuli to sectors that provide the inputs required by a particular production activity. For instance, setting up a steel plant would stimulate the demand for steel scrap, coal and other similar goods. The latter, instead, represent the inducement to start new activities employing the output supplied by a particular production activity. For example, the expansion of the steel industry would encourage the emergence of sectors employing steel as their basic input, such as machine tools.

With specific reference to the case of countries dependent upon resource extraction and primary industries, two further concepts of linkages are introduced, namely “consumption linkage” and “fiscal linkage” (Hirschman, 1977; Andreoni 2015, 2018b). Consumption linkages reflect the process by which the new incomes of the primary resource producers lead, in a first stage, to the import of consumer goods and, later, to their replacement by domestic production in the agricultural, industrial and service sectors. Fiscal linkages emerge when resource rents are deployed to fund public investments and to develop production in unrelated sectors.

Finally, technological linkages represent potential factors encouraging or discouraging productive opportunities and technology adoption, respectively. More specifically, input–output tables – matrices of inter-industrial flows of goods and services produced domestically – provide a faithful representation of the backward and forward linkages connecting different sectors, whereas technological linkages capture the underlying direct and indirect transfer of technological capabilities within and across sectoral value chains.

On the one hand, within–sectoral technological linkages occur between firms operating at different segments of the same sectoral value chains (e.g. from agriculture to agro-processing), as well as firms operating at the same tier of the sectoral value chain (e.g. farmers supplying the same agro-processors). On the other hand, cross-sectoral technological linkages exist between companies operating across different sectoral value chains, for example between farms and firms manufacturing production technologies and inputs such as fertilizers for agro-processing (Andreoni, 2011, 2014) or between extractive and manufacturing activities (Andreoni, 2015).

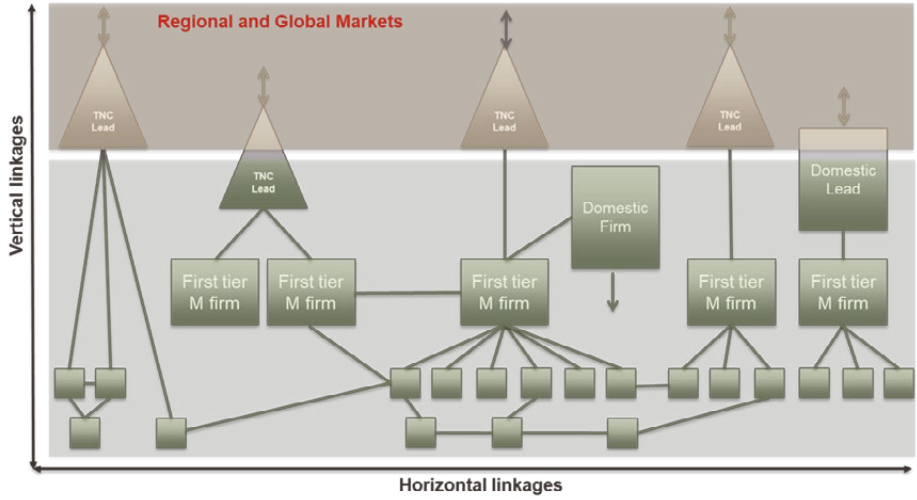
These technological relations are extremely important, as they provide the main channels whereby intersectoral learning may occur. Some of these cross-sectoral technological linkages are more critical than others. For instance, electronics components and mechanical equipment manufacturing are intrinsically connected by several technological linkages, although the respective sectoral value chains might stand as separate ones.

2. Vertical integration and horizontal supply chain development

In an LPS, different types of linkages may involve players vertically organized along sectoral value chains – "vertical linkages" – and players operating at the same stage of the sectoral value chain or across different sectors in the LPS – "horizontal linkages". While the GVC literature focuses on governance and power relationships vertically integrated along the chain, the shifting perspective provided by the LPS framework places particular emphasis on the multiple horizontal interconnections determined, for example, by production relationships (intermediate and final goods demand and supply), as well as technological linkages. Given the different "length" of the sectoral value chains, as well as the overall production matrix in a certain country, we might observe a prevalence of vertical or horizontal relations. Figure III.6 provides a stylized representation of an LPS, including multiple types of linkages and involving players related by both horizontal and vertical linkages.

Figure III.6

Vertical and horizontal linkages in LPSs



Source: Andreoni (2018b).

Typically, staple economies or countries that have experienced GVC upstream integration are characterized by “enclaves” or “islands of globalization”, where vertical integration is dominant, and horizontal supply chains are constrained and involve a limited number of players and sectors. Industrialization opens these enclaves exactly by shifting the balance between vertical and horizontal linkages in favour of the latter. Thus, industrialization is a process that modifies the structural configuration of the LPS and is accompanied by local value creation and distribution.

In Africa, GVC-led industrialization has often left the structural configuration of the LPS unchanged, with little impact on domestic value addition and diversification. For example, with respect to *production* and *consumption linkages*, all African countries – including the two major economies, Nigeria and South Africa – have been deindustrializing and are overdependent on imported final and intermediate goods, including agricultural and industrial raw materials. The importation of final and intermediate goods (in some cases also available in the country) is driven by an incentive structure favouring trader, as well as a negative perception of domestically produced goods among consumers.

Furthermore, the lack of investments in technology absorption, manufacturing extension services, engineering skills and vocational training, has resulted in limiting firms’ *technological linkages* and capabilities. Many companies tend to rely on the very old generation of domestic engineers, importing specialized technicians from India and other economies in South-East Asia. The upgrading of many vocational training institutions and polytechnics in universities has followed a very detrimental tendency to produce non-STEM (science, technology, engineering and mathematics)-related graduates, leading to a very tiny minority of indigenous technicians and a workforce often without relevant competencies needed by firms. With some notable exceptions – see, for example, Ethiopia’s industrial research centre for leather – public technology intermediaries are largely underfunded and have often been replaced by ineffective incubators and other initiatives disconnected from potential production activities in the LPS. As a result, productivity has stagnated across the majority of sectors, undercapacity utilization is very common, and process and quality standards are often not met.

The political economy dynamics and the restricted enforcement capabilities of the State also limit *fiscal linkages* (e.g. tax, royalties and duty collections). This means that the State had no resources to allocate for productive investments. Underreporting of extracted value and transfer pricing in the mining sectoral value chain, tax elusion in the tourism industry, and the overall dominance of the informal

economy are also critical dynamics diverting potential resources for LPS development.

Contrary to the African experience, a country such as Malaysia has massively benefitted from actively managing and synchronizing LPS- and GVC-led targeted strategies.

In the electronics cluster of Penang, for example, the emergence of TNCs–SMEs relations was strongly encouraged by the presence of local production, consumption and technological linkages, fostering inter-firm cooperation and vertical and horizontal networking. The presence of such interconnections was instrumental in stimulating TNCs–SMEs collaboration, as well as technology transfer and skills upgrading for local suppliers.

Differently from the situation in many African countries, TNCs in South-East Asian economies are able to recruit native managers and engineers. In Malaysia, these local high-specialized technicians played a significant role in encouraging parent TNCs in adopting local sourcing and procurement practices to set up linkages with domestic suppliers, thus strengthening the development of a vibrant local suppliers network and the promotion of specialization. Within this context, the Penang Skills Development Centre was key in promoting collaborative relationships between companies and the Malaysian Government, and in providing specialized and targeted training to firms in the LPS (UNCTAD, 2010).

3. Linkage effects: Inducement and constraining mechanisms

Linkages and their context-specific structural configurations are responsible for a number of both incentive and constraining mechanisms and are critical to understand production transformation and, eventually, how to achieve quality of growth.

Production, consumption and, especially, technological linkages can induce learning and diversification dynamics, improvements in process efficiency, and scaling up, as well as product quality, standards and functionalities. The lack of these linkages might undermine the possibility of implementing scale-efficient investment, as well as result in production-related interlocking bottlenecks within and across value chains. Indeed, investment bottlenecks upstream might make it unprofitable to invest downstream in the sectoral value chain, while the lack of technological linkages might frustrate technological upgrading in sectors relying on manufacturing production technologies (e.g. agriculture and mining). Limited improvements in agricultural productivity make downstream activities unfeasible or extremely uncompetitive, given low-quality standards and an unreliable supply. For

example, with special reference to Africa, the inadequate development of irrigation systems and low-quality seeds and fertilizers have affected production levels in countries with immense agricultural potential, such as the United Republic of Tanzania, and constrained the development of agro-industries (Andreoni, 2017a).

4. Political economy factors and the relationship with the linkages effects

Apart from historical and context specificities, linkages effects are intrinsically intertwined with political economy dynamics. The distribution of organizational power in both the public and private sectors, and the relationship between these powerful organizations (including elites and intermediate groups) affect rents allocation and value creation dynamics (Khan, 2010).

With specific reference to sectoral value chains, these political economy forces and dynamics will result in rent chains – that is, opportunities for value extraction in the LPS (Khan et al., 2016; Khan 2018). The concentration of power in upstream value chains as well as among traders vis-à-vis domestic manufacturers can impede productive transformation in the LPS.

Modifying the existing political settlement, political economy forces and dynamics can also transform constraints into opportunities for productive investments. For example, the reduction in rent chains might reduce industrial and agricultural raw materials costs (e.g. metals and sugar), and open the space for the scaling up of downstream manufacturer producers (e.g. machine tools, or agro-processors in confectionary industries). The reduction in rent capture might also allow some firms to capture opportunities for diversification across sectoral value chains (e.g. from production of metal pipes to plastic tubes and pipes).

C. Firms' heterogeneity in local production systems: The missing middle phenomenon

From a policy perspective, it is fundamental to take into account the high *structural heterogeneity* characterizing LPSs in LDCs, and in particular in Africa.

This notion is introduced by Andreoni and Chang (2017) in the context of manufacturing development. However, with respect to LPSs in LDCs, it is useful to introduce a more granular concept of structural heterogeneity, at the firm level. Companies, indeed, are not equally distributed across the country and sectors, and even within the same regions and industries, they differ with respect to performance, access and use of skilled labour, production capacity and raw materials.

In African LPSs, for example, the distribution of companies is extremely skewed, with few large-scale actors and myriads of micro- and small-scale companies producing mainly for the local market. In countries such as Uganda, for example,

the presence of many micro-enterprises, far from being the sign of diffused entrepreneurial capabilities, is the expression of "survival entrepreneurship" and lack of good occupational opportunities.

Another key problem affecting LPSs in LDCs is the lack of middle-size companies – the already mentioned "missing middle" phenomenon. The absence of middle-size firms is particularly critical, since these companies ensure connection between small-scale and large-scale establishments, thus making the LPS more integrated and articulated.

A disaggregated analysis of 2013 firm data for the United Republic of Tanzania (Andreoni, 2017a, 2017b) reveals the high structural heterogeneity of the country's industrial sector, in particular the extreme differences in industrial performance and drivers across the establishment types. The United Republic of Tanzania's production system presents a dualist structure, with a high concentration of industrial activities in a few industries (e.g. mining and quarrying, manufacturing, manufacturing of food products) and regions (e.g. Morogoro and Dar es Salam), and a limited number of large- and major-scale establishments, while a vast group of micro- and small-scale firms remains largely excluded from value added processes, scaling up opportunities and market access. The 80 per cent of manufacturing value addition (MVA) is generated by 200 establishments employing at least 100 employees. Furthermore, the same group of companies accounts for 87 per cent of the total value exported (Figure III.7).

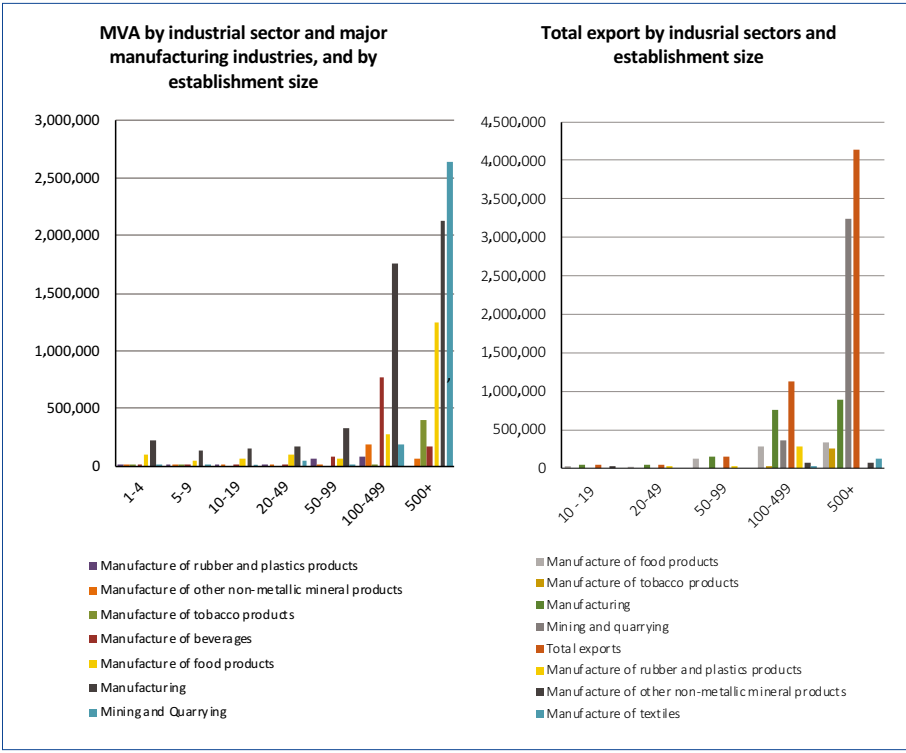
The limited number of medium-sized enterprises prevents the rebalancing of this dualist structure and leaves these two opposite and heterogeneous sets of industrial establishments disconnected. Industrial performance indicators and industrial drivers, such as the high degree of dependence on imports or the concentration in value added processes, confirm the lack of domestic backward and forward linkages. Moreover, the production capacity utilization in the manufacture of sectors – such as other non-metallic mineral products and chemical products – is strongly and positively correlated with firm size.

Finally, the positive relation between increasing establishment size and increasing presence of operative skilled workers is particularly pronounced in the manufacture of wearing apparel, pharmaceutical products, repair and installation of machinery and equipment, and other transport equipment. On the contrary, the ratio of unskilled operatives is systematically higher among small and medium establishments, and decreases for large ones (from 0.8 to 0.3 for mining and quarrying, and from 0.7 to 0.5 for manufacturing).

The production and analysis of better disaggregated statistics, reflecting the structural heterogeneity characterizing LPSs in LDCs, are fundamental steps towards more tailored and effective industrial policy interventions. For example, acknowledging that in the United Republic of Tanzania production capacity underutilization or skills gaps are particularly severe among specific establishment types within the same industry or region, reveals the importance of introducing targeted policies. Some of these could support small firms with a potential to scale up toward middle-size establishments, while other policies could focus on gradually reducing import dependence on specific inputs, coupled with increasing production capacity utilization of capable domestic firms.

Figure III.7

Structural heterogeneity in manufacturing, United Republic of Tanzania, 2013



Source: Andreoni, 2017b.

References

Amsden, AH (1985). The division of labour is limited by the rate of growth of the market: the Taiwan machine tool industry in the 1970s. *Cambridge Journal of Economics*. 9(3):271-284.

_____ (1989). *Asia's Next Giant: South Korea and Late Industrialization.* Oxford University Press. New York.

Andreoni, A (2011). Manufacturing Agrarian Change. *DRUID Working paper series*. 11(13): 1–36.

_____ (2014). Structural Learning: embedding discoveries and the dynamics of production. *Structural Change and Economic Dynamics*. 29:58–74.

_____ (2015). On Manufacturing Development under Resources Constraints. In: Baranzini, M, Rotondi, C and Scazzieri, R., eds. *Resources, Production and Structural Dynamics*. Cambridge University Press. Cambridge: 407–423.

_____ (2017a). Anti-corruption in Tanzania: A Political Settlement Analysis. ACE Working paper. 1:1–58.

_____ (2017b). Mapping Industrial Production in Tanzania: A disaggregated analysis based on the 2013 mainland census. UNIDO Working paper series. 12:1–75.

_____ (2018a). The Architecture and Dynamics of Industrial Ecosystems. Diversification and Innovative Industrial Renewal in Mature Economies. Cambridge Journal of Economics, forthcoming.

_____ (2018b). A Generalized Linkage Approach to Local Production Systems Development in the Era of Global Value Chains, with special reference to Africa. In: Noman, A and Stiglitz, J, eds. Quality of Growth in Africa. Columbia University Press.

Andreoni, A and Gregory, A (2013). Why and How Does Manufacturing Still Matter: Old Rationales, New Realities. Revue d'Economie Industrielle. 144(4):17–54.

Andreoni, A and Chang, H-J (2017). Bringing production and employment back into development: Alice Amsden's legacy for a New Developmentalist agenda. *Cambridge Journal of Regions*, Economy and Society. 10(1):173–187.

Andreoni, A, Frattini, F and Prodi, G (2017). Structural Cycles and Industrial Policy Alignment: The private-public nexus in the Emilian packaging valley. *Cambridge Journal of Economics*. 41(3):881–904.

Andreoni, A and Tregenna, F (2018). Stuck in the Middle: Premature deindustrialization and industrial policy. IDTT Working paper. 4:1–30. CCRED and South African Research Chair in Industrial Development. Johannesburg.

Bair, J and Gereffi, G (2001). Local clusters in global chains: The causes and consequences of export dynamism in Torreon's blue jeans industry. *World Development.* 29(11):1885–1903.

Baldwin, R (2014). Trade and Industrialization after Globalization's Second Unbundling: How Building and Joining a Supply Chain Are Different and Why It Matters. In: Feenstra, RC and Taylor, AM, *Globalization in an Age of Crisis: Multilateral Economic Cooperation in the Twenty-First Century*. National Bureau of Economic Research: 165–212.

Baldwin, R and Lopez-Gonzalez, J (2015). Supply-chain Trade: A Portrait of Global Patterns and Several Testable Hypotheses. *The World Economy*. 3(11):1682–1721.

Behuria, P, Buur, L and Gray, H (2017). Studying political settlements in Africa. *African Affairs.* 116(464):508–525.

Bernhardt, T and Pollack, R (2016). Economic and social upgrading dynamics in global manufacturing value chains: A comparative analysis. *Environment and Planning A: Economy and Space.* 48(7):1220–1243.

Best, M (1990). *The New Competitive Advantage*. Polity Press. Cambridge.

_____ (2001). The New Competition. Institutions of Industrial Restructuring. Oxford University Press. Oxford.

Chang, H-J (1993). *The Political Economy of Industrial Policy*. Palgrave MacMillan.

_____ (2010). Industrial Policy: Can We Go Beyond an Unproductive Debate? In: Lin, JY and Pleskovic, B, eds. *Lessons from East Asia and the Global Financial Crisis* ABCDE, Annual World Bank Conference on Development Economics.

Chang, HJ, Hauge, JL and Irfan, M (2016). *Transformative Industrial Policy for Africa.* United Nations Economic Commission for Africa. Addis Ababa.

Cramer, C and Sander, J (2015). A*gro-processing, wage employment and export revenue: Opportunities for strategic intervention.* Trade and Industrial Policy Strategies.

Cramer, C and Chang, H-J (2015). Tigers or Tiger Prawns? The African "Growth" Tragedy and "Renaissance" in Perspective. In: Monga, C and Yifu Lin, J, eds. *The Oxford Handbook of Africa and Economics: Volume 1.* Oxford University Press. Oxford.

De Marchi, V, Di Maria, E and Gereffi, G (2018). *Local Clusters in Global Value Chains.* Routledge. London and New York.

_____ (1995). Embedded autonomy: *State and industrial transformation.* Princeton: Princeton University Press.

Foster-McGregor, N, Kaulich, F and Stehrer, R (2015). Global Value Chains in Africa. UNU-MERIT Working Paper. 24:1–94.

Gallagher, KP and Zarsky, L (2007). *The Enclave Economy: Foreign Investment and Sustainable Development in Mexico's Silicon Valley.* MIT Press. Cambridge.

_____ (1999). International trade and industrial upgrading in the apparel commodity chain. Journal of International Economics. 48(1):37–70.

_____ (2014). Global value chains in a post-Washington consensus world. *Review of International Political Economy.* 21(1):9–37.

Gereffi, G and Lee, J (2016). Economic and Social Upgrading in Global Value Chains and Industrial Clusters: Why Governance Matters. *Journal of Business Ethics.* 133:25–38.

Goger, A, Hull, A, Barrientos, S, Gereffi, G and Godfrey, S (2014). Capturing the Gains in Africa: Making the most of global value chain participation. Center on Globalization, Governance and Competitiveness, Duke University.

Guerrieri, P and Pietrobelli, C (2004). Industrial districts' evolution and technological regimes: Italy and Taiwan. *Technovation.* 24(11):899–914.

_____ (1977). A Generalised Linkage Approach to Development, with Special Reference to Staples. *Economic Development and Cultural Change.* 25(Supplement):67–98.

_____ (2002). How does insertion into global value chains affect upgrading in industrial clusters? *Regional Studies.* 36(9):1017–1027.

Kaplinsky, R. and Morris, M. (2001). A Handbook for Value Chain Research, International Development Research Centre, Ottawa.

Kaplinsky, R and Morris, M (2015). Thinning and Thickening: Productive Sector Policies in the Era of Global Value Chains. *European Journal of Development Research.* 28(4):1–21.

Khan, MH (2010). *Political Settlements and the governance of growth-enhancing institutions.* Mimeo. SOAS University of London.

_____ (2015). Industrial Policy Design and Implementation Challenges. In: Felipe, J, ed. *Development and Modern Industrial Policy in Practice: Issues and Country Experiences.* Edward Elgar. Cheltenham:94–126.

_____ (2018). Introduction: Political settlements and the analysis of institutions. *African Affairs.* 117(469): 636–655. Available at https://doi.org/10.1093/afraf/adx044 (accessed 29 September 2019).

Khan, MH, Andreoni, A and Roy, P (2016). Anti-Corruption Evidence: A strategic approach. Mimeo. ACE Anti-Corruption Evidence Research Consortium. Available at https://ace.soas.ac.uk/ (accessed 2 October 2019).

Lee, K (2005). Making a Technological Catch-up: Barriers and Opportunities. *Asian Journal of Technology Innovation.* 13 (2): 97-131.

Lee, K (2013). *Schumpeterian Analysis of Economic Catch-up.* Cambridge University Press. Cambridge.

Lee, K and Lim, C (2001). Technological regimes, catching-up and leapfrogging: Findings from the Korean industries. *Research Policy.* 30(3):459–483.

Lee, K, Song, J and Kwak, J (2015). An exploratory study on the transition from OEM to OBM: Case studies of SMEs in Korea. *Industry and Innovation.* 22(5):423–442.

Lee, K, Szapiro, M and Mao, Z (2017). From Global Value Chains (GVC) to Innovation Systems for Local Value Chains and Knowledge Creation. *European Journal of Development Research.* Available at https://doi.org/10.1057/s41287-017-0111-6 (accessed on 2 October 2019).

Milberg, W, and Winkler, D (2013). *Outsourcing Economics. Global Value Chains in Capitalist Development.* Cambridge University Press. Cambridge.

Milberg, W, Jiang, X and Gereffi, G (2013). Industrial Policy in the Era of Vertically Specialized Industrialization. In: Nubler, I, Salazar-Xirinachs, JM and Kozul-Wright, R, eds. Industrial Policy for Economic Development: Lessons from Country Experiences, Geneva: ILO–UNCTAD.

Neilson, J, Pritchard, B Wai-chung Yeung, H (2014). Global value chains and global production networks in the changing international political economy: An introduction. *Review of International Political Econ*omy. 21(1):1–8.

Nolan, P (2001). China and the Global Economy: National Champions, *Industrial Policy, and the Big Business Revolution.* Palgrave. New York.

Penrose, E (1959). *The Theory of the Growth of the Firm.* Oxford University Press. Oxford.

Plank, L and Staritz, C (2013). "Precarious Upgrading" in Electronics Global Production Networks in Central and Eastern Europe: The Cases of Hungary and Romania. 2 May. Available at http://dx.doi.org/10.2139/ssrn.2259671 (accessed on 2 October 2019).

Schmitz, H (1999). Global competition and local cooperation: Success and failure in the Sinos Valley, Brazil. *World Development 27(9):*1627–1650.

Shih, S (1996). *Me-Too is Not My Style: Challenge Difficulties, Break through Bottlenecks, Create Values. The Acer Foundation*. Taipei.

_____ (2016). *Trade and Development Report 2016: Structural transformation for inclusive and sustained growth.* (United Nations publication. Sales No. E.16.II.D.5. New York and Geneva).

_____ (2017). *Trade and Development Report 2017: Beyond austerity: Towards a global new deal*. (United Nations publication. Sales No. E.17.II.D.5. New York and Geneva).

Tassey, G (2014). Competing in Advanced Manufacturing: The Need for Improved Growth Models and Policies. *Journal of Economic Perspectives.* 28 (1): 27-48.

Vargas, M and Alievi, R (2003). Learning trajectories and upgrading strategies in the footwear productive system of Sinos Valley. In: Cassiolato, J, Lastres, H and Maciel, M, eds. *Systems of Innovation and Development – Evidence from Brazil.* Edward Elgar. Cheltenham.

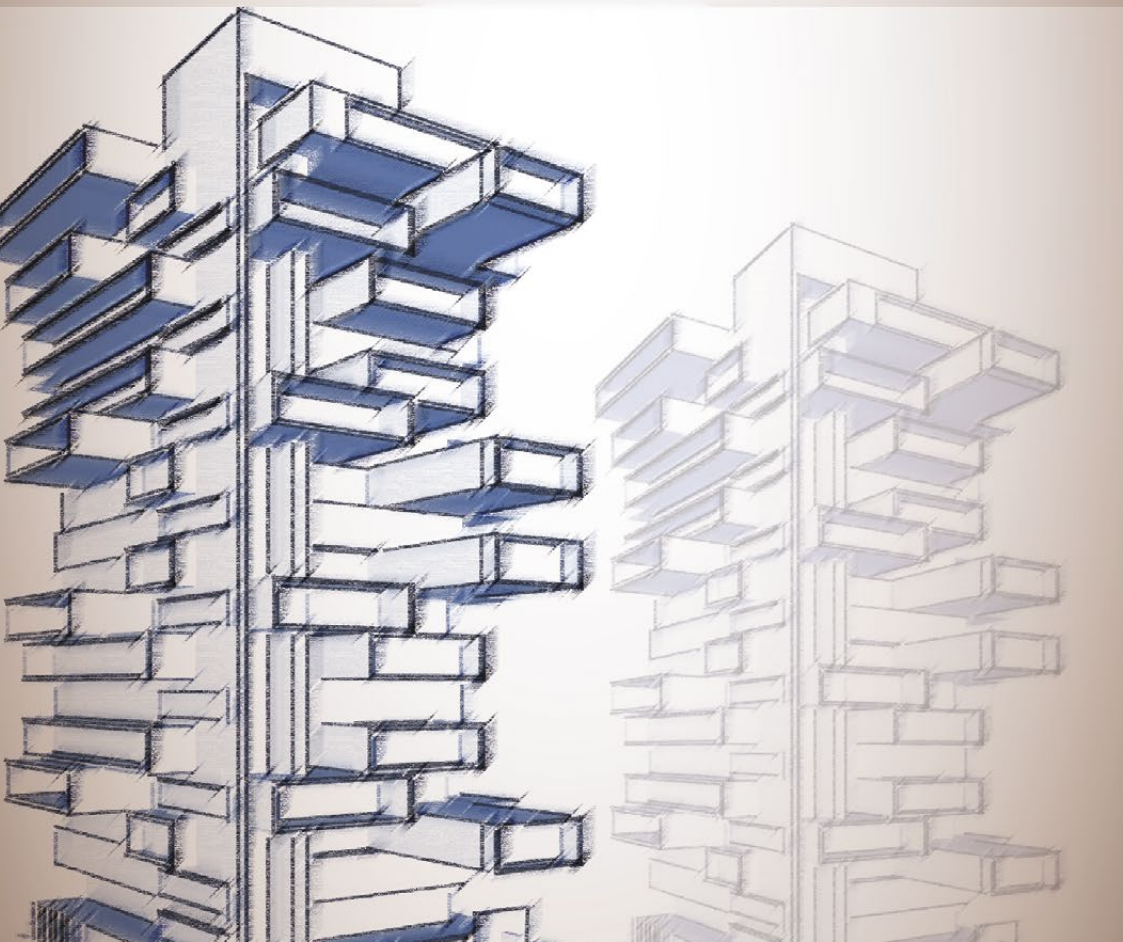
Wade, R (1990). *Governing the Market.* Princeton University Press. Princeton.

Whitfield, L, Therkildsen, O, Burr, L and Mett, SA (2015). *The Politics of Industrial Policy in Africa.* Cambridge University Press. Cambridge.

UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT

UNCTAD

IV. Building productive capacities: The role of industrial policy



IV. Building productive capacities: The role of industrial policy

Structural transformation policies, in particular industrial policy, have recently reappeared as a central component of economic development strategies. The global economic crisis encouraged academics, policymakers and international agencies to take a closer look at a topic that had been long disregarded in the development discourse. For almost three decades, productive sector interventions were not prioritized in general, and proactive government involvement in the structural and industrial development of economies had been considered highly risky and distortive.

Today, structural transformation policies are again acknowledged and in fact implemented by Governments in both developed and developing countries as a necessary means to enable countries to experience a sustained structural growth trajectory. Accordingly, the question as to whether or not industrial policy makes sense has given way to a discussion on how to use it as an effective tool. While academic discussions have made some important steps forward and laid the foundation for a more systematic approach to industrial policy design, implementation and evaluation, practical challenges remain highly problematic and context-specific.

This chapter focuses on the role of industrial policy in building productive capacities.[11] It addresses the "why" industrial policy question. It starts by providing some evidence of the pervasive use of industrial policy among today's developed countries, especially during their catching up economies. The chapter then focuses on a critical aspect related to industrial policy design, namely the issue of selectivity. It also provides a systematization of industrial policies' rationales and, on this basis, discusses "why (and when)" industrial policies are necessary for LDCs. Finally, it highlights the issue of policy space – that is, the extent to which industrial policies are permissible and practicable in today's global economy.

A. Industrial policy design: Learning from history

In recent decades, two main approaches to the issue of industrial policies emerged: the neoliberal and the structuralist. Under the flag of the so-called "Washington Consensus", the neoliberal approach dominated the debate until the early 1990s and defined the policy agenda of many developing countries, especially in Latin America and Africa. Since the late 1980s, the structuralist approach has criticized neoliberal theoretical and empirical arguments. Structuralists have reintroduced the

[10] For more detailed discussion of industrial policies in Africa and LDCs see UNCTAD (2018) and UNIDO and UNCTAD (2011).

idea that government interventions are essential to accelerate the process of structural change and industrialization in developing countries. To shed light on this polarized debate, in this section we will introduce the main arguments and historical case studies provided by the two different approaches: the neoliberal and the structuralist.

Neoliberal policy recommendations for developing countries are based on three pillars: liberalization, privatization and depoliticization of their economies (Chang, 2007). To achieve the highest level of efficiency and the largest rate of sustainable growth, neoliberals believe that developing countries should commit to the free market – i.e. price mechanisms for the allocation of resources and competition rules – and drastically reduce State intervention. Moreover, neoliberals claim that developing countries should open their boundaries to international markets, specialize according to their "natural" comparative advantage – i.e. abundance of unskilled labour – and go through a "natural" development of their industrial sector (Pack and Saggi, 2006). FDI, multinational corporations and international competition are considered great opportunities for developing countries' industrialization, and for gaining a place in the global system of production, the so-called "global value chain".

The role of the State, according to neoliberals, is reduced to essentially "market-friendly" functions: maintaining macroeconomic stability, providing public goods (education, health and infrastructure) and creating an enabling institutional environment through functional pro-market policies. In contrast, all those "selective" industrial policies – for example, those oriented to promoting and nurturing indigenous firms and solving market failures – not only introduce distortions and inefficiencies in the market mechanism, but they also open the door to a series of government failures. In addition, the "informational objection" proposed by neoliberals according to which "it is impossible for Governments to identify with any degree of precision and certainty the relevant firms, sectors, or markets that are subject to market imperfections" seems to deny any form of industrial policy (Rodrik, 2004, 2008). Finally, according to neoliberals, the development experience of today's high-income countries and their businesses, as well as the more recent impressive rise of the East Asian Newly Industrialized Countries would provide empirical evidence in support of their "good" policies and institutions (World Bank, 1993).

However, since the late 1980s, a number of influential development economists have strongly criticized the mainstream paradigm (Amsden, 1989; Wade, 1990; Chang, 1994; Stiglitz, 1996; Andreoni, 2016). The starting point has been the reconsideration of the "official" history of capitalism promoted by neoliberals. Before

analysing the main theoretical rationales for State intervention that many economists have developed during this debate, it is worth introducing some salient historical facts that have constituted the empirical basis for their strong critiques. Many scholars have shown how today's developed countries during their early phase of catching up widely adopted industrial assistance policy to promote infant industries and selective indigenous strategic firms. Although these policies have been realized in different forms according to countries' internal and external specificities, they have demonstrated the crucial role played by the State in the industrialization process.

Firstly, States promoted tariffs and quantitative restrictions to protect and promote infant industries, allowing them to achieve the level of technological capabilities needed to compete abroad. Moreover, Governments stimulated efficiency and competitiveness, subsidizing indigenous firms' exports and supporting riskier investments (see table IV.1).

Table IV.1

Average tariff rates on manufactured products for selected developed countries in their early stages of development.

	1820[2]	1875[2]	1913	1925	1931	1950
Austria[3]	R	15-20	18	16	24	18
Belgium[4]	6-8	9-10	9	15	14	11
Canada[5]	5	15	n.a.	23	28	17
Denmark	25-35	15-20	14	10	n.a.	3
France	R	12-15	20	21	30	18
Germany[6]	8-12	4-6	13	20	21	26
Italy	n.a.	8-10	18	22	46	25
Japan[7]	R	5	30	n.a.	n.a.	n.a.
Netherlands[4]	6-8	3-5	4	6	n.a.	11
Russia	R	15-20	84	R	R	R
Spain	R	15-20	41	41	63	n.a.
Sweden	R	3-5	20	16	21	9
Switzerland	8-12	4-6	9	14	19	n.a.
United Kingdom	45-55	0	0	5	n.a.	23
United States	35-45	40-50	44	37	48	14

Source: **C**hang(2002:17)

Secondly, the acquisition of technological capacity and of those capabilities needed to use and adapt knowledge was stimulated through legal means – funding universities and technical schools, facilitating targeted training and research, organizing expos and directly building model factories – and illegal means, especially through industrial espionage or foreign skilled workers' recruitment.

Thirdly, States intervened, propelling savings and capital accumulation, guaranteeing the internal demand for indigenous firms, financing large-scale firms and directly leading massive investments in strategic manufacturing industries and infrastructures. Furthermore, they sometimes developed various forms of public–private cooperation and inter-firm relation in many infrastructural industries and advanced technological sectors.

The direct State intervention in the economy of the United Kingdom until the 1860s, and later its guiding role for large firms, represented a model for many relatively late industrializers. In two centuries, the United Kingdom applied all the policies mentioned above, selecting its industrial priorities and opening gradually to international competition only when its national firms had become competitive. Moreover, as has been widely documented, State support has strongly influenced the emergence of modern powerful large firms accompanying the tendency towards a natural process of concentration and oligopolistic competition.

For example, in the nineteenth century both the United States and United Kingdom Governments widely supported the growth of their indigenous firms, allowing them to exploit economies of scale, vertical integration and managerial economies. Similarly, in the twentieth century, many East Asian economies (in particular Japan, the Republic of Korea and Taiwan Province of China) and some Latin American countries adopted many of the policies described above in order to lead the process of structural change of their economies and the emergence of internationally powerful firms. The Republic of Korea steel firm POSCO, the Japanese automobile firm Toyota, the aircraft company Embraer in Brazil and the salmon industry in Chile are all case studies in favour of industrial policies and State support of large firms. To sum up, the reality of industrial policy and business history seems to demonstrate that in many of today's developed countries the state played a crucial role in the emergence of large indigenous firms.

B. Industrial policy design: Selectivity

The controversial nature of industrial policy is testified to by the fact that there is actually no universally agreed definition of the term. The most literal interpretation of industrial policy would be to define it to include any policy that affects industry (usually interpreted as the manufacturing industry), in the same way in which we

would define fiscal policy as policy that affects government revenue and spending, and monetary policy as policy that affects monetary variables. Indeed, some commentators who adopt this definition would even include infrastructure policy, education policy and tax policy as parts of industrial policy.

The majority of the commentators on industrial policy, however, define industrial policy to mean "selective" industrial policy, "sectoral industrial policy" or "targeting" – namely, a policy that deliberately favours particular industries/sectors (or even firms) over others, against market signals, usually (but not necessarily) to enhance efficiency and promote productivity growth, for the whole economy as well as for the targeted industries themselves.

In contrast, those supporting "selective" (also called "sectoral" or "vertical") policy measures tend to stress how the very definition of industrial policy implies an element of selectivity (Chang, 1994; Rodrik, 2004; Andreoni and Chang, 2017). They argue that industrial policy always involves making choices (targeting) about the specific manufacturing development trajectory that the country (or region) should follow. This can be done by selecting specific policy targets, such as picking "high value added" industries or channelling financial resources in specific activities.

To appreciate the variety of ways that the selectivity approach finds its way into the policy discussion, consider the following examples drawn from leading authors' definitions of industrial policy:

... a policy that deliberately favours particular industries over others, against market signals, usually (but not necessarily) to enhance efficiency and promote productivity growth (Chang, 1994:58).

I will use the term [industrial policy] to apply to restructuring policies in favour of more dynamic activities generally, regardless of whether those are located within industry or manufacturing per se (Rodrik, 2004:3).

... comprises policies affecting "infant industry" support of various kinds, but also trade policies, science and technology policies, public procurement, policies affecting FDI, [intellectual property rights] and the allocation of financial resources (Cimoli, Dosi and Stiglitz, 2009:2)

Those embracing a selective approach also stress how the distinction between general and selective measures is fictitious, since even supposedly "general" measures imply some trade-offs. This point has been highlighted by Landesmann when he argues:

Industrial policies are targeted towards increasing national wealth and they thus open up positive sum options from which everybody could gain. In actual practice, however, industrial policy is designed to be specific, i.e. directed towards particular industries, firms, regions, groups in the labour market, etc., rather than general. Even in those cases in which they are general (such as general tax allowances), they have a differential impact upon different parts of, and actors in, an economy. Implicit in industrial policy formulation and execution are… trade-offs between different groups, regions, industries, etc. (Landesmann, 1992:245).

The selective nature of industrial and technology policies has also been recognized in policy practice. Governments adopt multiple selective interventions which impact the same sector and its underpinning technology system from different angles. For example, industrial policy can target the same sector or technology with a package of selective market regulations and standards, productive knowledge service provision and financial incentives. The effectiveness of each selective measure will depend on the quality of the policy design and also on the linkages among the different policy measures acting upon the same sectors, technologies and specific institutions of the manufacturing system. This has two main implications. First, industrial policy selectivity is determined by the combined effect of policy measures constituting the industrial policy mix. Thus, we need to examine the alignment of policies within an overall industrial policy package to capture the degree of selectivity as well as the effectiveness of each individual measure. Second, since policies do not work in isolation, their effectiveness might improve by redesigning the policy measure and by changing or introducing other complementary measures.

Industrial policy thus defined has been even more controversial than more generally defined industrial policy. Many people believe that industrial policy should be of a general (or functional or horizontal) kind, rather than of a selective (or sectoral or vertical) kind. In this view, industrial policy should focus on “public goods” that benefit all industries equally but are likely to be underprovided by the market – e.g. education, R&D and infrastructure – and not involve “picking winners”.

The distinction between general and selective measures is a fictitious one, since even supposedly “general” measures imply some trade-offs. Interestingly, even the lack of industrial policy is an implicit form of selective intervention. A country that refuses to adopt any industrial policy is implicitly accepting the current structural configuration of its economic system, the pervasive presence of market failures, and the current distributions of learning opportunities across sectors.

In a world with scarce resources, every policy choice made, however general the policy involved may look, has discriminatory effects that amount to implicit targeting.

For example, many people believe that education is one of those general industrial policies, but beyond the basic level (say, the first nine years), education becomes specialized. So, for example, when we produce engineers, it does not produce some generic engineers, but engineers specialized in certain areas. Therefore, a Government providing more funding to electronics engineering departments than to chemical engineering departments is implicitly favouring the electronics industry. Likewise, there is no such thing as generic physical infrastructure. Physical infrastructure is always location-specific, so it affects different industries differently. Moreover, different modes of transportation have different impacts on different industries – bulky goods (e.g. iron ore, wheat) will be helped more by developments of seaports and railways, while lighter goods, especially when they are perishable (e.g. flowers, fresh fish), will be helped more by developments of airports. Finally, if a Government is giving out R&D subsidies, it is implicitly favouring the more R&D-intensive higher-tech sectors. Thus seen, selectivity (targeting) is inevitable.

Given all this, we must admit that we cannot "not target" and should try to attain the best possible degree of targeting, which may differ across industries and countries. We cannot assume that there is a linear relationship, positive or negative, between the degree of targeting and policy success. Some degree of targeting is inevitable, while some more of it may be desirable, but too much of it may not be good, although how much is too much is debatable (and one's position on it will depend on one's economic theories and political values). The best way to think about it is "targeting within universalism", as some people propose in relation to social policy (Skocpol, 1991), rather than "targeting vs. universalism".

C. Industrial policy design: Rationales

Two main sets of problems and obstacles that justify State intervention – industrial policy rationales – are considered here. The first set is related to those market failures caused by information asymmetries and information externalities that lead to underinvestment in new activities. The second set is more related to problems of coordination and possibility of waste of resources. The static as well as the dynamic implications of these market failures must be taken into consideration.

Firstly, investments in new non-traditional industrial sectors are strictly limited by capital markets' failures, as well as the lack of firm internal financing resources and equity markets. Moreover, the market price mechanism does not provide a clear enough indication of the profitability of resources that do not actually exist (e.g. new skills and technology). These market failures are particularly pervasive in developing countries, where new investments are perceived by private lenders as highly risky. The State can intervene in two ways. It can directly become a surrogate of the

capital market through the provision of subsidies or venture capital schemes that help new investors, especially in sectors with high initial fixed cost. In addition, the State can promote savings accumulation and investments through creating and supporting/controlling financial institutions. The East Asian experience testifies how government intervention has driven the establishment of a "system of flexible bank finance", as Joseph Stiglitz defined it, that promotes high saving ratios and introduces alternative forms of risk sharing through "bailouts". Moreover, as Ha Joon Chang (2004) underlines, "State control of the financial sector has been critical… to influence private sector investment decisions and, more importantly, by giving it the power to discipline the non-performers".

Secondly, the existence of informational externalities and problems of "appropriability" in the innovation process drastically affect investments in new activities. Specifically, in the so-called process of "self-discovery", firms invest many resources in order to discover new combinations of factors and procedures. These new procedures enable firms to produce the same good already established in the international market in a more efficient way. However, if one firm cannot fully internalize the value of its discovery because of imitation by other firms, or learning by doing or informational externalities, there will be no incentive to sustain the initial investment. In other words, "market imperfections hinder the full private appropriability of social returns", leading to a phenomenon of lack of investment or underinvestment (Rodrik, 2008). In the so-called "East Asian model", Governments addressed this problem by adopting the so-called "carrot and stick strategy". Governments subsidized innovators, guaranteeing them a rent for a delimited period through trade protection or facilitating access to venture capital. At the same time, these rents were balanced with strong performance requirements – i.e. export market requirements – and monitoring firms" competitiveness.

The second set of theoretical rationales in favour of State intervention is related to a series of coordination problems that arise in the presence of "strategic uncertainty". The first problem of coordination is related to the so-called "big push" argument, and has been widely recognized by mainstream economists. Many sectors and industries require in the first phase of their development a series of complementary investments in interconnected activities. If these investments are not simultaneously undertaken, or firms are not sure that they will be implemented, the profitability of their new activities will be compromised. Evidently, the State can coordinate firms' investments through a series of specific subsidies and incentives in order to avoid coordination failure and achieve a higher social benefit. For example, in the Republic of Korea, the State designed "ex ante subsidies that [did]

not need to be paid ex post", such as guarantees for new investments in technology (Rodrik, 2004).

Another less immediate problem of coordination occurs in the presence of "competing investments". In modern industries, large firms sustain initial huge investments in machinery and productive capacity to achieve the efficient scale of production. As these initial costs are generally specific and "sunk", the oligopolistic strategic competition in these sectors may lead to price wars that may destroy parts of firms' assets or may lead them to bankruptcy. Moreover, in new sectors, the impossibility for the market to coordinate ex ante investments may cause problems of underinvestment or overinvestment. The State can intervene ex ante in many ways. For example, in Japan the State adopted a system of "entry licenses"; in the Republic of Korea, a "conditional entry system" was developed that artificially tries to "clear" the market, adjusting the supply to the evolution of demand (Chang, 1994).

However, collective-action problems may be related not only to investment but also to situations of temporary disinvestment or structural change in the industrial sector. Recession cartels and mechanisms of negotiated exit have been widely used to face periods of economic crisis or accompany structural transformation. In these situations, industrial policies introduce "a 'protective' element – that is 'helping losers' by temporarily shielding them from the full forces of the market" (Chang, 1994). More generally, the State can introduce mechanisms of socialization of risk to encourage and sustain the process of structural change and productivity growth from which economic development derives.

Finally, many studies have also demonstrated how the State can provide the economy an "entrepreneurial vision" and a series of focal points that may help the main economic actors to coordinate. For example, the Japanese Government, through its "MITI", indirectly led the process of mergers and creation of large domestic firms. The State encouraged the rise of industrial powerful groups – i.e. keiretsu – which were able to develop technological and business capabilities as well as international brands. Similarly, since the 1980s, the "Chinese State consciously nurtured a group of large enterprises" to create a strong national team (Nolan, 2001).

State intervention can play a crucial role, as a "visible hand", in all stages of the life of the firm: from the "infant" stage, when the firms require to be nurtured to develop their productive capacity and capabilities; to those mature stages, when the firms must transform themselves, developing their own indigenous technological capabilities.

To conclude, many of the theoretical arguments and examples discussed above support the idea that today's large firms in developing countries need effective State intervention, "more than a good night watchman". However, the dramatic transformations in the global scenario have rendered the implementation of industrial policies increasingly difficult.

D. Industrial policies in a new global scenario: The "permissible" and the "practicable"

Since the late 1980s, the global playing field experienced an impressive process of transformation. Three main factors are responsible for this process. Firstly, the liberalization of international trade and capital flows has rendered the global economy increasingly interconnected, and has reduced the "political space" needed to adopt industrial policies (Chang, 2007; Andreoni et al., 2018). Secondly, new powerful actors have emerged. They are the so-called "big businesses" – global giant firms that own impressive global market shares. Schumpeterian competition in oligopolistic markets has selected the most efficient and technological advanced global firms. Thirdly, the impressive technological revolution that has occurred in recent decades has reshaped production processes and has accelerated the emergence of large firms. Considering these dramatic transformations, the adoption of past industrial policies seems to today's developing countries neither permissible nor practicable. In this section, we will analyse the way in which the process of trade liberalization, the rise of big businesses and the technological revolution have strongly affected the possibility for today's developing countries to implement industrial policies to catch up to the level of large domestic firms. This analysis will lead us to argue that today's developing countries cannot simply copy the industrial policies adopted in the past by today's developed countries. Instead, developing countries should creatively learn from the past to invent and implement new industrial policies able to nurture their rising large firms.

The process of trade liberalization experienced a decisive acceleration in the 1990s. Developing countries were convinced and sometimes constrained to reduce drastically the use of all those selective industrial policies that affect international trade. International organizations – i.e. WTO, IMF and World Bank – used many instruments in the establishment of the new international system of rules: WTO agreements, such as the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS); IMF's structural adjustment programmes; and unequal bilateral and regional trade agreements. As a result, the "policy space" needed to nurture indigenous large firms through industrial policies is now drastically reduced

and many past industrial policies – i.e. quantitative restrictions on imports, or domestic content requirements – are not allowed anymore.

However, as highlighted in Andreoni et al. (2018), there are still some exceptions and industrial policies that are allowed, especially for LDCs in the transitional phase towards the new global market rules. Specifically, some selective policies widely used by today's high-income countries – such as "skill formation, technology support, innovation financing, FDI promotion and targeting, infrastructure development for IT, and all general subsidies that do not affect trade performance" – are still allowed (Lall, 2004:27). All these measures can strongly affect the availability and accumulation of technological capabilities in developing countries. The fact that many LDCs do not implement these measures suggests that it is not simply a problem of permissibility but also of willingness. Knowing the real history of today's developed countries could reduce this lack of willingness or awareness on the crucial role of industrial policies.

Nevertheless, the stronger challenge for today's developing countries is not represented by the processes of liberalization discussed above, but prominently by the so-called "big business revolution" (Nolan, 2001). The emergence of global giant firms is at the same time the result and one of the main causes of the impressive technological revolution of these last decades. The analysis of these two strongly interconnected processes is a fundamental step to discuss the main strategies that today's developing countries can use for nurturing – or more often allowing the "birth" – of their large firms.

During the 1990s, developed countries experienced a progressive process of industrial concentration at the level of the "global system integrators". An impressive number of mergers and acquisitions in many sectors – i.e. aerospace and defence, automobiles, trucks, power equipment, oil and petrochemicals, pharmaceuticals, and banking – led to the emergence of global firms. These new global giants implemented a process of selection among the networks of their suppliers to increase their competitiveness in increasingly oligopolistic markets. In turn, the global giants' selection of the best suppliers triggered a process of concentration at the level of the first-tier suppliers – i.e. the so-called "cascade effect".

Today's giant system integrators coordinate a global network of first-tier suppliers – i.e. the "external" firm – which constitutes the single business units of the global value chain. The strong connection between the global firm and the "external firm" is not limited to price relationships, but includes many crucial activities of the network suppliers, such as new investments, process innovations and product development. In just a few years, the giant system integrators have erected high

barriers to entry into their industries. From more capital-intensive sectors to knowledge-intensive sectors, giant firms are consolidating their global market shares, investing in brands, efficiency and R&D. Their strategic investments in technological advancement have transformed many production processes so that, in many sectors, today's developing countries cannot use low labour cost as a comparative advantage. For today's developing countries' large indigenous firms, the possibility to gain a place in the global value chain is strictly related to the availability of knowledge and the building process of technological capabilities.

To summarize, if the new international system of rules seems to leave some degree of freedom in the adoption of industrial policies, the big business revolution arises as the main challenge for developing countries' process of catching up. Undoubtedly, for today's developing countries it is "more difficult and risky to take the autonomous route of Japan, the Republic of Korea or Taiwan Province of China" of building large indigenous firms through industrial policies. However, developing countries should not be constrained in choosing between the neoliberal policies or the adoption of the past set of industrial policies adopted by today's developed countries. Developing countries have the possibility to choose a third alternative, that is to develop their own new set of industrial policies for technological capability development. These new industrial policies must not only be permissible and practicable, in the new global context but, more importantly, must be congruent with the specific local needs and conditions that different developing countries are facing.

In conclusion, there is no "blueprint", but only several inspiring examples from history and strong theoretical rationales for State intervention, as we have seen above. In the next chapter, we will discuss policy instruments and challenges associated with using industrial policies for building productive capacities.

References

Amsden, AH (1989). *Asia's Next Giant: South Korea and Late Industrialization.* Oxford University Press. New York.

Andreoni, A (2016). Varieties of Industrial Policy: Models, Packages and Transformation Cycles. In: Noman, A and Stiglitz, J, eds. *Efficiency, Finance and Varieties of Industrial Policy*. Columbia University Press. New York: 245–305.

Andreoni, A and Chang, H-J (2017). Industrial policy and the future of manufacturing. *Economia e Politica Industriale.* 43(4):491–502.

Andreoni A, Chang, H-J and Estevez, I (2018). New Global Rules, Policy Space and Quality of Growth in Africa. In: Noman, A and Stiglitz, J, eds. *Quality of Growth in Africa,* Columbia University Press.

Chang, H-J. (1994). *The political economy of industrial policy.* Macmillan. Basingstoke.

_____ (2004). Institutional Foundations for Effective Design and Implementation of Trade and Industrial Policies in Least Developed Countries. In: Soludo, C Ogbu, O and Chang, H-J, eds. *The Politics of Trade and Industrial Policy in Africa: Forced Consensus?* Africa World Press, Inc. Trenton, New Jersey and Asmara, Eritrea.

_____ (2007). *Bad Samaritans,* London: Anthem Press.

Cimoli M, Dosi G and Stiglitz JE (2009). Industrial Policy and Development: The Political Economy of Capabilities Accumulation. Oxford University Press. Oxford.

Lall, S. (2004). Selective Industrial and Trade Policies in Developing Countries: Theoretical and Empirical Issues. In: Soludo, C Ogbu, O and Chang, H-J, eds. *The Politics of Trade and Industrial Policy in Africa*: *Forced Consensus?* Africa World Press, Inc. Trenton, New Jersey and Asmara, Eritrea: 75–109.

Landesmann, M (1992). Industrial Policies and Social Corporatism. In: Pekkarinen, J, Pohjola, M and Rowthorn, R, eds. *Social Corporatism: A Superior Economic System.* Oxford University Press. New York: 242–279).

Nolan, P (2001). *China and the Global Economy: National Champions, Industrial Policy, and the Big Business Revolution.* Palgrave. New York.

Pack, H and Saggi, K (2006). Is There a Case for Industrial Policy? A Critical Survey.

The World Bank Researcher Observer: 267–297.

Rodrik, D (2004). *Industrial Policy for the Twenty-First Century*. CEPR Discussion Paper 4767. Centre for Economic Policy Research. London.

_____ (2008). *Normalizing Industrial Policy.* Commission on Growth and Development Working Paper No. 3. The World Bank. Washington, D.C.

Skocpol, T (1991). Targeting within Universalism: Politically Viable Policies to Combat Poverty in the United States. In: Jencks, C and Peterson, P eds. *The Urban Underclass.* Brookings Institution Press. Washington, D.C.: 411–436.

Stiglitz, JE (1996). Some Lessons from the East Asian Miracle. *The World Bank Research Observer.* 11(2):151–177.

United Nations Industrial Development Organization (UNIDO) and UNCTAD (2011). *Economic Development in Africa 2011: Fostering Industrial Development in Africa in the New Global Environment* (United Nations Publication, Sales No. E.11.II.D.14. New York and Geneva).

UNCTAD (2018). *Achieving the Sustainable Development Goals in the Least Developed Countries: A Compendium of Policy Options.* UNCTAD/ALDC/2018/4. New York and Geneva.

Wade, R (1990). *Governing the Market.* Princeton University Press. Princeton.

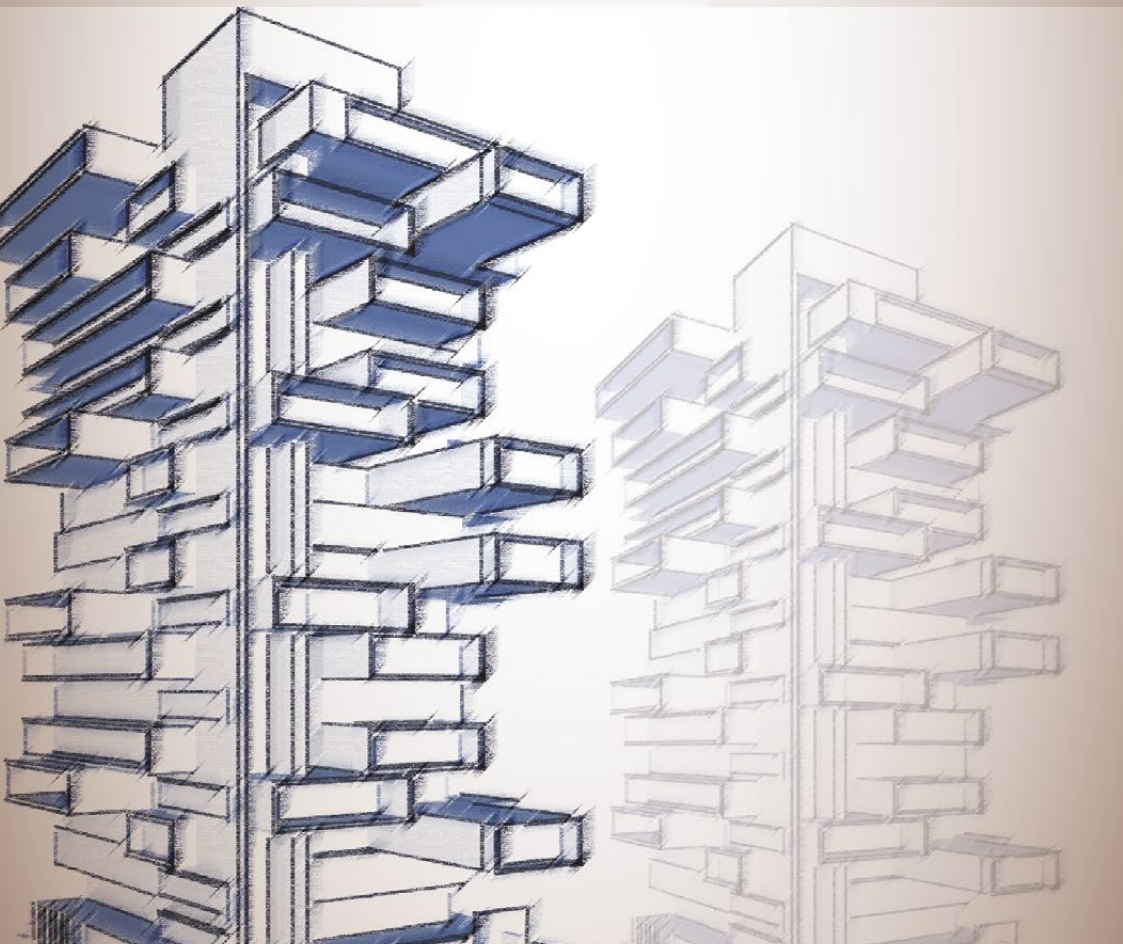
World Bank (1993). *The East Asian miracle: Economic growth and public policy.* Oxford.

UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT

UNCTAD

V. Building productive capacities:

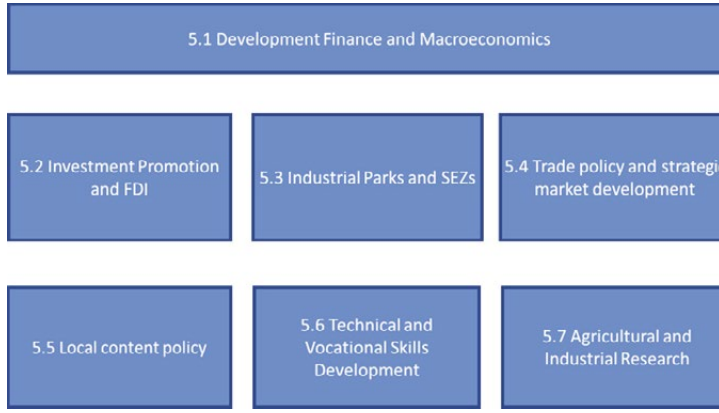
Policy instruments and implementation



V. Building productive capacities: Policy instruments and implementation

This chapter provides a practical guide for productive capacities development, by describing key policy instruments (the "what" industrial policy) and the ways in which different countries have designed and implemented them in practice. The chapter engages with policy instruments, focusing on different dimensions (figure V.1).

Figure V.1
Areas of policy and dimensions



Source: Authors

We start from the consideration of the development finance and macroeconomic policy framework, as this affects the meso–micro level dynamics leading to productive capacity-building. We then move to three sets of instruments which operate at the meso (cross-sectoral) level, although they are connected to micro level interventions in multiple ways. Investment and promotion of FDI are critical to reach scale-effective productive operations and diversify the economy, while industrial parks and special economic zones (SEZs) play an important role in exploiting agglomeration and scope economies in early industrializing countries. The increasing investments in productive capacities also require the strategic development of markets to fully capture domestic and external demand opportunities. Alongside these meso-level interventions, productive organizations will have to be supported by targeted skills policies and institutions, focusing on the development of their organizational capabilities, processes and product standards. Local content policies are also part of this micro-level process of

production capacity-building, as they give domestic firms (and farms) opportunities for engaging with more sophisticated technologies, as well as build up local supply chains.

For each policy instrument, a collection of country cases – including both today's LDCs and historical country cases – will be discussed to engage with the "what" to do to develop productive capacities.

A. Developmental finance and macroeconomics

1. Overview

Financial economists thus far have tended to focus on the role of finance primarily in poverty reduction and overall economic growth, emphasizing the importance of developing financial markets and the role of banks. What attracts less attention, despite its fundamental importance, is the role of financial systems in the steering of countries' industrial transformation. Policy agendas and financial reforms that have been shaped by dominant perspectives have not taken into consideration the heterogeneous financial needs of different establishments within the productive sector, which change over time. Existing frameworks are therefore overwhelmingly constrained by a supply-side bias. Financing needs of medium-sized manufacturing firms, which have the potential to be powerful transformation agents in Africa and LDCs, are especially differentiated, rendering them underserved or unserved by financial systems under currently prevailing development finance frameworks. Hence the existence of the increasingly discussed phenomena in Africa and LDCs known as the "missing middle".

The experience of the Republic of Korea in the late twentieth century is drawn on here, to highlight the country's successful targeting of development finance at both sector and firm levels. On the supply side, the State achieved this through ownership of commercial banks. On the demand side, funds were channelled through various development banks and other institutions, which each had different areas of focus. Specifically, the Industrial Base Technology Development Projects addressed the heterogeneous financing needs of SMEs in the country. In contrast, the Zambian case is analysed to emphasize the persistence of the "missing middle" phenomenon in many LDCs, and the problems that SMEs in the country continue to face, despite attention given to supply-side development financing in the country on the part of the Government and institutions such as the World Bank.

To be effective, development finance must address the specific and differentiated financial needs of productive enterprises within and across sectors at different stages of industrial transformation. The key policy implication here is that

development financing institutions must interact closely with firms on a regular basis, to ensure development financing can be targeted in a way that enables SMEs to overcome their heterogeneous financial constraints.

2. Rationale

On the supply side, access to private finance can be constrained in Africa and LDCs for two key reasons: firstly, banks are unwilling to invest in projects cloaked in uncertainty; secondly, financial markets themselves are often underdeveloped. It is becoming increasingly recognized that SMEs are key contributors to both the creation of employment and the development of "more diversified, agile and resilient economies" (Alibhai et al., 2017:3). However, credit markets for SMEs in Africa and LDCs are shrouded in market imperfections and failures, including lack of acceptable collateral, perception of high risk, information asymmetries and high transactions costs associated with small-scale lending (ibid.:9).

Even if problems of uncertainty are overcome, the underdevelopment of financial markets in many LDCs could still result in below-optimum investment in productive enterprises. It has been argued that strong financial market development is positively linked to economic growth (McMillan et al., 2017), and according to Beck et al. (2011:3), the promotion of financial sector development in LDCs has been successful in growing both financial access and private credit, therefore helping to "overcome market frictions that make direct exchanges between economic agents difficult" (ibid.).

On the demand side, the rationale behind development financing policy targeted at the firm level is that enterprises are heterogeneous in their financing needs, which also change over time, and simply freeing up the flow of funds towards these establishments does not guarantee that the funds will be used effectively to promote industrial transformation.

3. Policy options

Development finance policy needs to be addressed from both the supply and demand side. The design and implementation of the policy package depends on the economic and political context of the country in question, but most African countries and LDCs will benefit from some policy based on each of the following aspects of development finance.

(a) State-led development financing: With the right political and institutional conditions, many of the market failures and imperfections associated with financing development can be addressed through allocating resources to government-controlled development banks, and channelling rents towards firms or sectors that

are considered as priority areas for spurring productive development. The key roles of development banks are to provide countercyclical assistance, to aid capital development, to support new ventures and to address development challenges (Mazzucato and Pena, 2015; Guadagno, 2016; Ferraz, 2016).

During the late twentieth century, development banks in different countries used an array of mechanisms to lead in the financing of structural transformation, with varying degrees of success: The Korean Development Bank was heavily involved in buying equity from priority firms, while Mexico's development bank formed numerous partnerships to help organize local firms and offer technical assistance. In Brazil, BNDES actively established a stock market, while the approach of India's development bank was more direct, for example in supplying foreign and local currency loans (Amsden, 2001:132). It is vital that development banks use different policy instruments, depending on the needs of the productive entities of the country in question, to be effective.

Political influence, however, can be a key constraint on the effectiveness of development banks. Policies offering State-led financial support to priority firms must be monitored and disciplined through a "carrot-and-stick" approach, in the sense that assistance to non-performing industries should not be sustained (Amsden, 2001). The capacity of Governments to enforce strict rules surrounding development finance and ensure such rents are not open to political capture ultimately depends on the political settlement of the country in question (Khan, 2013b).

(b) Mobilization of private finance: Public institutions can also use financial instruments to incentivize the private financial sector to invest in manufacturing firms. Table V.1 provides some possible tools that could be implemented to mobilize private finance (Tyson, 2017:16).

Table V.1

Development finance institution policy instruments for manufacturing and agricultural processing

Instrument	Typical structures	Example market segment
Debt and equity financing	Debt and equity including in local currency and for relatively long periods	Larger companies and value chains
'Ring-fenced' funds via financial intermediaries	Intermediaries are typically local banks or microfinance institutions serving small and micro businesses	SMEs and small farmers
Venture capital funds	Equity, quasi-equity and debt for new investments, including via fund-of-funds and risk-sharing with investors	Innovative businesses and greenfield sites
Raising and managing third-party funds	Including loan syndication and funds to provide diversification benefits to investors through risk-pooling	Not used extensively in manufacturing
Advisory services and technical advice	Support for domestic financial institutions, private investors and to firms; can be difficult to leverage because it is cost-intensive	Building a pipeline of 'bankable firms'

Source: Tyson (2017 :16)

(c) Macroeconomic policy: Macroeconomic policy is multifaceted and can encourage/discourage productive investment in different ways, depending on the country context. Three key macroeconomic variables that can be manipulated to adjust financing pathways are: real effective exchange rate (REER), inflation rate, and interest rate.

(i) REER: Undervalued currencies typically can aid growth (Rodrik, 2008; Habib et al., 2016), although they can also boost inflation (Wondemu and Potts, 2016). On the other hand, an overvalued REER can function as an import subsidy and a tax on exports (Papadavid, 2017). The heterogeneous economic structures of countries, sectors and firms mean that the benefits arising from either overvaluation or undervaluation will vary depending on, for example, how import-dependent the entity might be (ibid.).

(ii) Inflation: Inflation itself discourages investment because it increases the cost of accumulating retained cash earnings and encourages speculation and investments in assets such as property, as well as capital flight (McKinnon, 1973). Moreover, high inflation and inflation volatility foster uncertainty, which further discourages investment (Baharumshah et al. 2016).

(iii) Interest rates: Interest rates have important effects on the cost of finance, which is especially significant for manufacturers with long investment periods – for example, extractive industries (Papadavid, 2017). High lending rates increase the cost of finance for firms in need of capital, while low interest rates on savings reduce the amount of potentially investable deposit funds that could be channelled towards productive industries (Akinlo and Owoyemi, 2012). Moreover, the interest rate spread (i.e. the difference between interest rates on loans and savings deposits) can significantly affect development finance. The Chinese Government enforced a policy of interest rate spread protection during its economic development, whereby the deposit rate was maintained below *equilibrium* level. According to Zhao (2017), this policy grew China's private financial sector profits, as they were not obliged to pay high interest on savings deposits, thereby *increasing* the funding available to invest in productive firms. Conversely, in the Republic of Korea in the 1970s, all interest rates were supressed in order to reduce the interest rate burden on borrowing firms, which it was able to do through State ownership of banks (Lee, 2017).

(d) Cautious financial sector development: While financial development is important for Africa and LDCs, the finance mobilized has not always found its way into the manufacturing sector (Tyson, 2017; Papadavid, 2017). Financial development does increase domestic bank capital and lending, but there is some evidence that it also reduces the amount of FDI being channelled into manufacturing, and therefore has a substitutional relationship with manufacturing, rather than additive (Tyson, 2017). An example of this is Kenya, where manufacturing sector development has been limited compared to the growth of other sectors, despite the country having one of the most developed financial markets in East Africa (Papadavid, 2017).

(e) Heterogeneity and evolution of financing needs: What is fundamentally missing from the supply-side-focused literature is that policies aimed at channelling economic resources, mobilizing private finance, improving macroeconomic conditions and developing financial systems affect different industries disproportionately. For example, the impact of supply-side financial policies on those firms relying on internal finance, versus those dependent on external funds, is likely to be different (Rajan and Zingales, 1998). This highlights the structural differences in the financial needs of distinct industrial sectors.

Taking this one step further, the financial needs of industrial sectors are defined by the financial needs of the firms within those sectors, which themselves are heterogeneous by nature. However, going beyond conventional studies, firm heterogeneity cannot be defined simply by establishment size, age, ownership and source of funding. Other structural factors that must be considered when assessing

the finance-production nexus can be clustered into three groups: market factors, technology and production:

(i) Market factors: What is the degree of access, direct or indirect, that firms have to final markets via final or intermediate products? What is the size composition of these markets, and are they domestic or external?

(ii) Technology: How complex are the adopted technologies and how long is needed for the absorption of these technologies and their successful deployment? How much risk is associated with different technology types (especially green technologies), and the infrastructures needed to complement these technologies?

(iii) Production: Firms differ hugely in company size and production scale, the composition of factor inputs, production cycles and firms' position in global and local production networks. Which finance channels will best contribute to structural transformation through local production system development?

These firm-specific factors, in turn, shape the heterogeneous financial needs of industrial sectors as a whole. Moreover, these needs are dynamic in that, as a country moves along its structural transformation pathway, the financial requirements of productive enterprises change as well.

4. Case study 1: The Republic of Korea's State-led financing

In 1960, economic conditions in the Republic of Korea were, in many ways, like those in many countries of sub-Saharan Africa (Lee, 2017). The country relied on aid from the United States, had suffered colonial rule for several decades and went through a period of food shortage in the 1950s. However, with the implementation of an innovative development strategy founded on "getting prices wrong" (Amsden, 1989), and channelling rents towards targeted sectors, the administration of 1961 led by Park Chun-Hee was able to accelerate industrial development in the country.

In terms of the supply of financing, the Republic of Korea faced two serious problems in the 1960s: capital scarcity and a severe savings gap. Capital scarcity meant that firms had to rely on credit, although capital markets remained underdeveloped (Lee, 2017). In response, in 1961, commercial banks were nationalized by the State, which meant that the Government could effectively channel foreign and domestic savings towards selected firms (Lee, 2017). The savings gap had to be bridged through foreign borrowing in the short term, while in the long term the Government imposed a policy of financial restraint, which encouraged investment through lowering interest rates (although keeping them

positive – therefore it was not financial "repression" (Hellmann et al., 1998)). Investment grew, encouraging domestic savings, which by the mid-1980s made up about 30 per cent of GDP, up from 9 per cent in 1960 (Lee, 2017).

State control of the banking sector meant that the latter was forced to provide "growth money" to the real sector at affordable rates (Lee, 2017:184). Production and manufacturing sectors were prioritized, and the margin between deposit and lending rates was very small to encourage private investment towards manufacturing, as opposed to the financial sector (Lee, 2017). The Government maintained strong control over entry into sectors, ensuring that firms admitted participating had some level of profit guaranteed.

Various development banks were used as vehicles for these financing policies, including the Korea Development Bank. In 1973, the Korea Development Bank contributed to sourcing funding to develop the chemical and heavy industry, for which investment requires notoriously long-time horizons, by acquiring loans from external financial institutions and issuing foreign currency bonds to external capital markets. These financing sources made up about half of the bank's overall funds in 1979. The rest came from bonds issued to private banks and households (Lee, 2017).

However, in the 1980s the Government of the Republic of Korea recognized that other financing constraints needed to be addressed, in particular technology bottlenecks (Shin and Lee, 2012). Thus, the Korea Development Bank looked to channel funds towards R&D, while the creation of the Korean Technology Financing Corporation in 1984 meant that the rate of growth of policy loans from the Korea Development Bank started to slow. As the economy grew, funds were increasingly sourced internally, thus reducing reliance on the external supply of development financing (Lee, 2017).

Throughout this period, the Export-Import Bank of Korea supported domestic exporting firms that faced conditions of deferred payment from buyers in the global market. This bank also aided firms in moving production overseas after the 1980s as the country's wages increased. The Industrial Bank of Korea looked to provide loans, as well as technology guidance, in partnership with UNDP to SMEs. While at the start of the development process in the Republic of Korea, big businesses were the main focus of the Government's strategy, after the mid-1980s resources were increasingly allocated to technology-intensive SMEs that supplied parts to larger firms (Lee, 2017; see box V.1). In 1989, the Export-Import Bank of Korea specifically targeted loans to firms with less than 50 employees that struggled to provide sufficient collateral for commercial loans (Lee, 2017).

The strategy of the Government of the Republic of Korea in financing the country's economic development was effective because it was not only successful in sourcing and channelling funds efficiently, it was also responsive to the changing and varying needs of different firms according to their characteristics, and the level of development of the country. In other words, the approach of the Republic of Korea accounted for both demand-, as well as supply-side financing constraints, and responded to them effectively, even as they evolved.

Box V.1

Financing Bottleneck Technologies for Republic of Korea SMEs

During the period 1987–1991, the Industrial Base Technology Development Projects (IBTDPs), later known as the Industrial Technology Development Projects, conducted five survey rounds in a "bottom-up" approach to identifying the main technology bottlenecks impeding the growth of SMEs. A total of 1,329 required technologies were identified, of which 934 received funding for development. Of these projects, 84.4 per cent were deemed a success. The technologies were categorized according to how they could be developed and financed. As such, funding from the IBTDP was allocated in different ways to different technologies. Technologies in Group I were considered as badly needed – they were common bottlenecks – and they were directly funded by the IBTDP. In contrast, Group III technologies, which were easy to develop through direct grants to firms, were funded by other bodies such as the Industrial Bank of Korea or KDP. (Lee, 2017).

5. Case study 2: Zambia's missing middle

Zambia is a prime example of a country experiencing the "missing middle" phenomenon. Most establishments in the private sector are micro-firms (94 per cent), which provide 68 per cent of the country's total employment, while medium firms make up less than 1 per cent, and large firms less than 0.1 per cent (Phillips and Bhatia-Panthaki, 2007). The majority of micro and small establishments are in mining and agriculture, and there is a high degree of concentration among large exporting enterprises in some large-scale industries such as copper mining. Zambia lacks an organized SME sector connected to value chains, meaning that few firms can effectively export (ibid.).

The Zambian Government and the country's donors have recently been paying more attention to the resuscitation of private sector development, as its importance as an engine of growth is increasingly recognized (ibid.). Indeed, the Government

and the World Bank have thoroughly analysed the country's investment climate, proposing macro level policy interventions for its improvement, as well as developing a private sector development action plan. Financial Sector Deepening Zambia is tackling the issue of finance from the supply-side, working on projects to improve the delivery and supply of financial services to SMEs; address asymmetries in information; and better the support services for the financial service providers (FSDZ, 2017).

However, Phillips and Bhatia-Panthaki (2007) highlight that, crucially, these analyses do not account for constraints on development at the firm level, which will vary across firms, given their heterogeneous characteristics. To gauge what interventions are needed at the operational level in order that the private sector might grow, they conducted 200 interviews with enterprise owners in Zambia, with mixed results.

A total of 32 per cent of the MSME firm owners interviewed stated that they founded their business in response to a gap in the market, and were therefore more growth-oriented, while 47 per cent were only looking to supplement their family's income, and generally were not looking to expand their business. Most entrepreneurs in the former group undertook minimal market research on establishing their businesses, and had been operating with an absence of market knowledge regarding available financial assistance, demand and sometimes even competitive behaviour. These firms have thus been taking large risks on misinformation and inadequate evaluation, minimizing their chances of successful expansion. Within the latter group, entrepreneurs were found to be more risk-averse and less ambitious about growing their firm. A third group of more entrepreneurial firms was also identified.

Phillips and Bhatia-Panthaki (2007) found that, in terms of the growth trajectory of Zambian micro and small enterprises, there is substantial evidence of diversification towards other low-value activities, but much less on deepening and repeatedly investing in the prevailing activity. Differentiated instruments are needed to support entrepreneurs in realizing the potential of their firms, and a variety of formal and informal networks should be encouraged (ibid.). Institutions such as those supplying microcredit may benefit entrepreneurs looking just to support their families, but not those that are ambitious to grow (ibid.). Improved information is likely to benefit all parties, and a toolkit should be developed to understand the incentives of different groups before targeting policy. The facilitation of more statistical research on the differentiated financial needs of SMEs in Africa and LDCs is urgent.

6. Policy implications

(a) Attention to the demand-side of development finance

While the development of productive SMEs in Africa and LDCs could act as a catalyst for economic growth and industrial transformation, at present there is a lack of consideration for the demand-side constraints that are holding SMEs back. The financing needs of these establishments are differentiated, and change over time, as demonstrated by the case of Zambia, where different firms have different aspirations, constraints and access to information. This implies that policies looking to alleviate these demand-side constraints must involve close interaction between financing institutions (government, development banks, private financial sector, among others) and those SMEs, as occurred in the Republic of Korea with the creation of the IBTDPs. The Government of the Republic of Korea was also successful in adjusting its financing strategies over time, as the financing needs of firms evolved. Without a comprehensive understanding of where funding should be channelled according to the heterogeneous, and changing, financing needs of SMEs, supply-side policies are likely to be ineffective.

(b) Align supply- and demand-side policies

Supply- and demand-side policies should be aligned, to ensure their positive impact is maximized. Distinct countries, productive systems, sectors and firms will require different mixes of supply- and demand-side policies, and these will change over time. In the example of the Republic of Korea, the Government implemented a mix of policies. Demand-side policies were implemented alongside supply-side ones: the Government implemented State-led financing through State ownership of the financial sector and the creation of various development banks, as well as financial restraint policies through reducing interest rates, while also developing initiatives such as the IBTDPs. In contrast, Zambia's development finance focus has not aligned demand- and supply-side policies, but approaches looking to resuscitate the private sector appear to be overwhelmingly focused on the latter. The result is that many SMEs in the country remain unserved or underserved by the country's financial markets.

B. Investment promotion and foreign direct investments

1. Overview

Investment by foreign and domestic firms is recognized to be a critical factor driving economic growth, yet the contribution of investment to industrialization is not automatic. Creating the right policy and institutional framework to support productive investment must therefore be a top priority for policymakers in Africa

and LDCs. This section outlines some key considerations in the construction of a policy framework for investment that supports industrialization.

The example of a matching grant scheme in South Africa is explored to show one approach to promoting domestic investment in the manufacturing sector. The experience of Viet Nam is then studied to understand how FDI has contributed to the industrialization process there. Finally, some policy implications are drawn out, with an emphasis on the need for strategic investment promotion, smart design of incentives and an overarching focus on developing viable local production systems.

2. Rationale

Often the most profitable areas for investment by domestic entrepreneurs in Africa and LDCs are in non-tradable services such as retail, where prospects for productivity growth are negligible. Where it is available, private finance tends to have short repayment periods and high interest rates, further encouraging importing and resale activities. There is a strong rationale for policy initiatives to incentivise investment in productive activities such as manufacturing, where there are increasing returns to scale and the potential for dynamic, long-term productivity gains and job creation (Andreoni and Chang, 2016).

An important means of kick-starting the industrialization process is FDI, where investors from overseas invest their capital and organizational know-how to gain access to cheap labour and resources. This sounds like a "win–win" scenario, but in order for FDI to contribute meaningfully to industrialization, a strategic approach to FDI promotion is required along with careful design of incentives to ensure benefits in terms of employment generation, the creation of linkages with domestic firms and technological learning.

3. Policy options

Almost any industrial policy measure, which generally seeks to reorient the structure of the economy towards industry, is likely to involve making investment in industry more attractive. Some of the most important are shown in table V.2, which can be equally used to encourage domestic or foreign investment in priority sectors (UNIDO, 2017).

Table V.2
Industrial policy measures

Policy instrument	Examples and description
Industrial financing	Preferential loans or matching grants for investment in plant or machinery upgrading, e.g. via a national development bank.
Fiscal incentives	Deductions against taxable income for productive investments; tax holidays in exchange for local procurement, technology transfer or R&D; import tariff exemptions on machinery and inputs.
Infrastructure	Provision of land, electricity, water etc. at preferential rates, e.g. through special economic zones (SEZs).
Tariffs	Strategic tariff protection to increase competitiveness of domestically produced goods vis-à-vis imports.
Export promotion	Export credit guarantees, export performance requirements, export subsidies, marketing services, trade agreements for market access.
Skills	Vocational training schemes to increase the supply of skilled workers.

Source: Authors

The following policy options target foreign investors more directly (Table V.3), and are often carried out by dedicated investment promotion agencies (ESCAP, 2017; UNCTAD, 2015).

Table V.3
Policy options

Policy instrument	Examples and description
Image-building	Location marketing to attract investors to a country/region.
Bankable projects	Defining and marketing bankable investment projects (that are politically supported, regulatorily prepared and prepackaged).
Targeted investment promotion	Preparation of investment proposals and participation in international exhibitions, fairs, seminars, etc., to disseminate information about business opportunities.
Investment facilitation	Handling administrative and political issues around establishment of a business/project (permits, etc.) and subsequent aftercare services.
Advocacy	Advocate to Government on behalf of foreign investors regarding specific problems and general investment climate issues.

Source: Authors

Finally, the policy interventions below (table V.4) seek to build linkages between FDI projects and domestic firms, with a view to building the productive capacities of the latter.

Table V.4
Policy interventions

Policy instrument	Examples and description
Matching service	Establish and maintain supplier database and actively seek to close information gaps and broker deals between foreign and domestic firms.
Joint venture requirements	Require foreign investors to establish joint ventures with domestic firms as a condition for operating in a country.
Cluster development	Promote clustering of domestic firms supplying FDI projects to reduce costs through shared facilities and network effects.
Local content policy	Either require or incentivize foreign investors to procure inputs locally, e.g. localization plans, local sourcing reporting requirements.
Supplier development incentives	Offer incentives (e.g. preferential loans, tax exemptions) for foreign investors who actively facilitate the upgrading of their domestic suppliers.
Standards development	Establishment of national norms and standards, in line with international (e.g. ISO) standards, to increase capabilities and investor confidence.
Extension services	Capacity-building for domestic firms around upgrading technologies, production processes, management practices, etc.

Source: Authors

Policymakers considering options in a specific country must take account of national policy space – for instance WTO members are committed to following the rules enshrined in the TRIMS agreement and restraining from imposing requirements on foreign investors around local content, trade balancing and foreign exchange balancing.

4. Case study 1: South Africa's domestic investment promotion

(a) Overview

The South African Government Department for Trade and Industry (DTI) identified the scarcity of affordable long-term financing as a principal obstacle to investment in the manufacturing sector (DTI, 2017). This reflects the financialization of the South African economy, especially the tendency for non-financial corporations to invest in financial assets for short-term returns over productive activities (Newman, 2014). To address this issue, and to support key sectors in the wake of the global financial crisis, DTI introduced the Manufacturing Competitiveness Enhancement Programme (MCEP) in 2012 (DTI, 2015a). It consisted of two elements: a matching grant scheme managed by DTI, which made up 80 per cent of the MCEP budget, and a loan facility administered by the government-owned Industrial Development Corporation, which made up the remaining 20 per cent (DTI, 2016).

During the first round of the MCEP, from April 2012 to March 2016, about 1,552 grants and loans were approved, for a total value of R5.8 billion. The initial budget was fully committed by October 2015, and from April 2016 a second round was opened in with an additional R1 billion. The majority of grants were for investments in capital equipment (for upgrading and expansions), and enterprise-level competitiveness improvements (related to products, processes, markets or skills) – these two categories made up 95 per cent of MCEP grants in 2014/15 (DTI, 2015b). The lion's share of funds approved in that year were for the agro-processing (27 per cent), non-metals (14 per cent), plastics (13 per cent), metals (12 per cent) and paper (8 per cent) subsectors. During 2016/17 the Industrial Development Corporation approved 41 loans with the value of R871 million (of which R727 million was for working capital and R144 million for capital investment).

(b) Evaluation

Incentives for manufacturing, including MCEP, made up over one third of the Government's budget for Trade and Industry in 2013/14, making them the principle industrial policy expenditure in South Africa. Grants for capital equipment were available for 30–50 per cent of the total value of investments, with firms providing the remainder, to ensure the commitment of private investors to the success of investment projects.

Although MCEP represents a major commitment of government resources to capital investment in manufacturing, MCEP funds were equivalent to a small share (2 per cent in 2012/13) of the publicly-owned Industrial Development Corporation's lending portfolio, which focuses on provision of short-term working capital loans. A

reorientation of that institution towards longer-term financing for capital investment could be more effective than interventions like the MCEP. Furthermore, while industrial financing is a "horizontal" issue (cutting all sectors and firms), the MCEP is a "vertical" response since the grants generate firm-specific assets (Andreoni and Neuerburg, 2014). DTI recognizes the need for a more coherent approach, with the aim of "building a much stronger system of industrial finance and incentives to support investment in the productive sectors of the economy" (DTI, 2017).

The stated aim of MCEP is to improve the competitiveness of manufacturing firms, but an immediate stimulus for the programme was provided by the political imperative to shore up employment during the post-financial crisis global economic downturn. As a result, as with many industrial policy initiatives, there was tension (at least in the short run) between the MCEP's competitiveness and employment objectives (Andreoni and Neuerburg, 2014). The programme required grant beneficiaries to maintain their employment levels, and the number of jobs sustained/retained was a key performance indicator. This effectively disincentivized equipment upgrading, which would reduce employment in the short run but increase competitiveness and so create the potential for more and higher value employment in the medium-to-long run.

5. Case study 2: Viet Nam's FDI-led structural transformation

Viet Nam opened up to FDI in the late 1980s under the Doi Moi economic reform programme, and the significant flows of foreign investment the country attracted have been a major force driving structural economic transformation (UNCTAD, 2008). This was not due to any "natural" operation of market forces however, but the result of the authorities' "steer and control" regulatory approach towards FDI.

(a) Choice of sectors

An important aspect of Viet Nam's FDI strategy has been the channelling of investment to priority sectors, principally in export-oriented manufacturing. The processing and manufacturing industries accounted for 57 per cent of total registered investment at the end of 2015 (Hanh et al, 2017). Initially low-tech labour-intensive industries, such as apparel and footwear, were targeted for FDI, but this increasingly shifted to higher-technology areas such as electronics and automobiles. The draft FDI strategy for the 2018–2023 period will push this further, promoting the manufacture of pharmaceuticals and medical equipment (Shira, 2017).

In contrast to many developing countries, Vietnamese authorities placed restrictions on FDI in service sectors such as telecommunications and finance (UNCTAD, 2008). As part of Viet Nam's accession to WTO, it committed to lifting restrictions on FDI in these sectors, but even in 2017 the financial sector remained dominated

by four State-owned banks, which provided half of total credit and accounted for 45 per cent of banking sector assets (IMF, 2017). This gives the State considerable latitude to ensure the orientation of the financial sector is supportive to core policy objectives such as industrialization.

(b) Incentives

Despite Viet Nam's favourable position in East Asia, cheap labour force and advantageous access to the United States market via a bilateral trade agreement from 2001, industrial competitiveness was initially low and significant subsidies to foreign investors were judged necessary (Gray, 2012). The most important of these were SEZs, which provided duty-free access to inputs, fiscal incentives and subsidized land and infrastructure. An important feature of Viet Nam's FDI model is the devolution of investment promotion and facilitation functions to provincial governments.

(c) Control mechanisms

Subsidy recipients were compelled to become internationally competitive through a variety of institutional arrangements, or "control mechanisms" (Amsden, 2001). A critical factor was the dominance of State-owned enterprises over the domestic market, such that foreign investors had little choice but to export and therefore become competitive (Gray, 2012). In addition, the State imposed requirements around the balance of imports to exports and foreign exchange controls to promote export orientation, as well as local content requirements (MPI, 2003). Many of these disciplines had to be phased out after Viet Nam's accession in 2007 to WTO, which bans their use.

(d) Evaluation

Viet Nam has seen huge increases in FDI alongside dramatic changes in the structure of its economy towards manufacturing and industry. Net FDI inflows increased from $180 million in 1990 to $2.4 billion in 2006; increased to $6.981 billion in 2007, when Viet Nam acceded to WTO; and has continued on an upward trend, reaching $12.6 billion in 2016 (UNCTAD, 2018). Meanwhile, GDP per capita increased from $97 in 1989 to $1,903 in 2013, and MVA as a share of GDP increased from 12.3 to 17.5 per cent over the same period (Chang et al, 2016). Manufacturing exports grew from $4.037 billion in 1997 to $92.9 billion in 2013, during which time the share of manufacturing in total merchandise exports increased from 46 per cent to 70 per cent.

While impressive, Viet Nam's trajectory of structural change has not been on a par with that of China, which grew even faster and expanded its presence in medium

and high-technology sectors more effectively (Chang et al, 2016). Viet Nam has so far focused on low-technology sectors, but even there, technological spillovers from FDI have been limited – the garment industry, for instance, is predominantly based on assembly activities with higher value parts of the value chain located elsewhere (Gray, 2012; Chang et al, 2016). Efforts to promote technology transfer in the automobile sector were ineffective, because manufacturers were able to successfully lobby to prevent the enforcement of localization targets, partly because foreign investors in the sector had partnered with State-owned enterprises (Gray, 2012).

6. Policy implications

The case studies above and broader literature on investment policy in developing countries point towards the following policy implications for Africa and LDCs:

(a) Strategic investment promotion

Investment promotion should be closely aligned with an overarching national development strategy and specific industrial policy objectives. The choice of sectors to promote foreign and domestic investors should reflect the country's particular long-term vision for economic transformation towards higher value added activities. Sector choice must also be based on an assessment of existing resources and productive capacities, or a clear plan for how they are to be acquired. Beyond targeting at the sector level, Governments should seek to identify clear opportunities for investment by developing specific bankable projects with well-defined business plans (UNCTAD, 2015).

(b) Smart incentive design

Fiscal incentives are commonly used by countries to attract foreign investors, but there is evidence that these are often redundant, as investors would have invested anyway (IMF et al., 2015). For all types of investment incentives, the likely costs (e.g. forgone tax revenue) should be clearly justified by expected benefits (e.g. employment generation, technology spillovers) which are additional to what would have otherwise occurred. Where incentives aim to promote investment in infant industries, they should be time-bound and conditional on performance to increase competitiveness, with agreed monitoring and enforcement mechanisms aligned with the relevant political settlement (Khan, 2013b).

(c) Local production systems development

Attracting FDI is not an end in itself, but a means to enable the development of domestic production capabilities and a dense set of input–output linkages between sectors. To achieve this, domestic and foreign investment policy should foster the emergence of a well-integrated "local production system", rather than an "enclave

economy" (Andreoni, 2018). This requires policies that incentivize foreign investors to transfer technology to the host country, procure locally and enter into joint ventures with domestic firms. At the same time, Governments must work actively to develop the productive capacities of domestic firms and workers through effective manufacturing extension services, skills development programmes, industrial financing and infrastructure provision. Investment promotion agencies should be tasked with linking foreign investors with domestic firms through information provision (e.g. supplier databases) and active brokering of supply relationships.

C. Industrial parks and special economic zones

1. Overview

Proponents of industrial parks, also known as special economic zones (SEZs), champion their capacity to lower transactions costs; facilitate skills, technology and knowledge spillovers; and reduce barriers to entry, spurring productive development of firms and thus industrial transformation and competitiveness. However, many attempts to build successful industrial parks have failed in the past, and it is therefore crucial that such entities are constructed with caution, with special sensitivity to the types of policies that will foster investment and linkages, rather than leave the parks underutilized or empty.

As well as a brief examination into some of the reasons that caused industrial parks in Egypt, Senegal and India to fail, the example of Hawassa Industrial Park is drawn on here, in more depth, to highlight the steps that were taken by the Ethiopian Government to successfully encourage investment into the area. Key findings are: there was a close and cooperative relationship between investors and high-level government officials, with strong and genuine commitment from the Government; the park is targeted in a sector in which Ethiopia now has a comparative advantage (textiles), as wages in Asia are increasing; robust institutions to facilitate investment have been put in place; and one especially significant investor was effectively targeted (PVH), giving park producers access to global markets.

The policy implications are the following: firstly, parks that have successfully attracted investment have offered not just financial, infrastructure or trade facilitation benefits to firms, but have also emphasized government commitment to the development of the parks and created institutions to facilitate their establishment; secondly, industrial parks will only truly benefit the domestic economy in the long term if linkages are effectively fostered. This can be achieved through ensuring that investment incentives are appropriately targeted towards firms that will benefit the local economy and facilitate the growth of competitive industry and are equally retracted from underperforming firms.

2. Rationale

An industrial park can be defined as "a tract of land developed and subdivided into plots according to a comprehensive plan with provision for roads, transport and public utilities, with or without built-up (advance) factories, sometimes with common facilities and sometimes without them" (UNIDO, 1997:10). Unlike clusters, which are organically formed geographical groupings of firms, industrial parks can be synthetically introduced by Governments to kick-start economic growth within a specific locality or geographic region (Zhang, 2017). Industrial parks often go beyond the provision of hard infrastructure. Firms in industrial parks are usually granted preferential policies and are subject to special institutional arrangements – such as looser labour regulations than other firms in the country, reductions in taxes and tariffs, and different laws – with the aim of reducing the cost of conducting business there (ibid.).

Four chapters of Marshall's seminal book, *Principles of Economics* (1920) were devoted to discussing the phenomenon of grouping industry geographically, highlighting three key benefits in particular: purchasing costs are lowered because accessing buyers and suppliers is much easier; the pooling of labour markets makes skills transferable across firms, incentivizing workers to invest in their own professional development; and the likelihood of technological and knowledge spillovers is increased. Adding to Marshall's list, the capital needed to start a business is reduced at each stage of development due to the fine division of labour (Ruan and Zhang, 2009). Moreover, firms can easily lend to each other through interfirm trade credit, due to locational proximity and strong social capital (developed from repeated transactions and free flowing information) (Zhang, 2017). These last two benefits lower the barriers to entry for entrepreneurs, thus stimulating the opening of employment opportunities (ibid.). Some countries that have experienced success with such industrial park creation include China (Zhang, 2017; Yuan et al., 2010; Naughton, 2007), Indonesia, Malaysia, Sri Lanka, and the Republic of Korea (Jayanthakumaran, 2003).

3. Policy options

(a) Financial incentives

Typical financial incentives used in industrial park development include free land, subsidies and tax breaks (Khandelwel and Teachout, 2016; Zhang, 2017). Khandelwel and Teachout (2016) emphasize that the increasing reliance of firms on global supply chains for sourcing intermediary inputs is also increasing the importance of duty drawback policies, which were heavily used in China's SEZs (Naughton, 2007).

(b) Non-financial incentives

Aside from financial incentives, trade facilitation and infrastructure will also provide strong incentives for firms to establish themselves in SEZs (Farole and Akinci, 2011), as well as genuine, consistent commitment from the Government to follow through on its proposed policies, and a robust institutional system to implement them (Mihretu and Llobet, 2017).

(c) Targeting international firms

By attracting establishments to industrial parks that produce to international market orders, problems of limited domestic markets can be overcome. The development of domestic markets over time means that, gradually, those establishments that supply to external markets can start to subcontract domestically, thus inducing employment opportunities and technology spillovers (Glaeser and Gottlieb, 2009; Greenstone et al., 2010).

(d) Targeting grouped businesses

Another way to gain access to external markets is to establish an industrial park outside the domestic country, in a host country, using "go-as-a-group" strategy. This entails a lead enterprise or a business association establishing an industrial park overseas, attracting other domestic firms, thus maintaining the domestic value chain. Zhang (2017) recounts the case of Yue Mei, a Chinese firm that invited 15 Chinese establishments, both upstream and downstream, to set up an industrial park for garment and textile production in a free trade zone in Abuja, Nigeria, when the country declared the import of such products illegal. However, this approach limits the potential for vital spillovers and linkages to the rest of the domestic economy.

(e) Experimentation and a gradual approach

In China, SEZ policies have taken the shape of a step-by-step approach alongside an experimental mentality (Xing and Zhang, 2013). The first industrial park, Shekou, established in 1979, was very small (11 km2), after which Shenzhen was established in 1980 (328 km2), followed by 14 "opening-up" coastal cities in 1984. Zhang (2017) suggests that Governments "start small" so that any negative spillovers that might accidentally arise from the creation of industrial parks can be quickly corrected and restricted to a narrow locality. The policies which best spur growth can then be identified and gradually scaled up (Khandelwal and Teachout, 2016), as they have been in Jamaica, Kuwait, Malaysia and Jordan (Akinci and Crittle, 2008). Moreover, SEZs provide Governments with a small-scale area in which to experiment with new regulatory frameworks and institutions which, if they are successful, can act as an

effective catalyst for implementing country-wide institutional reforms from which many LDCs could benefit (Khandelwal and Teachout, 2016).

Despite their potential, many industrial park programmes in developing countries have failed in the past. Critics have highlighted issues of tax base erosion; facilitating land speculation; producing white elephants; and channelling funds towards politically favoured districts and firms (Saleman and Jordan, 2014). An example of such a failed attempt at establishing industrial park is Egypt, where severe information asymmetries persisted between grass-roots entrepreneurs and Governments, due to the heavy bureaucracy of the SEZ system and constant policy changes (Zhang, 2017). In Senegal, excessive bureaucracy, inadequate transportation infrastructure, expensive labour and high electricity costs inhibited the growth of effective industrial parks (Cling and Letilly, 2001).

In India, experience with industrial parks has been mixed. Despite the 2005 SEZ Act, private firms remain reluctant to invest in industrial parks, as governmental patronage is still necessary for land acquisition (Seshadri, 2012). According to Saleman and Jordan (2014), the difference between SEZs that have been successful and unsuccessful in India is that the former – for instance, a recent programme developed by the Ministry of Textiles – have been designed in such a way that they are compatible with the domestic political economy. This example of a country that has experienced both successes and failures in industrial parks emphasizes the crucial need to shape policies according to institutional capabilities and characteristics of the firms involved.

4. Case study: Ethiopia Hawassa Industrial Park

Hawassa Industrial Park (HIP), established by the Ethiopian Industrial Parks Development Corporation in 2016, has thus far been considered by many as a great success (Hoque, 2017; Davison, 2017; Barrie, 2017). Hoping to lure manufacturers currently suffering from increasing wages in Asia, the Ethiopian Government has invested US$250 million into HIP. The park is projected to create 60,000 jobs annually, compared to the mere 250,000 jobs that the country's manufacturing sector has managed to generate over the last 30 years, as well as export revenues worth US$1 billion, generating much-needed foreign exchange for the country (Mihretu et al., 2017). HIP was constructed in just nine months, and its development is based not only on financial incentives, but also on institutional and practical coordination, and the genuine commitment of a Government striving for manufacturing growth and industrialization for Ethiopia (Hoque, 2017).

According to Dr. Arkebe Oqubay, the former Ethiopian Prime Minister's Senior

Advisor, many SEZs in Africa are "missing the 'basics' such as power, water and one-stop services, and were not aligned with national development strategy" (Fruman, 2015). In response to this, HIP was constructed with four important elements: expat housing units; a water treatment plant; the largest textile mill in Ethiopia (which is also a key part of the Government's wider vertical integration plan); and factories, all of which are linked by an underground piping of 50 km. The park's energy is derived from a mobile substation of 19 MW, which will later be substituted by direct supply from a 200 MW dedicated substation. To put this into perspective, the rest of the city is served by a power supply of just 75 MW (Hoque, 2017). The Ethiopian Investment Commission selects investors, assembles the strategy for industries within the park, and is in close contact with the Prime Minister – demonstrating the strong commitment to the programme at a high level of Government (Hoque, 2017). New companies entering the HIP are supported by the Ethiopian Investment Commission through a one-stop service for institutional matters (visa, banking, work permits, etc.), which lowers set-up costs and accelerates decision-making (Barrie, 2017). Beyond spurring positive economic externalities in terms of job creation, infrastructure and exports, HIP follows strict conservation principles and is operating a facility of zero-liquid discharge (Hoque, 2017). In terms of labour, there are 5 million inhabitants within 50 km of Hawassa, constituting an abundant labour supply (ibid.).

From the perspective of investors, foreign investment might be attracted to Ethiopia due to its export access to United States and European Union markets as a result of the African Growth and Opportunity Act and the Everything But Arms agreement, respectively. A total of 18 firms have already leased out all 52 of the park's units, including, vitally, the United States company PVH, which owns brands such as Tommy Hilfiger and Calvin Klein (Davison, 2017). PVH, discontent with increased production costs and weak institutions in Asia, considered five factors when deciding on a new production location: port accessibility; land accessibility; government stability; labour availability; and energy cost. Long-term government commitment to the availability of these factors was crucial (Mihretu et al., 2017). While Ethiopia mostly satisfied these conditions, the targeting of the textile industry by the Government was the deciding factor for PVH (World Bank, 2017). A direct communication channel between senior government officials and PVH was established, enabling trusting and effective coordination to take place (Mihretu et al., 2017).

The park, however, is facing challenges. Power failures are commonplace, transport costs between the park and Hawassa are high; and absenteeism among workers

is rife. Workers are moving to other factories once they have acquired sufficient skills, and managers are concerned at their inability to influence the staff selection process as a government job centre sources workers (Hoque, 2017; Davison, 2017). However, the HIP programme is still in its infancy, and many are optimistic about the benefits such parks can bring for industrialization in Ethiopia in the future (Davison, 2017; Hoque, 2017).

5. Policy implications

(a) Government commitment

The first policy implication that can be drawn from the Hawassa case study is that investment incentives entail more than just financial benefits and infrastructure provision. Visibly genuine commitment on the part of the Ethiopian Government towards the development of industrial parks was paramount in attracting PVH to Hawassa Park.

(b) Strategic sector and firm targeting

In the Hawassa case the strategic targeting of the textile industry also incentivised the company to locate there, as labour costs in their Asian operations were increasing. While financial and infrastructure incentives are certainly important in fomenting investment in industrial parks, strategic sector targeting is also clearly valuable.

(c) Pursuit of linkages and spillovers

Linkages need to be effectively fostered for the domestic economy to truly benefit from industrial parks. It is too early to tell the impact of positive externalities emanating from the Hawassa Industrial Park on the rest of the Ethiopian economy, but the Government has strategically placed the park, which targets the labour-intensive textiles industry, near an area that is abundant in labour. In theory, this should facilitate not only job creation, but also skills upgrading, as technological spillovers from firms such as PVH improve the skills of the local population. Clearly, however, the current turnover rate of labour in Hawassa is too high, and the Government needs to address this issue lest it causes investment disincentive for firms.

D. Trade policy and strategic market development

1. Overview

Extensive engagement in external trade has been a common feature of almost all countries that have successfully industrialized, but LDCs also carry out much trade with the rest of the world. LDCs are in fact generally more open to trade than OECD

countries, when measured as the sum of imports and exports as a share of GDP: the average figure for LDCs as a group was 48 per cent compared with 41 per cent for OECD countries, during the 2005–2016 period (UNCTAD, 2018). This section discusses how trade can be an instrument of industrial policy and contribute to structural economic transformation, rather than compounding underdevelopment.

The examples of Uganda and the Republic of Korea are drawn on to illustrate the case of a contemporary LDC seeing some success in diversifying its exports towards higher value goods, and a historical case of rapid industrialization where export promotion played a key role. Some policy implications are then set out around strategically using and expanding trade policy space and the importance of establishing institutions capable of effectively monitoring trade performance and removing incentives in the case of non-performance.

2. Rationale

Trade and trade policy can contribute to industrialization through several channels. At early stages of development, when countries have a static comparative advantage in agriculture and raw materials, exports of primary products can serve as a "vent for surplus" and earn foreign exchange to pay for imports of capital equipment. Where the domestic market is sufficiently large and productive capacities exist, tariffs and complementary policies to promote technological learning can provide space for infant industries to achieve international competitiveness. Alternatively, or concurrently, through exporting manufactured goods, domestic industries can have access to a larger market, which permits greater exploitation of scale economies in production and increased competitiveness. The key is for trade and industrial policy to be focused on increasing the technology content of production and exports, so that countries can develop new comparative advantages and exploit dynamic gains from trade.

3. Policy options

In thinking about the trade policy options available to a country, the concept of "policy space" is useful in defining (a) the set of the instruments which are legally compatible with the trade agreements to which the country is party; and (b) those which can be feasibly implemented, given the political and economic context (UNCTAD, 2014).

Countries that are members of WTO, for instance, are legally constrained in their ability to use some trade policy instruments which were important for successful late developers in East Asia (e.g. quantitative restrictions on imports). But beyond the legal policy space, every country faces a specific political–economic context

which determines which policies can be feasibly implemented, including factors such as domestic market size, foreign market access, domestic industrial structure and productive capacities, the national political settlement, governance capabilities, etc. Based on the multilateral, regional and bilateral trade agreements it has signed and its own specific context, a country can determine its trade policy space and develop a specific strategy, potentially including some of the instruments in table V.5 (UNIDO, 2017; UNCTAD, 2016). A combination of some of these instruments constitutes a policy package, and some well-known examples in trade policy are "free trade", "import substitution" and "export orientation". No country has ever seen successful late development through free trade, so that option is not relevant for Africa and LDCs today (Reinert, 2007; Chang, 2002). Import substitution and export orientation are often seen as separate options, but in fact are complementary, with successful late developers using aspects of both.

Table V.5

Instruments countries can use to determine trade policy space

Policy instrument	Examples and description
Trade agreements	Agreements for reciprocal tariff reductions on certain goods, in order to create larger markets and permit economies of scale.
Export subsidies	Provide exporters with cash grants, preferential loans, export credit guarantees, tax incentives and exemptions, etc., in return for meeting export targets.
Export promotion	Support exporters by providing market information, match-making services with potential partner firms, capacity building, etc.
Strategic tariff protection	Sequential adjustment of tariffs to promote import substitution and/or protect infant industries.
Exchange rate	Overvaluation favours importers, undervaluation favours exporters.
Export restrictions	Incentivize domestic value addition by increasing administrative requirements for exporting raw products and imposing export taxes, quotas or bans.
Infrastructure	Provide exporters with specialized infrastructure, e.g. clusters/micro-parks for SMEs, export processing zones (with preferential access to land, electricity, etc.).

Standards and non-tariff barriers	Align domestic with foreign standards to enable export of domestic produce. Use non-tariff barriers (e.g. quality requirements) to protect domestic producers from foreign competitors.
Trade facilitation	Streamline administrative requirements (e.g. export licenses), eliminate unnecessary procedures, operate administration offices at border posts (to save travel costs), operate a 'one-stop shop' for exporters, improve logistics performance.

Source: Authors

4. Case study 1: Uganda's export diversification

Uganda is a landlocked LDC that has seen positive changes in trade outcomes in recent decades, with some diversification of its exports towards higher value products. The country's trade policy space is legally constrained by its membership in WTO, which rules out a number of options, but the Ugandan authorities have expanded the political–economic aspects of policy space through a prolonged period of macroeconomic stability, efforts at industrial policy, and participating in a project of integration into growing regional markets. However, the analysis suggests that Uganda could do more to use and expand the trade policy space available to support industrialization.

After major losses of industrial capacity under the Idi Amin regime of the 1970s, the political instability of the early 1980s and structural adjustment in the late 1980s and early 1990s, 91 per cent of Uganda's merchandise exports were primary products in 1995 (Shinyekwa et al., 2016). By 2016, this figure had fallen to 51 per cent, while resource-based, low-technology and medium-technology manufactured products reached 18 per cent, 10 per cent and 8 per cent of exports, respectively (UNCTAD, 2018).[12] As well as this product diversification, Uganda's end markets also became more diversified. The share of exports sold to Europe was nearly 80 per cent in 1995, but by 2016 this figure had fallen to less than 40 per cent, with the difference being sold to markets in Africa, Asia and the Middle East (Atlas of Economic Complexity, 2017). Uganda's manufactured exports per capita increased from $1 in 1990 to $74 in 2016 (UNIDO, 2016).

[12] For more detailed discussion of industrial policies in Africa and LDCs see UNCTAD (2018) and UNIDO and UNCTAD (2011).

(a) Instruments

As in many LDCs, tariff policy in Uganda was significantly liberalized as part of its structural adjustment reform programme, with the simple mean tariff applied to imported manufacturing products cut from 16 per cent in 1994 to 8 per cent in 2000 (IMF, 1998; World Bank, 2018). The figure increased again to 12 per cent with the implementation of the East African Community (EAC) common external tariff (CET) in 2005. Overall, it can be said that Uganda is not using much of its tariff policy space, given its minimal commitments in WTO – only 16 per cent of tariff lines are bound at an average rate of 73 per cent, largely consisting of agricultural products bound at 80 per cent (WTO, 2013).

The limited use of tariff policy space in Uganda partly reflects the small size of the domestic market, which would make an import substitution strategy based on high tariff protection unlikely to succeed. Gaining duty free access to larger markets is a strategic way to expand broader policy space, by making industrial policy feasible in manufacturing sectors with scale economies where domestic firms can gain competitiveness through producing for export. Uganda has pursued this objective through regional free trade agreements, particularly the EAC and the Common Market for Eastern and Southern Africa (COMESA).

Since EAC is a customs union, Uganda's access to that market comes at the price of a loss of policy space to autonomously set its own national tariffs via the requirement to apply the CET. This is mitigated by flexibilities built in to the EAC CET that allow some room for manoeuvre. Stay applications allow EAC members to disregard the CET rate and apply a different tariff, while duty remissions allow companies to pay lower import duties or none at all (Mshomba, 2017).

Membership of both the EAC and COMESA requires liberalization of internal trade from all countries participating in those agreements, which limits policy space because building an infant industry in a sector where EAC/COMESA countries are already competitive would be more difficult without the possibility of tariff protection. Also, the proper enforcement of rules of origin by other COMESA countries (and the United Republic of Tanzania, which is in the EAC and also the Southern African Development Community free trade area) is critical to the integrity of the EAC CET and therefore also to Uganda's trade policy. Fortunately, it appears to be possible for Uganda to impose some tariffs on "sensitive items" from COMESA and EAC countries.

Export taxes are permitted under WTO rules and can be a useful instrument to incentivize the processing of commodities domestically (Chang et al., 2016). The WTO (2013) Trade Policy Review reports that Uganda maintains a tax of 1 per cent

on exports of coffee (used for coffee development activities), 2 per cent on cotton and US$0.8/kg on raw hides and skins (equivalent to around 35 per cent ad valorem, according to Shepherd et al, 2017). Uganda's own National Export Development Strategy 2015–2020 emphasizes the importance of export taxes and suggests applying them at higher rates and to a wider range of products (MTIC, 2015).

As an LDC, Uganda is permitted under WTO rules to use export subsidies, e.g. subsidies that require recipients to meet certain export targets, whether in the form of direct payments, low-cost loans, export loan guarantees, tax relief, etc. (Chang et al, 2016). This is a valuable policy instrument, heavily used in the United Kingdom, China and the Republic of Korea (see below) during their industrialization periods, which at present is not being utilized in Uganda. According to WTO (2013), Uganda's Export Promotion Fund is no longer operational, but the Government has proposed the establishment of a new Export Development Fund to finance export activities (MTIC, 2015). The Uganda Export Promotion Board is the State institution responsible for promoting exports, but is inadequately resourced (MTIC, 2015).

(b) Evaluation

By participating in a project of regional integration involving a customs union and free trade agreements, Uganda has chosen to give up the possibility of an autonomous national trade policy, but gained enhanced access to regional markets and made new sectoral industrial policies feasible. This purposeful reconstruction of policy space occurred alongside great improvements in the diversification of Uganda's exports, both in terms of products and export markets.

This correlation may reflect a tendency for trade between African countries to involve higher value products, with manufactured goods accounting for 42 per cent of intra-African exports in 2014 compared with 15 per cent of exports outside the continent (ECA, 2017). One explanation offered is that regional value chains (RVCs) offer better upgrading prospects for African firms because markets are characterized by similar consumer tastes, less sophisticated marketing and distribution channels, less stringent standards, and fewer information asymmetries (Fessahie, 2018).

It remains to be seen whether further regional integration – such as the proposed Tripartite Free Trade Area between COMESA, EAC and Southern African Development Community or the eventual Continental Free Trade Area – will on balance enhance Uganda's policy space by expanding market access or limit the efficacy of industrial policy by opening domestic firms up to competition from regional industrial powers such as South Africa. In any case, more strategic use of

currently underutilized policy instruments like export taxes and export subsidies could help build the capacities of Ugandan firms to increase domestic value addition and compete in regional and international markets.

5. Case study 2: The Republic of Korea's export-led industrialisation

The extraordinary success of the Republic of Korea's export-led industrialization drive is well documented, transforming its productive structure from resembling low-income countries such as Kenya in the 1960s to upper-middle-income countries such as Spain by the mid-1980s (Chang, 1996: 94). The Republic of Korea's trade policy space was characterized by almost no legal restrictions as a member of the permissive General Agreement on Tariffs and Trade (GATT) regime from 1967; by 1994, when it joined WTO, the economy was already transformed. The political–economic aspect of trade policy space was defined by a visionary developmental leadership from the 1960s and a strong State relative to subordinate businesses and other social groups.

After Park Chung Hee's arrival in power via a coup in 1961, his military regime focused relentlessly on the building of Jarip Gyongjé (an independent economy) through vigorous sectoral industrial policies and purposefully "getting the prices wrong" (Chang, 1996; Amsden, 1989). Trade policy was central to the industrialization drive, with a period of import substitution in the early 1960s laying the foundations for successful export expansion (Wade, 1990:84).

Exports were regarded as a means to ease balance of payments constraints, achieve the scale economies prevalent in priority sectors, and discipline subsidy recipients to ensure they reached international competitiveness (Chang, 1996). As a result of the policies pursued, exports rose steadily as a share of GDP, from less than 5 per cent in the 1950s to around 35 per cent in the 1980s (Amsden, 1989:70), and by 1990 the Republic of Korea exported more manufactured products than the whole of Latin America (Wade, 1990:34).

(a) Instruments

The Republic of Korea used a wide range of trade policy interventions: high tariffs, frequent use of additional emergency tariffs, extensive quantitative restrictions on imports, bans on imports of luxury goods, and export subsidies (Chang, 1996:98). Export subsidies are focused on here, since they are regarded as having been instrumental to the success of the Republic of Korea's industrial policy (Rodrik, 1993).

Exporters (as well as domestic firms supplying intermediate goods to exporters) received direct cash grants, generous tax and import duty exemptions on inputs,

priority in acquiring import licenses, and subsidised credit in the form of 12 different kinds of preferential loans (Rodrik, 1993:11–12). Government direction of credit was facilitated by Park's regime having expanded policy space in this area by nationalizing the banking sector upon coming to power, precisely to gain control over financial flows in the economy (Chang, 1996, p.125).

Key to the success of the Republic of Korea's export drive was not the export subsidy policy instruments themselves, but the way they were implemented and monitored, which was "reminiscent of the way that the military command of a nation would run a war" (Rodrik, 1993:10). There was no reliance on market forces to bring about the desired response to subsidy incentives, instead the Government publicly announced quarterly export targets for products and individual firms. Performance against these targets was monitored literally on a daily basis at the highest levels of the Ministry of Commerce and Industry. A Monthly Trade Promotion Conference chaired by the president himself and attended by ministers and exporters provided further scrutiny and served as a forum for coordination and problem solving. There were rewards for good performance, both financial and in terms of prestige, and penalties for failure, including prison sentences for false reporting (Chang, 1996:114).

(b) Evaluation

What accounts for the phenomenal success of the Republic of Korea's export drive? It could not have been the policy instruments themselves (subsidized credit, export incentives etc.), which were applied in many countries with disappointing results – for instance. in Pakistan (Khan, 1999). Neither was it a lack of corruption – there were frequent corruption scandals – or inherent features of the national culture, which was a drag on progress in the early twentieth century (Chang et al, 2016).

Part of the answer lies in the fact that subsidy recipients were under constant pressure to increase competitiveness, via the discipline of export markets and the non-market government targets and monitoring system. Crucially though, what distinguishes the case of the Republic of Korea is that the State was able to remove subsidies from non-performers, rather than being politically captured by them (Chang, 1996:121). This is best explained by the unique distribution of power in the Republic of Korea society under the Park regime, particularly the strong and centralized State relative to weaker capitalist and non-capitalist social organizations, which was a result of government action to expand policy space in this area but also the historical form of Japanese colonialism in the Korean Peninsula (Khan, 2000; Kohli, 1994).

6. Policy implications

(a) Strategic use of existing trade policy space

Despite the constraints on policy space that exist through multilateral, regional and bilateral trade agreements, a significant range of options remain available, which are often under-utilized by LDCs (Chang et al, 2016). Policymakers should undertake a careful assessment of their national policy space context, the existing set of instruments in place, and the potential role of neglected options such as export subsidies, export taxes and strategic tariff protection to contribute to industrialization. One common problem is that tariff policy is the responsibility of the Ministry of Finance, so the role of tariffs as a tool for dynamic trade and industrial policy is overlooked.

(b) Active expansion of trade policy space

Policy space is not fixed and can be influenced by Governments – for instance, through signing trade agreements that increase market access, often at the cost of limiting the policy instruments which can be used. This trade-off must be consciously evaluated by policymakers to ensure that policy space for industrialization is maintained and enhanced. For instance, The United Republic of Tanzania is concerned that signing on to the proposed Economic Partnership Agreement between the European Union and the EAC would prevent it from using export taxes and expose its domestic producers prematurely to competition from European Union manufacturers, without significantly improving market access for Tanzanian exporters (The Economist, 2017).

(c) Institutions for effective monitoring and enforcement

Once strategic choices have been made regarding the use and expansion of trade policy space, it is essential that effective institutions are put in place to monitor outcomes closely and adjust policies as appropriate. This may be in the form of a National Trade Council with political support at the highest level, which can serve to coordinate action across line ministries (UNCTAD, 2016). Crucially, whichever institution is responsible for monitoring trade performance should have the mandate and political clout to recommend and enforce the removal of incentives from non-performing industries and firms.

E. Local content policy

1. Overview

There is no consensus on the definition of local content policy (LCP), which varies from country to country, and across legal and institutional settings (Gwayaka, 2014).

However, in general, the concept usually refers to policy measures that require a certain quantity (percentage) of factors of production being used in the production process to be sourced domestically, so that imported inputs can be replaced by domestic value addition. This includes intermediate goods, services, technology, knowledge and labour (Nyakabawo, 2017; Silva, 2014; Ramdoo, 2015).

In the natural resources sector, the example of MOZAL, in Mozambique, is drawn on here to highlight the benefits of close cooperation between Governments, leading firms and domestic SMEs in overcoming information asymmetries, and of changing LCPs alongside developments in production structure. In the manufacturing sector, the case of the booming textiles industry in Bangladesh is drawn on to demonstrate the benefits that can result from providing incentives, as well as compulsions, to foreign firms, to ensure compliance with LCPs.

Based on these case studies, some policy implications are drawn out here. Firstly, LCPs will vary across countries and regions, sectors and firms. LCPs therefore must be meticulously designed to fit contextual specificities and be appropriately targeted. Second, LCPs must be enforceable. This can be achieved by placing quantitative requirements on leading firms alongside providing incentives to ensure the policy will benefit all stakeholders. This is especially important in LDCs where institutional capabilities are weak. Thirdly, close cooperation between Governments, local firms and leading firms is necessary to overcome information asymmetries. Finally, if LCPs are constantly re-evaluated and adapted to changes in productive systems over time, they will be more sustainable, and eventually can be phased out.

2. Rationale

Local content policy can be used strategically to foster industrial transformation through the following channels (Ramdoo, 2015; Nyakabawo, 2017; Steenbergen and Sutton, 2017; Ostensson, 2017):

(a) Job creation (due to a strengthened industrial base);

(b) Skills upgrading (due to technological knowledge transfer);

(c) Development of infant industries (increasing industrial competitiveness);

(d) Improvement in the balance of payments;

(e) Decrease in transport costs;

(f) Fostering of long-term trust and cooperative relationships;

(g) Facilitation of local firms' insertion into global value chains.

Motivations behind the implementation of local content policy can be grouped into two key categories: economic and sociopolitical (Nyakabawo, 2017). The primary

rationale behind local content from an economic standpoint is that it can strengthen the nation's industrial base, stimulating infant industry development and job creation (Nyakabawo, 2017). Additionally, LCPs can foment local capability development in technology, knowledge and skills (Ramdoo, 2015). On the sociopolitical front, LCPs can redistribute rents away from foreign firms towards specific regions, firms or groups domestically (Silva, 2014). This can be achieved through targeting policies at specific industries and adjusting them accordingly.

3. Policy options

Local content policies can take various forms, which can be categorized into quantitative requirements, and incentive-based policies (Nyakabwo, 2017; ANRC, 2016; Steenberg and Sutton, 2017):

(a) Quantitative requirements:

(i) For locally sourced inputs used to produce goods;

(ii) For locally sourced services, such as insurance, engineering, transport or financial services;

(iii) For local employment – for example, in the South African mining sector, a "Mining Charter" imposes an obligatory requirement that, at all employment levels, 40 per cent of labour must be local (Nyakabawo, 2017);

(iv) For local establishment of production units, facilities or factories, to facilitate any production, service provision or imports;

(b) Incentive-based policies:

(i) Reward establishments that account for local development in their strategic planning with financial incentives;

(ii) Broad-based policies such as aligning the education system with industry demands or investing in skills development in the country;

(iii) Bridging of information asymmetries by coordinating with international firms to transmit knowledge of local capabilities and engage local establishments in supply chains. This can be achieved through the creation of a mediating body, for example, the Local Content Unit in the United Republic of Tanzania (Steenbergen and Sutton, 2017).

The local content policy options in a given country depend on national policy space as defined by the multilateral, regional and bilateral trade agreements to which it is party – for instance, WTO members face restrictions on imposing local content requirements on foreign investors while other kinds of LCPs are permitted. In LDCs

in particular, quantitative requirements may discourage foreign investment, and institutions are often not capable of monitoring and enforcing them. Such regulations can be easily circumvented through misleading statistics and imaginative accounting practices (Sutton, 2014), and quality constraints on suppliers and information asymmetry problems are not addressed, so productivity and output are unlikely to improve through quantitative targets alone (Spray, 2017). Local content policies in the petroleum sector in Angola, the United Republic of Tanzania, Ghana and Nigeria are good examples of this type of prescriptive policy (Morris et al., 2011), and such policies are also common in Latin American automotive industries (Steenbergen and Sutton, 2017). In South Africa, local content policies have achieved a lower level of local manufacturer procurement than originally desired (Nyakabawo, 2017). It is therefore important to complement quantitative requirements with incentive-based policies, to ensure the buy-in of all stakeholders in the local content policy.

In summary, various factors can render local content policies ineffective (Kolstad and Kinyondo, 2015; Ovadia, 2012; Hansen et al., 2015):

(a) The costs of sourcing goods and services locally can be high in terms of both price and quality, unless domestic firms are granted more time and support to improve their capabilities to compete with foreign suppliers; non-compliance may result, as procurement regulations often leave little space for producers and suppliers to negotiate;

(b) Locally-sourced goods usually entail higher transaction costs due to information asymmetries;

(c) Institutional capacity must be such that policies can be monitored and evaluated, as well as disciplined, effectively;

(d) Strict local content requirements can discourage foreign investment;

(e) Local content policies are open to rent-seeking activities and political capture.

4. Case Study 1. Mozambique's promotion of MOZAL–SME linkages

Mozambique's aluminium smelting industry (known as "MOZAL") consists of a single joint venture dominated by three key foreign investors: South32 (formerly BHP Billiton, 47 per cent shareholding); the South African government-owned Industrial Development Corporation (24 per cent shareholding); and Mitsubishi Corporation (25 per cent shareholding), with only 4 per cent being held by the Government of Mozambique. The industry accounts for 42 per cent of the country's export revenues (Weiss, 2016).

LCPs surrounding MOZAL were implemented to overcome the underdevelopment of Mozambique's private sector, which consists of just some large establishments (dominated by foreign capital and local elites), some SMEs (owned by both domestic and foreign capital), and a much larger quantity of domestically-owned, informal, micro-enterprises (Hansen et al., 2014). Domestic SMEs are considered to have limited access to finance, limited skills, limited interfirm and intrafirm linkages, limited technological capabilities and limited managerial leadership capabilities (Buur, 2014; Krause and Kaufmann, 2011; Warren-Rodriguez, 2008).

Through the launch of the SME Empowerment and Linkages Programme (SMEELP) in 2001, Mozlink I in 2003 and Mozlink II in 2006, four main economic desirables were outlined to encourage local businesses to engage in MOZAL'S supply chain expansion and increase local value added: SME package creation; and SME capability pre-assessment, training, and mentorship (Adam Smith International, 2015). The Government and the three dominant large firms in the industry worked together to implement these actions.

As a result of the SMEELP programme, 16 SMEs underwent training programmes, and 28 contracts (with a combined value of over US$5 million) were awarded. The programme was perceived as useful by 88 per cent of SMEs involved. Access to finance was still an issue, but the LCP attempted to overcome this by enabling MOZAL to act as a guarantor for SME loans, and deducting the loan amortization from what they paid to the SMEs (ibid.).

Mozlink I aimed to replicate the SMEELP programme in 2003, by strengthening linkages between local SMEs and MOZAL using similar instruments. Mozlink I was seen to have impacted both the local economy and SMEs positively (IFC, 2008): 45 SMEs experienced enhanced capacity; local procurement from Mozlink-affiliated SMEs grew to US$13 million in 2005 from US$5 million in 2001; and from 2003 to 2007, MOZAL's purchases of goods and services from Mozambican companies jumped from 40 to 250 (Adam Smith International, 2015).

Based on the positive results of Mozlink I, four establishments (Coca-Cola, MOZAL, Sasol and Cervejas de Mocambique) were encouraged to come together in Mozambique to partner with the International Finance Corporation to plan another linkage programme for SMEs, following similar objectives as before, and to be implemented from 2006 to 2010. Successful results since 2006 have been: training of 140 managers of SMEs in technical best practices and management; active engagement of 75 SMEs in the programme, each implementing separate improvement plans; Mozlink SMEs have experienced annual total sales growth of

34 per cent on average; and over US$20 million had been spent on Mozlink SMEs by the close of 2009 (Adam Smith International, 2015).

Despite this, the results of MOZAL programmes are not clear cut. What made Mozlink LCPs successful, and what were their downfalls?

(a) These programmes were developed and built upon over a long period, making the linkages developed sustainable and strong. This is also likely to have developed trust among the parties involved (Adam Smith International, 2015).

(b) The allocation of responsibilities between different stakeholders was clear in SMEELP and Mozlink I, but perhaps less so in Mozlink II. This could be due to the inclusion of extra partners in Mozlink II, and exaggerated by the fact that neither Cervejas de Mocambique nor Coca-Cola are extractive firms (Adam Smith International, 2015).

(c) These programmes only developed backward linkages. This is because most Mozambican aluminium is exported, and the country lacks the capacity to create products with the material (Krause and Kaufmann, 2011).

(d) There was some confusion over the purpose of the programmes: some SMEs believed their contracts were guaranteed, while the objective was really to build the SME capacity until its competitiveness in the market was improved, and subsequently withdraw (Adam Smith International, 2015).

5. Case study 2: Bangladesh's LCPs in the booming garment industry

The Bangladeshi garment industry started to take off in the 1980s, and from 1983/84 to 2015/16, exports increased from US$31.57 million (representing about 4 per cent of total Bangladeshi exports) to US$28,034.16 million (accounting then for 82 per cent) (Weiss, 2016). Investors in the industry were attracted to the country in the 1980s due to the Multi-Fibre Arrangement quota systems and the low cost of labour in the country, as well as the large domestic market (Weiss, 2016). Various phenomena helped Bangladeshi firms take advantage of this influx of investors and boost exports, including: financial incentives (such as tax exemption on export profits and import duty exemption for exporters); the encouragement of joint ventures with foreign firms (such as Daewoo, a Republic of Korea firm; and Desh Garments of Bangladesh in 1979 (Khan, 2013a)); and export processing zones establishment (Weiss, 2016; Yunus and Yamagata, 2012).

The partnership between Daewoo and Desh can be seen as a local content policy, in that Daewoo was permitted to operate in Bangladesh, and reap 8 per cent of sales revenue as a royalty (very high for a low-margin sector) from garments sold by Desh, only on the condition that the Republic of Korea company helped the

development of Bangladeshi managers' skills. Daewoo hosted about 130 garment industry production managers from Bangladesh in Busan, the location of an advanced garments factory. On their return, 115 of these managers set up their own establishments, producing garments, thus creating new employment opportunities in their country. Moreover, by feeding their new technical knowledge to managers within their firms, the multiplier effect of the policy became clear. Desh grew at a rate of 90 per cent annually from 1981 to 1987 (Khan, 2013a). The partnership was a huge success because all parties were incentivized to follow through on the agreement: in order to gain anything from the 8 per cent royalty, Daewoo had to ensure Desh was able to capitalize on its preferential access to the United States market via the Multi-Fibre Arrangement by learning to become internationally competitive. In this sense it was an ex post rent (unlike a subsidy given before competitiveness is achieved) with lower requirements for government monitoring and enforcement.

The Government also introduced a number of explicit local content requirements to foster local linkages, especially regarding the use of domestically produced fabrics (BIDA, 2017). For example, currently, 5 per cent subsidies are granted to garment producers, conditional on local content (UNCTAD, 2012), and firms are eligible to cash compensation or access to duty drawback facilities, granted the raw materials used to produce garments are sourced locally (CPDBEI, 2001). In 1992, a cash incentive of 15 per cent of the export of garments made from locally produced fabrics was put in place, increasing in 2002 to 25 per cent before returning to 15 per cent in recent years (ITC, 2002; BIDA, 2017). If garment exporter products were manufactured with 100 per cent domestically sourced inputs, or duty-paid imported ones, the Bangladesh National Bank provided additional subsidies (United Nations, 2004). In terms of employment restrictions, quotas were placed on skilled foreigners for both foreign and domestic companies, whereby the ratio of foreign to domestic employees could not exceed 1:20 in industrial enterprises (Kathuria et al., 2016).

6. Policy implications

Based on the case studies described here, four clear policy implications can be traced out.

(a) Contextual specificity: LCPs come in a range of different forms, and which policy structure will be the most effective varies hugely across countries and regions, sectors, and firms. In order to design LCPs appropriately, attention to multiple factors is paramount, including the country development context, macroeconomic and microeconomic conditions, and means of implementation and

monitoring. The Africa Natural Resources Center (ANRC) step-by-step guide for local content policy formulation and implementation provides a good roadmap for planning LCPs in line with prevailing objectives, conditions, and institutional capacities of the country in question (see figure V.2 for a simplified visual representation).

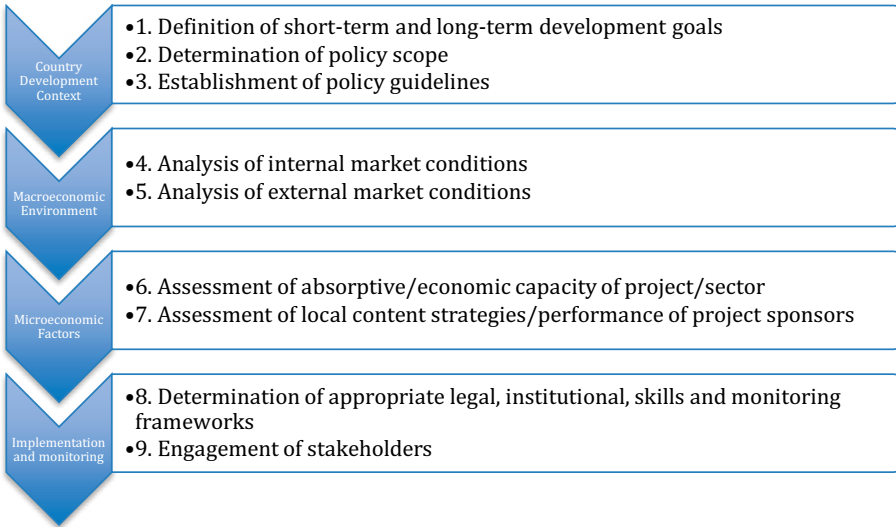
(b) Compulsions and incentives: In the Bangladeshi textile industry, compulsions were placed on lead firms, such as domestic employment quotas and the training of Bangladeshi managers in Busan. However, lead companies were also incentivized to adhere to local content requirements that were not compulsory, but that granted fiscal benefits to compliant firms. Similarly, the Republic of Korea firm Daewoo was incentivized to host Bangladeshi textile managers in Busan, because it was granted access to the Bangladeshi market and royalties on Desh's sales to the United States market in return.

(c) Cooperation: One of the key factors that enabled the success of the LCPs in both the Bangladeshi garment sector and Mozlink in Mozambique was the cooperative relationships between stakeholders. By ensuring effective communication between investors, local firms and Governments, information asymmetries can be overcome and long-term relationships of trust can be constructed. This will enhance the sustainability of linkages between lead firms and local suppliers, even once the Government has withdrawn the LCP.

(d) Monitoring and adaptation: In order to gauge what kinds of incentives will encourage adherence to LCPs, it is important to monitor the policies closely. Close monitoring will also enable Governments to respond to changes in the production system and adapt LCPs accordingly, as the Government in Mozambique adapted its LCPs to changing capabilities in the aluminium smelting industry, and the Government of Bangladesh has adjusted financial incentives related to LCPs over time.

Figure V.2

Visual adaptation of ANRC step-by-step roadmap for LCP



Source: ANRC (2016).

F. Technical and vocational skills development

1. Overview

Less developed countries cannot simply rely on natural resource abundance or traditional competitive factors (e.g. low cost unskilled labour) if they want to increase productivity in the traditional agricultural sector and catch-up in manufacturing industries. In the new global competitive landscape, low-skilled agriculture and manufacturing activities can be used as part of an entry-level strategy for the short term. However, only by increasing their industrial skills (and complementary productive capacities) will countries become able to process natural resources and to diversify into higher value agricultural and industrial products (Lin and Chang, 2009; Noman et al., 2011).

The examples of technical and vocational education and training (TVET) programmes in the United Republic of Tanzania and Ethiopia are discussed as cases of contemporary LDCs implementing skills development programmes. We conclude that more skills, higher-level skills and different kinds of skills have to be developed through skills policy if countries are to increase their presence in international and domestic markets whilst developing industrial sectors and activities with higher value-added and rising wages.

2. Rationale

The reason why skills development is one of the main drivers of countries' structural transformation becomes evident when we look at companies' technological efforts at the shop-floor level. For firms, the possibility of capturing new production opportunities arising in global markets, introducing new production practices, or selecting alternative technologies, critically depends on the domestic availability of relevant industrial skills. Workforce skills constitute the know-how base on which firms rely for absorbing and adapting technologies to local conditions, as well as modifying organizational practices. They are also crucially important for the development of new work methods, ranging from the simple rearrangement of production tasks up to the introduction of information technologies for process control, inventory systems and quality management.

Firms engage in costly and prolonged learning processes whereby production activities are eventually upgraded, the value of production output is increased and, ultimately, overall firm-level technological capabilities are developed (Lall, 2001; Andreoni, 2011; Toner, 2011). The success of these processes depends crucially on the skill level of their workforce, so skills become the main determinants of production and technological capabilities development at the firm level (and the main complements to firms' investments in equipment, machines and other capital goods). And of course, in order to be used and maintained properly, complementary investments require specific technical and engineering skills.

Thus, skills perform two roles. Firstly, the expansion of a firm's production capacity has to be accompanied by up-skilling and multi-skilling processes. Secondly, capital investment in strategic physical infrastructure (e.g. roads, power supply, water and sanitation systems and telecommunications) requires a skilled workforce able to plan, build, operate and maintain them (ADEA, 2012).

From the country-level perspective, the importance of skills for technological development is just as clear as at the shop-floor level. Crucially, increasing skills changes the structural trajectories of countries: they move from simple to difficult technologies, and within them, from basic production functions (production of simple components and assembly) to complex ones (improvement, design, innovation). Engaging in more complex production activities generally leads to the capture of higher value and generates spillover benefits to local input-supplying companies, within and across industries (Chang, 2002; Cimoli et al., 2009).

3. Policy options

In order to capture more value, by engaging in production activities that are complex and involve technologies that are difficult and costly to master, countries

have to boost skills development. In other words, they have to provide companies with an appropriately skilled workforce to engage in the technological upgrading described above. Thus, the need for increasing the quantity, quality and variety of skills domestically available goes hand in hand with the structural transformation of the national production system (in particular, the manufacturing base). The Government, in partnership with companies, has a fundamental role to play here.

By investing increasing tax revenues in the education and vocational school system, it helps drive the cumulative self-reinforcing process of skills development and structural transformation (Noman et al., 2011; World Bank, 2012a). The education system, from primary up to tertiary education (as well as technical and vocational schools), is the main supplier of skills. However, various forms of learning at work and re-skilling, particularly in manufacturing industries, are also important for building "experience-based technical skills" as well as for the transformation of "formal education-based skills" into production capabilities. Table V.6 provides a summary of the policy options for skills development.

Table V.6

Policy options for skills development

Supply side	Demand-side
• Primary education • Secondary education • Higher education • Technical and vocational education • Support for experience-based technical skills development	• Industrial policy to create jobs for skilled workers • Institutional structures to understand the current and future character of skills demand and feedback to the education system

Source: Authors

Understanding if and to what extent the current skills supply of a country is currently matching the skills demand expressed by foreign and domestic companies, especially in manufacturing, is the first step in the design of effective skills policy for economic development. This has an inherently dynamic character: skills supply and demand have to be coordinated over time by responding to current needs expressed by both domestic and foreign companies, but also having in mind the

need to match the future skills needs. Skills cannot be built in a day; their development requires long-term investments in learning processes and institutional building. Thus, today's skills supply must match today's skills demand but also respond to tomorrow's skills demand.

Countries with similar levels of investment in skills development may vary in their production and export performances according to their capacity to solve these skills-matching problems. Once identified through an appropriate methodology, each of them calls for policy action and rethinking current education policies as a fundamental lever in the broader industrial policy agenda. To be effective, skills policies require evidence-based judgments and, although difficult to capture, information on current workforce skills, specific skill needs and gaps, and the production and technological capabilities of firms (Andreoni, 2011).

The labour market in sub-Saharan African countries presents many complexities (Ansu and Tan, 2012). On the one hand, given the relative underdevelopment of the education system at all levels, there is a significant shortage of appropriate skills in the workforce, especially of higher-level technical skills. Thus, for companies, it is difficult to find workers with skills profiles matching their requirements. For example, companies tend to face a relative oversupply of graduates in humanities and social sciences, alongside a shortage of engineers, scientists and more technical profiles. Not only might the skills supply not meet the companies' demand for quantitative or qualitative reasons, sometimes the geographic distribution of workers in the country does not match companies' location, or the most able among the graduates are attracted by better job opportunities and higher wages abroad. Other workers may take up jobs for which they are overqualified or end up working in the informal sector (another form of misallocation). Paradoxically, at the early stages of countries' structural transformation or in certain cycles of economic contraction, the demand for skills may be weak and there may be unemployment among higher-skilled workers. Prolonged unemployment may result in de-skilling processes or emigration. In sum, lack of skills supply may coexist with unemployment, especially among the youngest, who find it harder to enter the labour market.

4. Case study 1: The United Republic of Tanzania's TVET system

Over the last decade, the United Republic of Tanzania has made an unprecedented fiscal effort to support its education system, including the abolition of primary school fees and enrolment-related contributions from parents in 2004. In 2011, spending

on education reached almost 20 per cent of the total government budget (of which half still goes to primary education), while from 2005 to 2011, education expenditure per capita increased by 175 per cent. In 2011, the number of unemployed people out of the United Republic of Tanzania's workforce of more than 22 million fell to 10.7 per cent. However, in the same year the level of unemployment among young people reached 13.4 per cent (14.3 per cent for women), with a high percentage of young people occupied in the informal sector.[13]

Notwithstanding the increased spending, since 2007 learning outcomes are lagging as measured by pass rates in primary and secondary schools and dropouts are high. According to the United Nations, in 2010, only 53 per cent of 13-year-olds had completed a full cycle of primary school and, of those, around half had passed the primary school leaving certificate. At the same time, secondary schools are relatively underfunded and are facing enormous pressures. Although in 2010 enrolments in secondary education (form I–IV) was only 30 per cent of the eligible population, student secondary school population grew by more than 30 per cent per year subsequently (World Bank, 2012a). As for tertiary education, the number of students is still insufficient, and enrolment rates are poor in absolute terms (in 2009/10 there were approximately 120,000 students distributed over 31 universities, 20 of which were private) as well as in relative terms, if we compare the United Republic of Tanzania to countries such as Burundi, Kenya, Rwanda and Uganda (EAC Competitiveness Report 2017: 110).

Formal education-based skills are necessary for using technologies effectively: for example, literacy skills allow workers to read blueprints or, in the case of engineering skills, to operate and control sophisticated machines. However, very often, basic skills acquired in primary and secondary schools, such as literacy and numeracy, or higher skills acquired in tertiary education, are insufficient as production processes also require workers endowed with experience-based technical skills. The latter are generally acquired in vocational training and technical education colleges (often called TVET). Among them, in the United Republic of Tanzania, the major providers of industrial skills which are relevant for industries are the Vocational Educational and Training Authority (VETA) training centres and the company-based training centres. Internal training schemes are mainly provided by larger companies and parastatal companies, and their number drastically decreased as parastatals were privatized. In 2010, the total number of students enrolled in all forms of vocational and technical education was approximately 180,000 (URT, 2011: chapter 19; ADEA, 2012).

[13] These estimates are provided by the National Bureau of Statistics by projecting the data collected in the Labour Force Survey 2006 (the last available).

VETA is the State body responsible for the management of vocational training in the United Republic of Tanzania. It is governed by a tripartite council comprising representatives from employer bodies; employee bodies, including trade unions; and government representatives from the Ministry of Industry, the Ministry of Labour and the VETA secretariat. Implementation of policy set by the council is overseen by the VETA secretariat through headquarters in Dar es Salaam and nine regional offices. VETA operates along four main operational axes (VETA, 2010):

(a) Provision of training and vocational education through its own network of education centres, including 27 VETA-run public training centres, and coordination of training by some 700 other institutes.

(b) Revision and setting of TVET curricula at the national level: Currently, there are 50 subject areas clustered into 13 skills groups: mechanical; electrical; civil and building engineering; extractive industry; transport; hospitality; tourism and travel agency; commercial and business support; automotive; textile and clothing; agriculture and food processing; cosmetology and printing. For each group, a sector advisory committee reviews the curriculum. The labour market department within the VETA secretariat also conducts market surveys to identify skills needs by employers. While there is an attempt to pre-empt future needs within industry, there is currently no strategic thrust to build skills in areas not currently within the country's industrial mix.

(c) Continuous training for TVET teachers within the Vocation Teachers Training College: The teacher training is tailored towards two streams: (i) courses on pedagogy, skills for teaching and communication for industry experts to prepare for the unfamiliar challenges of teaching; and (ii) providing more experienced teachers with industry placements and exposure to either upgrade existing skills or become acquainted with changes in their industry of expertise.

(d) Accreditation and assurance of quality and relevance of other vocational training institutions and centres run by other actors such as Ministry of Works, other ministries, private companies, civil society, faith-based organizations and private individuals: Although independent, institutions such as the Regional Vocational Training and Services Centres, Vocational Training Centres, Folk Development Colleges and Post Primary Schools fall under the VETA accreditation system. Inspections for all institutes occur on an annual basis, with repeat inspections on a quarterly basis for follow-up if deficiencies have been identified by the inspection team. To ensure a minimum standard in the quality of students graduating from the vocational schools, a national standardized exam is set for each subject. Recently, trade exams have been scaled back to put greater importance on continuous assessment.

The strong commitment to quality assurance is testified to by the fact that, in 2011, the number of vocational training centres fell from 900 institutes to 300 as a result of the annual review of accreditation standards. Also, the supply of programmes has been segmented for increasing training effectiveness, flexibility and differentiation: the minimum requirement of formal education for undertaking VETA training has been recently increased for many programmes, especially those aimed at developing higher experience-based technical skills; while, for other programmes, especially those targeting the informal sector, there is no barrier to entry, and selective interventions have been developed, such as the "informal apprenticeship" programme. Finally, other programmes promote self-employment, microenterprises and SMEs development by providing business and financial management skills and offer complementary services such as microcredit.

The VETA Directorate of Labour Market, Planning and Development is responsible for promoting private sector/industry interaction. Industry experts are involved in the training process as educators in some cases, but there appears to be a limited level of technology sharing. There are memorandums of understanding with several companies for training geared specifically towards their projected needs in the short to medium term. These include: British Gas, PetroBras, United Republic of Tanzania breweries and Tanzania Cotton Board, as well as hotels and cement companies. Special industry-specific trainings have been established in Moshi and Mwanza for the mining sector. However, there is mistrust on the part of some industries that (a) they may lose valuable staff to become full-time trainers, or (b) by sharing technology, competitors may gain advantage. Internship placement is common practice in most education programs in the United Republic of Tanzania and is part of many technical programmes. Previously, there was also an industry placement programme for trainees, but this is in need of revitalization. In response to industry needs, the Dar es Salaam Institute of Information Technology was opened in 2012, offering five courses on electrical, computer application and programming, electronics, multimedia, repair and maintenance.

The main sources of financing include: sales of products from training and other income generating activities; enrolment fees; public funds and private companies (the latter are levied at 6 per cent of total wage bill as part of a social development fund, with one third going towards vocational training programmes). Overall, the lack of appropriate funding constrains the possibilities of upgrading vocational training programmes, especially in those areas of training requiring high investments in capital equipment or those affected by fast technological change (Ziderman, 2002).

5. Case study 2: Ethiopia's TVET system

Ethiopia has been sharing with the United Republic of Tanzania a number of similar education policy challenges, especially with respect to the improvement of the quality of education at the different levels. However, today, Ethiopia is often mentioned as one of the most successful experiences in the context of effective TVET development (Baraki and van Kemenade, 2013). When the Government introduced the national TVET strategy in 2008, there was an overall restructuring of the education system and a number of innovative approaches were introduced.

Firstly, the Government realized that, in order to be effective (and to be perceived so), TVET curricula and activities need to be demand-driven and capable of responding and adjusting to ongoing changes in manufacturing sectors. Secondly, there is a recognition that TVET training needs to be reliable in terms of the achievement of certain certifiable quality standards. Thirdly, instead of following on more consolidated TVET models of the French/English-speaking African countries, the Government went for its own unique and context-based model. Specifically, the national TVET strategy stipulated the integration of traditional apprenticeship into the TVET system, and promoted vertical and horizontal mobility and progression (MOE, 2008 and 2010). Finally, the TVET national strategy adopted a very comprehensive approach whereby quality improvements were achieved by acting upon each specific component of the programme.

The new TVET programme has been evaluated along the following axes (Baraki and van Kemenade, 2013), each of them corresponding to a specific component of the implementation programme:

(a) National TVET qualifications framework:

The national framework was developed to identify demand-driven needs, to assess current skills gaps and mismatches and, finally, to design flexible pathways or qualifications levels facilitating horizontal and vertical integration. The National TVET certificates I–V are structured in five levels, each of them being carefully characterised with level descriptors.

(b) Occupational standards:

The definition of occupational standards required the development and constant update of a sophisticated scheme of occupational titles called Ethiopian Occupational Standards Development Guidelines (MOE, 2009 and 2012). This includes 338 occupational titles in agriculture; economic infrastructure; culture, sports and tourism; health; industry development; labour affairs and social services.

(c) Occupational assessment and certification:

The Occupational Assessment and Certification Directive was issued in order to bring coherence in the broader system.

(d) Accreditation of TVET institutions and testing centres.

(e) TVET research, monitoring and evaluation:

A system for gathering and disseminating labour market data and information was developed.

(f) Stakeholders' participation and partnership:

While the programme is under the responsibility of the Ministry of Education, the Government has decided to involve a number of stakeholders, from planning and policymaking, to delivery of training and monitoring and evaluation.

(g) Other support/regulatory mechanisms.

As a result of this articulated programme, and partially as a result of its large population, Ethiopia developed the second highest number of training institutions in Africa, 30 per cent of them provided by private actors. From 1999 to 2007, enrolment in TVET in Ethiopia increased by over 5,500 per cent. Since the introduction of the new TVET system, there was also an increase from 17.42 per cent in 2009/10, to 40.23 per cent in 2011/12 in the share of TVET graduates identified as competent by the certification system (Baraki and van Kemenade, 2013).

6. Policy implications

(a) Prioritize educational spending to meet present and future skills demand:

In line with the national industrial policy, spending on education at all levels should be prioritized so as to produce a skilled workforce capable of supporting economic transformation of the country. In most cases, this is likely to involve a focus on STEM subjects (science, technology, engineering, and mathematics) in secondary and higher education, but also technical and vocational skills development.

(b) Align TVET programmes with private sector demand:

Governments should develop coherent strategies aimed at providing an adequate supply of skilled workers to priority sectors. Technical and vocational training is essential to meet the specific needs of industry, and an institutional arrangement should be found providing for close cooperation between private sector organizations and training providers. This may be through a dedicated TVET institution (as in the United Republic of Tanzania) or from within the Ministry of Education (as in Ethiopia).

G. Agricultural and industrial research: Intermediate institutions and extension services

1. Overview

This section explores the role of intermediate institutions in providing research and extension services for the industrialization process. In many countries, such institutions have been instrumental in raising productivity, especially in agriculture, but also in industry, through the identification and transfer of appropriate technologies from overseas to domestic producers. They can also foster the development of new sectors in the country, in line with the national industrial policy, through an adaptive and entrepreneurial approach. Two successful cases of intermediate institutions – Fundación Chile and Embrapa in Brazil – will help in highlighting their specific functions and cross-sectoral development impact, before conclusions are drawn.

2. Rationale

Industrial learning requires specific ingredients and collective efforts, especially in the transition from an agricultural to an industrial economy. To the extent that a country experiences a sustained process of industrialization, the development of agricultural technologies becomes more complex and science-based. It thus moves gradually away from the farm to the firm, so to speak. Although on-farm testing, adaptation and evaluation of new technologies are still needed, agricultural machinery and fertilizers are very often manufactured by the machine tools and chemical industries. Thus, agrarian change becomes progressively less dependent on a country's geographical position, climate or natural endowments, and increasingly determined by its manufacturing development, agricultural policies and intermediate institutions. At this stage, the two processes of intersectoral learning and technology transfer become critical.

Given the increasing complexity of technologies adopted in agriculture, small and medium farmers are particularly in need of mastering technological innovations. Evidently, given the high costs of these activities and the "public character" of some of them, there is a strong rationale in favour of public intervention to fulfil the following functions:

(a) The identification, adaptation and development of agro-technologies through feasibility studies and market opportunity scouting, experimental testing, demonstration projects, lab testing, quality certification and product/process control;

(b) The diffusion and transfer of these technologies through technical assistance, demonstration projects, quality certification and product/process

control, extension services, and piloting innovative companies in partnership with private companies;

(c) The nurturing of focal technological linkages across sectors, especially with manufacturing, as many of the agro-technological innovations come from manufacturing industries.

3. Policy options

Intersectoral learning and technology transfer processes tend to be facilitated and triggered by intermediate institutions such as agrarian research institutes, technology centres, extension services, quality certification and standards providers (Andreoni and Chang, 2014). Historically, intermediate institutions have taken different "forms" and have performed different combinations of "production functions". These institutions are called intermediate as they play a critical intermediary role between R&D, education, markets and in-farm agricultural production. They also bridge and transfer knowledge, technical solutions and innovations across different sectors and, thus, facilitate various forms of intersectoral learning (Andreoni, 2011).

The transformation of the agricultural sector can be facilitated and triggered by designing a whole range of intermediate institutions and organizations for the provision of innovative "extension, production and technology services". Traditionally, extension services were aimed to "translate" technological innovations originated in the manufacturing sector for the agricultural one. Moreover, they were meant to provide assistance to farmers – for example, in repairing new mechanical tools or in the utilization of chemical fertilizers. The idea of "itinerant instructors", and more generally extension services, was successfully adopted in particular by Germany, Denmark, and Sweden in Europe, but also in the United States and Japan. Interestingly, these are among the main countries that experienced the highest increase in gross output and total productivity rates during the years of the first green revolution (Andreoni and Chang, 2014).

Innovative extension, production and technology services may not only facilitate the application of new technologies, but also proactively involve farmers in the design, experimentation and improvements of new technologies. As these activities imply farmers' direct involvement in processes of trials and errors, inverse engineering, redesign of "crop-growing techniques", they would result in a sustained process of in-farm technological capabilities-building.

4. Case study 1: Brazil's Embrapa[14]

Over the last 30 years, Brazil has been among the most active countries in terms of use of policies designed to expand natural resource-processing industries and food production. The results of these transformative policies are reflected in the remarkable results that Brazil has achieved in manufacturing its agrarian change. Brazil is today among the top three producers and exporters of orange juice, sugar, coffee, soybeans, beef, pork and chickens, as well as having caught up with the traditional big five grain exporters (United States, Canada, Australia, Argentina and the European Union). At the centre of the transformative policy package implemented in Brazil, there is a network of intermediate institutes – i.e. Embrapa – which has fostered technological change, diversification and upgrading in agriculture and farming.

Established in 1972 via Law 581 as a public corporation under the Ministry of Agriculture, Livestock, and Food Supply, Embrapa (Empresa Brasileira de Pesquisa Agropecuária) is the national agricultural research agency of Brazil. Brazil is a country with one of the most well-developed and well-funded agricultural research systems in the developing world (in terms of public investment in agricultural research, it is below only China and India). The agricultural research system involves federal and state governments as well as an enormous number of agricultural universities (around 80). There is also a very large number of agricultural research centres, (some of them have been in existence since the early nineteenth century). This makes the current Brazilian agricultural research system extremely complex and characterized by overlapping networks (17 state research networks in 2011). Embrapa stands as the main player within this complex system. With its 47 research centres throughout the country hosting 9,284 employees and an annual budget of over US$1 billion in 2011, it is the largest R&D agency of any kind, just in agriculture, in Latin America, by staff and budget. The research centres are organized along three main axes of specialization: commodities, resources and themes. In 2011, Embrapa counted 15 National "Thematic" Centres, 16 National "Commodity" Centres and 16 Regional "Resource" Centres.

Embrapa was founded in 1972 as a response to the main weaknesses of DNPEA (National Agricultural Research and Experiment Department). These included "researchers' lack of awareness of the basic needs of agriculture and the lack of intradepartmental and external interaction among researchers, extension workers, and farmers (which had led to instances of unproductive duplication of research

[14] This section draws heavily on Andreoni and Chang, 2014

efforts)". Other weaknesses involved "the lack of incentives for researchers (particularly indicated by low salaries), the low level of postgraduate training (12 per cent [of] the scientific staff at the time), and finally the insufficient, and often irregular financial resources available" (Beintema et al., 2001: 16). Embrapa took over DNPEA's extensive network of research institutes covering the main agricultural commodities and regions, experiment stations and existing projects. Agricultural extension services were outside Embrapa's area of intervention and were assigned to another agency, Embrater, which operated until 1991.

During its first decades, Embrapa created its network of national commodity centres and regional centres that focused on major cropping and animal production systems, as well as on eco-regional and national themes. It also increased its internal capabilities by signing partnerships with United States universities such as Purdue and Wisconsin, which allowed Embrapa's staff to receive postgraduate training. In 1993 the establishment of the Embrapa Planning System introduced a systems approach to R&D planning for the first time. This allowed a redefinition and reintegration of the centre's mission, objectives, programmes, human resources, infrastructural needs and priorities.

Throughout the 1990s "Embrapa was involved in a wide range of activities related to agricultural research and technology, including plant breeding, pest management, food safety, satellite monitoring, sustainable agricultural development, and hunger relief. Soybean breeding and pest management activities are headquartered at the Embrapa facility in Londrina in the state of Paraná, but crop research activities are carried out at locations around the country to develop crops and varieties that are suited for local conditions" (Matthey et al., 2004: 10).

The trend started in the 1990s and continued during the next decade, in particular in 2005–2006, when Embrapa made a serious effort to improve and renovate its infrastructure. A R$21 million investment was designated to the labs. However, if we include the full range of funding provided for facilities, equipment, tractors and vehicles, we reach R$90 million. Included among these investments – at the interface between agriculture, biotechnologies and advanced manufacturing – were:

(a) Facilities for quality improvement in the meat production chain.

(b) An aquaculture lab prioritizing water quality control, fish feeding and health.

(c) A new Oenology Lab to boost wine production in the North-eastern Semi-Arid Region.

(d) The construction of one of the world's first National Agribusiness Nanotechnology Lab focused on the development of sensors and biosensors for

food quality control, certification and traceability. The Lab was also dedicated to the synthesis of new materials – such as polymers and nanostructured materials, or thin films and surface – to manufacture smart packages.

(e) Six new walk-in freezers to increase the storage and preservation capacity of the Embrapa Germplasm Bank (from 120,000 to 240,000 seeds).

According to information provided by the Brazilian Government, Embrapa has generated and recommended more than 9,000 technologies for Brazilian farmers since its inception in 1973. This includes developments in tropical agriculture that have developed an extraordinary network of intermediate institutions, research centres, labs and other facilities. In 2007, it was estimated that Embrapa's lab infrastructures encompass 215,500 m2, while there were 33,000 m2 of canvas-covered facilities and 35,000 m2 of greenhouses (Embrapa, 2007; see also Embrapa 2012). This demonstrates the massive investment that the Brazilian Government made in order to develop the intermediate institutions.

Probably the most remarkable achievement of Embrapa has been the claiming of the cerrado (the Brazilian savannah) for modern agriculture. It introduced "new varieties, cultural practices, zoning, tillage, biological fixation of nitrogen, development of livestock for both meat and milk, vegetables, fruit, irrigation and knowledge of the cerrado natural resource basis" (Alves, 2010: 70). Embrapa's technological efforts were also reinforced by government investment, which established new universities and postgraduate courses in all states of the cerrado region.

5. Case study 2: Chile's Fundación Chile[15]

During the 1990s, Chile managed to become the largest exporter of farmed salmon in the world as well as one of the main exporters of fresh and processed fruit and tomatoes. Interestingly, at the centre of the transformative policy package implemented in Chile there was another model of intermediate institutes for agricultural transformation.

Fundación Chile (FCh) is a non-profit semi-public institution created in 1976 with a US$50 million endowment donated in equal parts by the Government of Chile and the International Telephone and Telegraph Corporation of the United States. In the course of its existence, FCh has undergone various phases of transformation with respect to its organizational and sustainability model, partners, sectors and areas

[15] This section draws heavily on Andreoni and Chang, 2014

of intervention. However, it managed to maintain its main vocation as "a public–private partnership for innovation" as well as its unique "business orientation". Specifically, as an intermediate institution, FCh focuses on "the identification, adaptation and development of technologies and the diffusion and transfer of these technologies through the creation of innovative companies" (Fundación Chile, 2005: 3).

In 1980, five central work areas were selected and Chilean professionals were nominated to head them (foreign experts were asked to provide advisory services). The selected central work areas were: the agro-industrial area, marine resources, product development, laboratory and pilot plant. For each of them, FCh implemented a number of so-called "demonstration projects" aimed at transferring foreign technologies and manufacturing agrarian change, (i.e. the adoption of industrial technologies and science-based innovations in agriculture, aquaculture and farming). Among the projects selected in 1980 was a feasibility study on the production of vegetable seeds for export. They also did an experimental test on freezing blackberries, strawberries and vegetables for future export, a study of potato processing and an assessment of green asparagus cultivation. They also studied sanitary improvements of milk handling in industrial dairies; technical post-harvest consulting in the fruit industry and quality control of fruit for export (and the utilization of apple rejects). Research was also done on plant design for the production of dietetic rice flour; technical assistance was given to canning plants and an aquaculture centre was established in Coquimbo. Finally, technical assistance was given on the refining of fish oil for edible and industrial uses (Fundación Chile, 2005; Bell and Juma, 2007).

Sometimes, demonstration projects resulted in the creation of a new laboratory (as occurred with the Marine Laboratory and Oyster Growing Station in Tongoy), which allowed FCh to acquire the official status of "quality certification entity" for fruits and vegetables exported (in 1985, this license was extended to other products such as meat, seafood, vegetables and housing industries). Other projects, such as the "Asparagus Cultivation" programme (1979), resulted in massive market successes. After having identified the market opportunity represented by green asparagus (for which there was a high demand in the United States and Europe), FCh provided technical assistance to farmers to introduce a new variety of asparagus. With this assistance, the area planted and operated grew by 40 per cent of the national acreage dedicated to green asparagus crops. Interestingly, given the great emphasis on agricultural technologies during this initial phase, FCh reoriented the research in electronics and telecommunications toward the design of microprocessors for process control, which eventually resulted in the application of ICT technologies to quality and process control in agro-industries.

In 1982, FCh acquired the company Domsea Farms (a subsidiary of Campbell's Soup), which specialized in aquaculture techniques and was later transformed into Salmones Antártica S.A., the first fully-integrated company in the Chilean salmon farming industry. When the original company was acquired, Chile's total national salmon exports were around 300 tons per annum. In 1988, when Salmones Antártica S.A. was sold for $22 million, Chile exported more than 250,000 tons and continued growing over the 1990s, approximately 17-fold, reaching a world market share of 35 per cent in 2002 (the export value was US$1.2 billion in 2003). Other companies were sold in subsequent years, consolidating a model according to which the invested capital was recouped through sale and reinvested in new ventures as soon as innovative technologies were transferred and disseminated through demonstration companies. Until the end of the 1990s, the three main pillars of action of FCh were agribusiness, forestry and marine resources.

Rarely were the successes of the many innovative companies promoted by FCh simply single company successes. Very often, they were stories of cluster development. For example, in the case of Salmones Antártica S.A., the Chilean salmon miracle would not have been possible without the original involvement of the Government in salmon research from the 1960s onward, and the promotion and joint development of various institutions which constituted and nurtured an intersectoral commons base (Andreoni, 2013a).

In analysing the public institutions involved, we must start with the joint venture between Chile's National Fisheries Service (SERNAP) and Japan International Cooperation Agency (JICA), which initially introduced salmon (a non-native fish) to the country. Furthermore, the acquisition of the first facilities for salmon farming by FCh was financed by the regional governmental planning institution of the XI Region (SERPLAC). The first commercial farming venture in Chile able to export to Europe was partly financed by a public agency (CORFO) and was founded by professionals who had worked in government institutions such as IFOP (Fisheries Development Institute). Other firms from other industries and sectors – such as those manufacturing cages, processing products, producers of refrigerators containers and providers of transport services – were forward and backward linked to the salmon industry, giving rise to a salmon industry cluster.

One of the main difficulties that firms in the salmon industry faced in the first stages of cluster development was the difficulty of achieving operational scale, international reputation and quality certification. The establishment of a "Chilean brand" occurred through the constitution of an institution specialized in quality control and certification (the Salmon Technology Institute or Intesal). This was established in

1994 thanks to the creation of a producer association (Association of Salmon and Trout Producers of Chile) supported by the Government.

The successful emergence of agro-technological clusters engineered by FCh is not limited to the case of the salmon industry. FCh was very successful in establishing a "grape technology platform" built on genetic engineering technologies. The enormous potential impact of this project was demonstrated by the adoption in other parts of the world of genetically engineered varieties of maize, soybeans and cotton. At that time, "little effort was being expended to make improvements in perennial crop species, such table grapes", a product particularly promising in the Chilean context. Starting from these experiments, the emergence of a wine cluster in Chile is a well-documented story.

During the 1990s and early 2000s, FCh continued to promote new industries such as the cultivation of abalone and the production of extra virgin olive oil. It also carried on diversifying its portfolio investing in innovative new companies such as Oleotop (2004), the country's first canola oil producer (replacing fish oil in feed for the salmon industry). However, it also initiated the promotion of new more horizontal interventions, such as fostering entrepreneurship and human capital. In 2001, together with the Ministry of Education, FCh created a portal containing 27,000 freely available educational resources and a Job Competencies Programme, focused on three main areas: certification of job competencies, formation and job market, and management of human resources. Finally, taking stock of its successes in the last few years, FCh has repositioned itself within the "densifying innovation and incubation ecosystem" (infoDeV, 2011: 85) focusing on:

(a) Creating and promoting "early stage" companies while leaving the "scaling-up phase" to other organizations;
(b) "Making things happen" i.e. operating more as a "do tank" than as a "think tank";
(c) Nurturing the ecosystem by articulating, coordinating and aligning the interests of key players, both public and private, at the national and international level;
(d) Filling in the gaps in the agribusiness value chain and identifying where value is nested.
(e) Developing transversal technologies.

6. Policy implications

(a) Establish adaptive and innovative intermediate institutions

Governments should seek to replicate the experience of successful late developers by establishing intermediate institutions providing agricultural and industrial research and extension services to promote industrialization. These may be State-owned (as in the case of Embrapa) or involve a public–private partnership (as in the case of Fundación Chile). Whatever their form, to be successful, these institutions must be adaptive and flexible, taking a dynamic approach to identifying and solving problems. They must be well resourced and work closely with a network of research institutions, universities and private sector organizations.

(b) Identify and transfer technologies to farms and firms

The central function of an intermediate institution is to identify and develop technologies appropriate to the domestic context and promote their transfer to local farms and firms. It may be necessary to adapt the technologies and provide training to recipients to enable uptake. An overarching focus should be the promotion of cross-sectoral linkages and learning (e.g. between agriculture and manufacturing) to support an integrated, broad based industrialization process.

(c) An experimental and entrepreneurial approach

Intermediate institutions have been most successful when encouraged to act like entrepreneurs, experimenting and taking risks which are not guaranteed to pay off. This stands in contrast to the bureaucratic norms in most State agencies around the world. For example, Fundación Chile created demonstration projects which were later sold to private sector actors when success was established, providing revenue to the agency and positive externalities to society. Market research to identify higher-value products capable of being produced domestically for export, and promotion of these opportunities and appropriate production technologies, is a further example.

References

Adam Smith International (2015). Extractives Industry Local Content Early Gap Analysis: Summary Report. Kenya Extractive Industries Development Programme. Available at www.adamsmithinternational.com (accessed on 4 October 2019).

ADEA (2012) *Critical knowledge, skills and qualifications for accelerated and sustainable development in Africa*. Synthesis Report, Triennale on Education and Training in Africa. Association for the Development of Education in Africa

Akinci, G and Crittle, J (2008). *Special Economic Zones: Performance, Lessons Learned, and Implications for Zone Development*. The World Bank. Washington, D.C.

Akinlo, A and Owoyemi, B (2012). The Determinants of Interest Rate Spreads in Nigeria: An Empirical Investigation. *Modern Economy.* 3(7):837–845

Alibhai, S, Bell, S and Conner, G (2017). *What's Happening in the Missing Middle? Lessons from Financing SMEs.* World Bank Group.

Alves, E. (2010) 'Embrapa: A successful case of institutional innovation', *Revista de Política Agrícola,* DF v. 19, special edition of Mapa's 150th Anniversary, p. 64-72.

Amsden, A. H. (1989). *Asia's Next Giant: South Korea and Late Industrialization*. Oxford University Press. New York.

_____ (2001). *The Rise of the Rest: Challenges to the West from Late-Industrialization Economies.* Oxford University Press. New York.

Andreoni, A (2011) Manufacturing Agrarian Change. DRUID Working Paper Series. 11(13): 1–36.

_____ (2018). A Generalized Linkage Approach to Local Production Systems Development in the Era of Global Value Chains, with special reference to Africa. In: Noman, A and Stiglitz, J, eds. *Quality of Growth in Africa*. Columbia University Press.

Andreoni, A and Chang, H-J (2014). Agricultural policy and the role of intermediate institutions in production capabilities transformation: Fundacion Chile and Embrapa in action. Working Paper, DRUID, Copenhagen, 16–18 June.

_____ (2016). Bringing production and employment back into development: Alice Amsden's legacy for a new developmentalist agenda. *Cambridge Journal of Regions, Economy and Society*. 10(1):173–187.

Andreoni, A and Neuerburg, P (2014). Manufacturing Competitiveness in South Africa: Matching industrial systems and policies. Paper for International Conference on Manufacturing Led Growth for Employment and Equality. Johannesburg, South Africa, 20–21 May.

Ansu, Y. and Tan, J-P. (2012) 'Skills Development for Economic Growth in Sub-Saharan Africa: A Pragmatic Perspective' in Noman, A., Botchwey, K., Stein, H., & Stiglitz, J. E. (eds.). (2011). *Good Growth and Governance in Africa: Rethinking Development Strategies*. Oxford, New York: Oxford University Press.

ANRC (2016). An ANRC step-by-step guide for local content policy formulation and implementation. Available at www.afdb.org (accessed on 4 October 2019).

Atlas of Economic Complexity (2017) The Growth Lab at Harvard University. http://www.atlas.cid.harvard.edu (accessed 5 October 2019).

Baharumshah, A, Slesman, L and Wohar, M (2016). Inflation, inflation uncertainty, and economic growth in emerging and developing countries: Panel data evidence. *Economic Systems*. 40(4):638–657. Available at www.sciencedirect.com/science/article/pii/S0939362516300735 (accessed on 4 October 2019).

Baraki, A. H., & van Kemenade, E. (2013). Effectiveness of Technical and Vocational Education and Training (TVET): Insights from Ethiopia's reform. *The TQM Journal*, Vol 25, 492–506.

Beck, T, Maimbo, SM, Faye, I and Triki, T (2011). *Financing Africa: Through the crisis and beyond*. IBRD. Washington, D.C.

Beintema, N., Avila, A.F.D. & Pardey, P. (2001) Agricultural R&D in Brazil:Policy, Investments and Institutional Profile. FONTAGRO, IFPRI and Embrapa. Washington.

BIDA (Bangladesh Investment Development Authority) (2017). Garments and Textiles. Available at http://bida.gov.bd/?page_id=680 (accessed on 4 October 2019).

Buur, L (2014). The development of natural resource linkages in Mozambique: The ruling elite capture of new economic opportunities. DIIS Working Paper 2014.

Chang, H.-J. (1996). *The Political Economy of Industrial Policy*. Macmillan.

_____ (2002). *Kicking Away the Ladder: Development Strategy in Historical Perspective*. Anthem Press. London.

Chang, H-J, Hauge, J and Irfan, M (2016). *Transformative Industrial Policy for Africa*. Economic Commission for Africa. Addis Ababa.

Cimoli M, Dosi G and Stiglitz JE (2009). *Industrial Policy and Development: The Political Economy of Capabilities Accumulation*. Oxford University Press. Oxford.

Cling, JP and Letilly, G (2001). Export Processing Zones: A Threatened Instrument for Global Economy Insertion? Working Paper DT/2001/17. DIAL. Paris.

CPDBEI (Centre for Policy Dialogue and Bangladesh Enterprise Institute) (2001). *A review of macroeconomic scenario, investment policies and regulatory framework in Bangladesh*.

Davison, W (2017). Park life: workers struggle to make ends meet at Ethiopia's $250m industrial zone. *The Guardian*. 5 Dec 2017. Available at www.theguardian.com/global-development/2017/dec/05/ethiopia-industrial-park-government-investment-boost-economy-low-wages (accessed on 4 October 2019).

DTI (2015a). Notice on the Suspension of the Manufacturing Competitiveness Enhancement Programme (MCEP). Media Statement 2015-10-28. Available at www.thedti.gov.za/editmedia.jsp?id=3546 (accessed on 4 October 2019).

_____ (2015b). 2014/15 Incentive Performance: Highlights. The Department of Trade and Industry, Pretoria.

_____ (2016). 2016/17 Annual Incentive Performance Report, DTI Incentive Development and Administration Division. Available at https://www.tralac.org/images/docs/12125/2016-17-annual-incentive-performance-report-dti.pdf (accessed on 4 October 2019).

_____ (2017). Industrial Policy Action Plan 2017/18 - 2019/20. The Department of Trade and Industry, Pretoria.

Economic Commission for Africa (ECA) (2017). *Transforming African economies through smart trade and industrial policy*. Economic Commission for Africa. Addis Ababa.

Economic and Social Commission for Asia and the Pacific (ESCAP) (2017). *Handbook on Policies, Promotion and Facilitation of Foreign Direct Investment for Sustainable Development in Asia and the Pacific*. United Nations Economic and Social Commission for Asia and the Pacific. Bangkok.

Embrapa (2007) *Tropical Agriculture: Brazil Building the Future*, Embrapa.

Embrapa (2012) *Brazilian Agriculture. Development and Challenges*, Embrapa.

Farole, T and Akinci, G, eds. (2011). *Special Economic Zones: Progress, Emerging*

Challenges, and Future Directions. The World Bank. Washington, D.C.

Ferraz, J (2016). Uncertainty, Investment and Financing: The Strategic Role of National Development Banks. In: Norman, A and Stiglitz, J, eds. *Efficiency, Finance and Industrial Policy* Columbia University Press. New York:105–131

Fessahie, J (2018). How Can the CFTA Help Africa Respond to its Economic Transformation Imperative? *Bridges Africa*. 7(1). Available at www.ictsd.org/bridges-news/bridges-africa/news/how-can-the-cfta-help-africa-respond-to-its-economic-transformation (accessed on 4 October 2019).

Fruman, C (2015). How to make zones work better in Africa? 27 Aug 2015. World Bank Private Sector Development Blog. Available at https://blogs.worldbank.org/psd/how-make-zones-work-better-africa (accessed on 4 October 2019).

FSDZ (Financial Sector Deepening Zambia) (2017). Small Medium Enterprises. Available at https://www.fsdzambia.org/what-we-do/inclusive-enterprise-finance/ (accessed on 4 October 2019).

Fundacion Chile (2005) 'Fundación Chile: 29 Years Fostering Innovative Business Development in Key Chilean Clusters', paper presented at the Workshop on Generating and Sustaining Growth without Picking Winners: Case Studies of New Industrial Policy Organizations, World Bank Institute, Washington DC.

Glaeser, EL and Gottlieb, JD (2009). The Wealth of Cities: Agglomeration Economies and Spatial Equilibrium in the United States. *Journal of Economic Literature*. 47(4):983–1028.

Gray, HS (2012). Tanzania and Vietnam: A Comparative Political Economy of Economic Transition. PhD Thesis, SOAS (School of Oriental and African Studies).

Greenstone, M, Hornbeck, R and Moretti, E (2010). Identifying Agglomeration Spillovers: Evidence from Winners and Losers of Large Plant Openings. *Journal of Political Economy*. 18(3):536–598.

Guadagno, F (2016). *The role of industrial development banking in spurring structural change*. UNIDO. Vienna.

Gwayaka, PM (2014). *Local content in oil and gas sector – an assessment of Uganda's legal and policy regimes.* ACODE Policy Briefing Paper Series, No.28. Kampala.

Habib, MM, Mileva, E and Stracca, L (2016). The real exchange rate and economic growth: Revisiting the case using external instruments. Working Paper 1921. Frankfurt:

ECB. Available at www.ecb.europa.eu/pub/pdf/scpwps/ecbwp1921.en.pdf (accessed on 4 October 2019).

Hanh, NP, Van Hùng, D, Hoat, NT, Trang, DTT (2017). Improving quality of foreign direct investment attraction in Vietnam. *International Journal of Quality Innovation*. 3(7).

Hansen, W, Buur, L, Kjaer, A and Therkildsen, O (2015). The Economics and Politics of Local Content in African Extractives: Lessons from Tanzania, Uganda and Mozambique. *Forum for Development Studies,* 43(2):201–228.

Hansen, MW, Buur, L, Therkildsen, O and Kjaer, M (2014). The political economy of local content in African extractives: Lessons from three African countries. Available at http://openarchive.cbs.dk/bitstream/handle/10398/9014/Wendelboe%20Hansen.pdf?s equenc e=1 (accessed on 4 October 2019).

Hellman, T, Murdock, K and Stiglitz, J (1998). Financial Restraint: Towards a New Paradigm. In: Aoki, M, Kim, H-K and Okuno-Fujiwara, M, eds. *The Role of Government in East Asian Economic Development: Comparative Institutional Analysis.* Oxford University Press. Oxford.

Hoque, S (2017). Ethiopia's Economic Transformation and job creation: The role of Hawassa Industrial Park. *SET ODI.* 24 August. Available at https://set.odi.org/sonia-hoque-odi-ethiopias-economic-transformation-job-creation-role-hawassa-industrial-park/ (accessed on 4 October 2019).

Hymowitz, D (2016). Too much science, not enough art. Africa Governance Initiative. London.

InfoDEV (2011) *Growing food, products and business: applying business incubation to agribusiness SMEs*. Washington DC: World Bank.

International Finance Corporation (IFC) (2008). Developing SMEs through Business Linkages: A Manual for Practitioners Based on the MozLink Mentorship. Available at www.enterprise-development.org (accessed on 4 October 2019).

International Monetary Fund (IMF) (1998). Policy Framework Paper – Uganda. Enhanced Structural Adjustment Facility and Policy Framework Paper 1998/99-2000/01. IMF, 28 October. Available at www.imf.org/external/np/pfp/uganda/102998.htm (accessed on 4 October 2019).

_____ (2017) Vietnam: Selected Issues. IMF Country Report No. 17/191. Washington, D.C.: International Monetary Fund

International Monetary Fund (IMF), Organisation for Economic Co-operation and

Development (OECD), United Nations and World Bank (2015). Options for Low Income Countries' Effective and Efficient Use of Tax Incentives for Investment. Report prepared for the G-20 Development Working Group, October. Available at www.imf.org/external/np/g20/pdf/101515.pdf (accessed on 4 October 2019).

International Trade Centre (ITC) (2002). Adding value: Building value-addition alliances, Inter-firm strategic alliances in the textiles and clothing industry. Examples from Bangladesh and Sri Lanka. Executive Forum on National Export Strategies. Available at http://www.intracen.org/uploadedFiles/intracen.org/Content/Exporters/Sectoral_Information/Manufactured_Goods/Textiles/Inter-firm%20Strategic%20Alliances%20in%20textiles%20and%20Clothing%20Industry,%20e.g.%20from%20Bangladesh%20and%20Sri%20Lanka.pdf (accessed on 4 October 2019).

Jayanthakumaran, K (2003). Benefit-Cost Appraisals of Export Processing Zones: A Survey of the Literature. *ODI Development Policy Review*. 21(1):51–65.

Kathuria, S, Mezghenni Malouche, M, eds. (2016). Strengthening Competitiveness in Bangladesh – Thematic Assessment. A diagnostic trade integration study. World Bank. Available at http://documents.worldbank.org/ (accessed on 4 October 2019).

Khan, M (1999). *The Political Economy of Industrial Policy in Pakistan 1947-1971*. SOAS, University of London. London.

_____ (2000). Rent-seeking as Process. In: Khan, M and Jomo, KS, eds. *Rents, Rent-Seeking and Economic Development: Theory and Evidence in Asia*. Cambridge University Press. Cambridge:70–144.

_____ (2013a). *Technology Policies and Learning with Imperfect Governance.* In: Stiglitz, J and Lin, J, eds. *The Industrial Policy Revolution I. The Role of Government Beyond Ideology.* Palgrave 2013. London:79–115.

_____ (2013b). Political Settlements and the Design of Technology Policy. In: Stiglitz, J, Lin, JY and Patel, E, eds. *The Industrial Policy Revolution II. Africa in the 21st Century*. Palgrave. London:243–280. Available at http://eprints.soas.ac.uk/17297/1/Political%20Settlements%20and%20Technology%20Policy.pdf (accessed on 4 October 2019).

Khandelwal, A and Teachout, M (2016). *Special Economic Zones for Mayanmar.* International Growth Centre. Available at www.theigc.org/ (accessed on 4 October).

Kohli, A 1994. Where Do High Growth Political Economies Come From? The Japanese Lineage of Korea's "Developmental State". *World Development* 22(9).

Kolstad, I and Kinyondo, A (2015). Alternatives to Local Content. WIDER Working Paper 2015/106. Helsinki: UNU-WIDER. Available from www.wider.unu.edu (accessed on 4 October).

Krause, M and Kaufmann, F (2011). Industrial Policy in Mozambique. German Development Institute. Discussion Paper 10/2011. Available at www.files.ethz.ch/isn/132283/DP%2010.2011.pdf (accessed on 4 October).

Lall, S. (2001) *Competitiveness, Technology and Skills*. Edward Elgar Publishing.

_____ (2017) Financing Industrial Development in Korea and Implications for Africa. In: *Industrialize Africa: Strategies, Policies, Institutions and Financing*. Industrialize Africa: AfDB.

Lin, J and Chang, H-J (2009). Should industrial policy in developing countries conform to comparative advantage or defy it? A Debate between Justin Lin and Ha-Joon Chang. *Development Policy Review*. 27(5):483–502.

Marshall, A (1920) *Principles of Economics (Eighth Edition)*. Macmillan and Co. London

Matthey, H., Fabiosa, J. F. and F. H. Fuller (2004) 'Brazil: The Future of Modern Agriculture?' MATRIC Briefing Paper 04-MBP 6. Midwest Agribusiness Trade Research and Information Center (MATRIC), Iowa State University.

Mazzucato, M and Pena, C (2015). *Beyond Market Failure: The Market Creating and Shaping Roles of State Investment Banks.* Levy Economics Institute. Working Paper:831.

McKinnon, R (1973). *Money and capital in economic development*. Brookings Institution. Washington.

McMillan, M, Page, J, Booth, D and te Velde, D (2017). *Supporting economic transformation: An approach paper*. Supporting Economic Transformation, ODI. London.

Mihretu, M and Llobet, G. (2017). *Looking Beyond the Horizon: A case study of PVH's commitment to Ethiopia's Hawassa Industrial Park*. World Bank. Available at http://documents.worldbank.org/ (accessed on 4 October).

MOE (2008) *National Technical and Vocational Education and Training (TVET) Strategy*. Federal Ministry of Education, Addis Ababa.

MOE (2009) *Ethiopian Occupational Standards Development Guideline*. Federal Ministry of Education, Addis Ababa.

MOE (2010) *Education Sector Development Program IV (ESDP IV) 2010/2011-2014/2015*. Federal Ministry of Education, Addis Ababa.

MOE (2012) *Occupational Standards Development Guideline*. Federal Ministry of Education, Addis Ababa.

Morris, M, Kaplinsky, R and Kaplan, D (2011). Commodities and linkages: Industrialisation in Sub Saharan Africa. MMCP Discussion Paper No. 13.

MPI (2003). Foreign Investment Policy of Viet Nam in the Process of International Economic Integration, Ministry of Planning and Investment. Available from http://siteresources.worldbank.org/INTRANETTRADE/Resources/WBI-Training/vietFIP_dat.pdf (accessed on 4 October).

Mshomba, RE (2017). *Economic Integration in Africa: The East African Community in Comparative Perspective*. Cambridge University Press. Cambridge.

MTIC (2015). National Export Development Strategy 2015/16–2019/20: Export Growth for Economic Development and Transformation. Ministry of Trade, Industry and Cooperatives.

Naughton, B (2007). *The Chinese Economy: Transitions and Growth.* MIT Press. Cambridge, Massachusetts.

Newman, S (2014). Financialisation and the financial and economic crises: The case of South Africa. Project Report. FESSUD, Leeds. Available from http://eprints.uwe.ac.uk/25391/3/FESSUD_studies-in-financial-systems_South-Africa_final_study-26%20%282%29.pdf (accessed on 4 October 2019).

Noman, A., Botchwey, K., Stein, H., & Stiglitz, J. E. (Eds.). (2011). *Good Growth and Governance in Africa: Rethinking Development Strategies*. Oxford, New York: Oxford University Press.

Nyakabawo, W (2017). South Africa's local content policies: challenges and lessons to consider. TIPS Policy Brief: April 2017.

Ostensson, O (2017). Local content, supply chains, and shared infrastructure. *United Nations University WIDER Working Paper 2017/96.* Available at www.wider.unu.edu/ (accessed on 4 October 2019).

Ovadia, JS (2012). The Dual Nature of Local Content in Angola's Oil and Gas Industry: Development vs. Elite Accumulation. *Journal of Contemporary African Studies*. 30(3):395–417.

Papadavid, P (2017). Financing for manufacturing: financing conditions in sub-Saharan Africa. ODI. London.

Phillips, C and Bhatia-Panthaki, S (2007). Enterprise Development in Zambia: Reflections on the Missing Middle. *Journal of International Development.* 19:793–804.

Rajan, R and Zingales, L (1998). Financial Dependence and Growth. *The American Economic Review.* 88(3):559–586.

Ramdoo, I (2015): Industrial Policies in a changing world: What prospects for low-income countries. E15 Expert Group on Reinvigorating Manufacturing: New Industrial Policy and the Trade System. Think piece. International Centre for Trade and Sustainable Development and World Economic Forum.

_____ (2016). Local content policies in mineral-rich countries. European Centre for Development Policy Management Discussion Paper, No. 196.

Reinert, E (2007). *How Rich Countries Got Rich - And Why Poor Countries Stay Poor*. Constable. London.

Rodrik, D (1993). Taking Trade Policy Seriously: Export Subsidization as a Case Study in Policy Effectiveness. NBER Working Paper No. 4567. Cambridge, Massachusetts.

_____ (2008). *The real exchange rate and economic growth.* Harvard University. Cambridge, Massachusetts. Available at http://drodrik.scholar.harvard.edu/publications/real-exchange-rate-and-economic-growth (accessed 4 October 2019).

Ruan, J and Zhang, X (2009). Finance and Cluster-Based Industrial Development in China. *Economic Development and Cultural Change*. 58(1):143–164.

Saleman, Y and Jordan, L (2014). The Implementation of Industrial Parks: Some Lessons Learned in India. World Bank Policy Research Working Paper 6799. Available at http://documents.worldbank.org (accessed on 4 October 2019).

Seshadri, T (2012). An Analysis of the Feasibility of Private Land Assembly for Special Economic Zones in India. *Urban Studies*. 49(10)2285–2300.

Shepherd et al. (2017). Reform of the EAC Common External Tariff: Evidence from trade costs, International Growth Centre Policy Paper.

Shin, H and Lee, K (2012). Asymmetric Protection Leading Not to Productivity but Export Share Changes: The Case of Korean Industries, 1967–1993. *Economics of Transition.* 20(4):745–785.

Shinyekwa, I, Kiiza, J, Hisali, E, and Obwona, M (2016). The Evolution of Industry in Uganda. In: Newman et al., eds. *Manufacturing Transformation*. UNU–

WIDER/Oxford University Press.

Shira (2017). Vietnam: FDI Strategy for 2018–2023. Vietnam Briefing, Dezan Shira & Associates. Available from www.vietnam-briefing.com/news/vietnam-fdi-strategy-2018-2023.html/ (accessed on 4 October 2019).

Silva, S (2014). *Local content requirements and the green economy*. United Nations Conference on Trade and Development (UNCTAD).

Spray, J (2017). Exports and Promoting Backward Linkages: Ideas and lessons for the Made in Rwanda Policy, IGC: Kigali.

Steenbergen, V and Sutton, J (2017). Establishing a Local Content Unit for Rwanda. International Growth Centre Policy Note April 2017. Available at www.theigc.org (accessed on 4 October 2019).

Sutton, J (2014). Gains from the Natural Gas: Local Content and Tanzania's Industrial Development. Seventh Gilman Ruthinda Memorial Lecture, Bank of Tanzania, June.

The Economist (2017). Blown off course: A trade deal between the EU and east Africa is in trouble. 25 May. Available at www.economist.com/news/finance-and-economics/21722684-eus-push-new-trade-deals-africa-caribbean-and-pacific-faces (accessed on 4 October 2019).

Toner, P. (2011) Workforce Skills and Innovation: an Overview of Major Themes in the Literature. STI Working Paper Series, OECD Directorate for Science, Technology and Industry.

Tyson, JE (2017). Mobilising Private Financing for Manufacturing in Sub-Saharan Africa. SET, ODI. London.

UNCTAD (2008). *Investment Policy Review: Viet Nam*. (United Nations publication. Sales No. E.08.II.D.12. New York and Geneva). Available from http://unctad.org/en/Docs/iteipc200710_en.pdf (accessed 4 October 2019).

_____ (2012). *Bangladesh sector-specific investment strategy and action plan*. Pilot study results, Inter-Agency Working Group.

_____ (2014). *Trade and Development Report 2014: Global Governance and Policy Space for Development*. (United Nations publication. Sales No. E.14.II.D.4. New York and Geneva).

_____ (2015). *Investment Policy Framework for Sustainable Development*. UNCTAD/DIAE/PCB/2015/5. New York and Geneva.

_____ (2016). *Making Trade Work for Least Developed Countries: A Handbook on Mainstreaming Trade*. UNCTAD/ALDC/2015/5. New York and Geneva.

_____ (2018). UNCTAD STAT. Geneva. Available from http://unctadstat.unctad.org/ (accessed 4 October 2019).

United Nations (2004). Export diversification and economic growth: The experience of selected least developed countries. Development Papers No. 24. Bangkok.

United Nations Industrial Development Organization (UNIDO) (1997). *Industrial Estates: Principles and Practice*. United Nations Industrial Development Organization. Vienna.

_____ (2016). UNIDO Competitive Industrial Performance Report 2016. United Nations Industrial Development Organization.

_____ (2017). The EQuIP Toolbox, E: Industrial Policy Design – Instruments for Implementation, Annex 1. UNIDO/GIZ. Available at www.equip-project.org/wp-content/uploads/2017/09/Annex-1-July-2017.pdf (accessed on 4 October 2019).

Wade, R (1990). *Governing the market: Economic theory and the role of government in East Asian industrialization*. Princeton University Press.

Warren-Rodriguez, A (2008). An Exploration of Factors Shaping Technology-Upgrading Efforts in Mozambican Manufacturing Firms. SOAS Department of Economics Working Paper No. 159. Available at SSRN: https://ssrn.com/abstract=1149325 (accessed 4 October 2019).

Weiss, M (2016). *The role of local content policies in manufacturing and mining in low- and middle-income countries*. UNIDO Working Paper 19/2016.

Wondemu, K and Potts, D (2016). The impact of the real exchange rate changes on export performance in Tanzania and Ethiopia. Working Paper 240. AfDB. Tunis.

World Bank (2018). Tariff rate, applied, simple mean, manufactured products (%) – Uganda. Available from https://data.worldbank.org/indicator/TM.TAX.MANF.SM.AR.ZS?locations=UG

World Bank Data (2017). [Online]. [Accessed 24 Jan 2018]. Available at https://data.worldbank.org/ (accessed 4 October 2019).

World Trade Organization (WTO) (2013). Trade Policy Review (TPR) of the East African Community Uganda. WTO Secretariat report, Revision 1, Annex 5 – Uganda.

Xing, H and Zhang, X (2013). *The Logic of Adaptive Sequential Experimentation in Policy Design*, IFPRI Discussion Paper 1273. International Food Policy Research Institute. Washington, D.C.

Yuan, Z, Zhang, L, Bi, J Lu, B and Zhang, B (2010). Eco-industrial parks: National pilot practices in China. *Journal of Cleaner Production.* 18(5):504–509.

Yunus, M and Yamagata, T (2012). The garment industry in Bangladesh. In: Fukunishi, ed. *Dynamics of the Garment Industry in Low-Income Countries: Experience of Asia and Africa*. IDE-JETRO.

Zhang, X (2017). Building Effective Clusters and Industrial Parks. *Industrialize Africa*: AfDB.

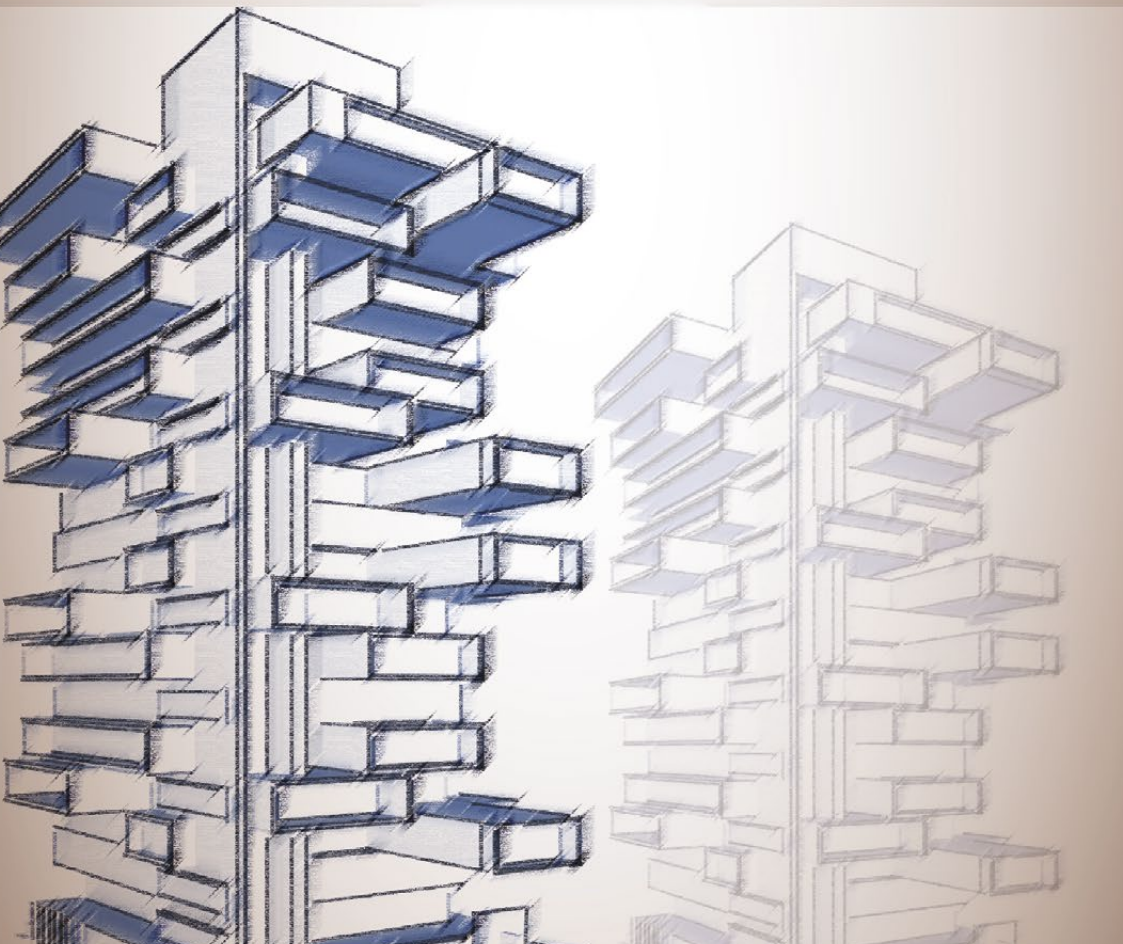
Ziderman, A. (2002) 'Financing Vocational Training to Meet Policy Objectives: Sub-Saharan Africa'. Africa Region Human Development Working Paper Series. The World Bank.

Zhao, C (2017). China's Financial Mechanisms in Industrial Development with Inspirations for Africa. In: *Industrialize Africa: Strategies, Policies, Institutions and Financing*. AfDB.

UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT

UNCTAD

VI. Policy processes, coordination and governance



VI. Policy processes, coordination and governance

Industrial policymaking for building productive capacities is a complex process involving multiple challenges. The effectiveness of industrial policy and thus the extent to which countries will be able (or not) to develop their productive capacities critically depends on the ways – the "how" – they deal with these challenges. In previous chapters (IV and V), we reviewed the "why" and "what" of industrial policies by drawing on a variety of country experiences. In particular, we focused on the rationales and design of industrial policy as well as various policy instruments and how each of them has been implemented in different contexts.

The challenges countries face in industrial policymaking – what we have called here the "how" industrial policy – are of course very context-specific, and each of them might play different roles in different countries. However, the following five main clusters of challenges can be identified, and lessons for effective ways to deal with them can be extracted from various countries experiences:

(a) The way in which the policymaking process itself is structured: that is, the extent to which key steps and principles for effective design and implementation are followed (the importance of selectivity was discussed in chapter IV);

(b) The government capabilities and leadership at each stage of the process, including the ideological background of the government actors involved;

(c) The need to coordinate packages of interacting policy measures to trigger systemic processes of productive capacity development (and the related need for interministerial, interdepartmental and inter-agencies coordination);

(d) The governance and political economy of the industrial policymaking process, in particular conflicting interests among ministries, departments and agencies (MDAs) and the institutionalization of the government–business relationships which affect the enforcement of the policies;

(c) The extent to which the Government can learn in industrial policymaking by monitoring and evaluating policies, as well as responding to changing circumstances by adapting its policy instruments and overall package of interventions.

This chapter engages with each of these clusters of challenges and provide practical recommendations on how to deal with them, building on various countries'

experiences. The ultimate goal is to understand why some countries succeed and others fail in industrial policymaking, and think of ways to maximize the chance of success and minimize the chance of failure.

A. Industrial policymaking: Process, principles and government capabilities

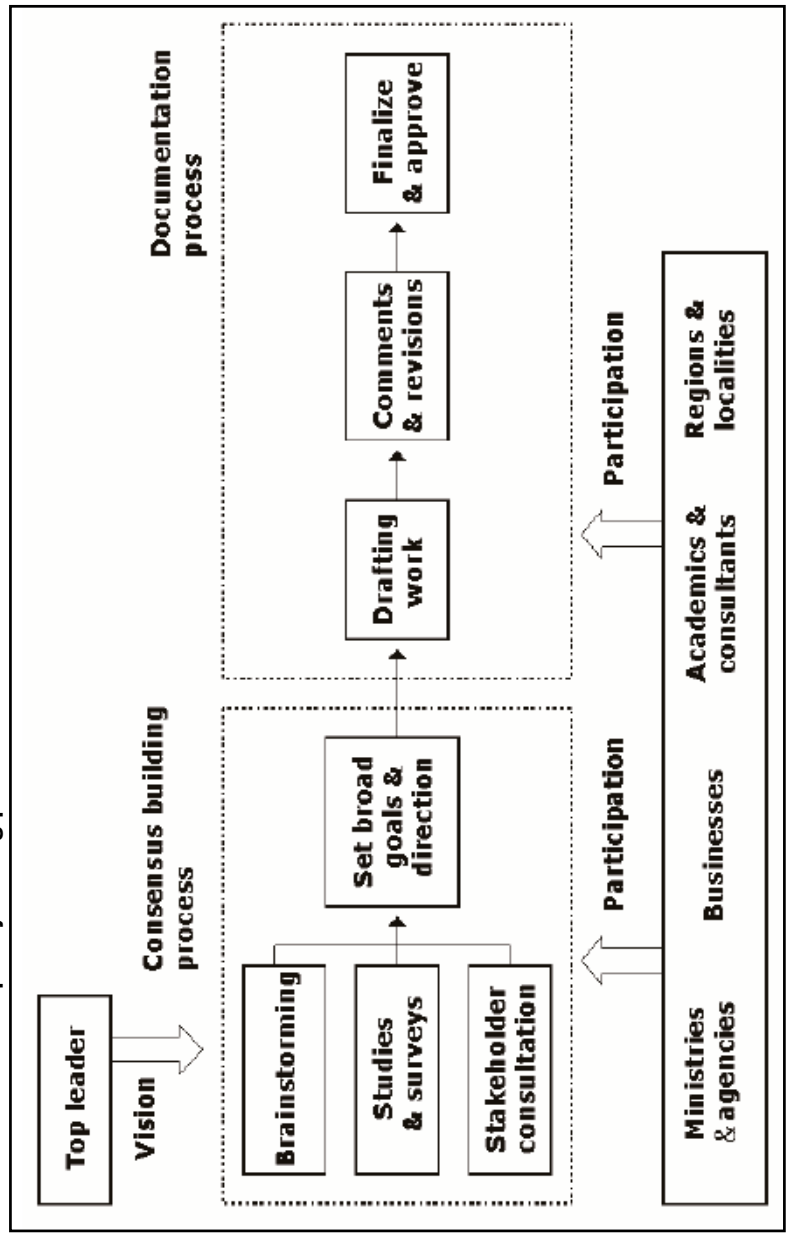
The policymaking process has been defined as a process through which Governments translate their political vision into specific policy solutions, the latter being specific programmes and actions implemented through a set of coordinated procedures and operations (Birkland, 2005). In the specific context of industrial policymaking, building on a review of different countries experiences, Ohno (2013) pointed out how "Success in industrial policy formulation depends not only on the proper choice of policy measures… but also, more fundamentally, on policy procedure and organization from which good policies are produced and executed" (Ohno, 2013:89). In other terms, industrial policy effectiveness depends equally on "what" you do, but also on "how" you do it.

The traditional way of structuring an industrial policymaking process is to follow a linear–sequential model, such as the one in figure VI.1. In this process, a ministry or agency is given the task of translating the top leader's vision and producing a new (or review/update an existing) industrial policy document. In the execution of this mandate, the ministry in charge of the industrial policy – generally the Ministry of Industry and Trade (or similar names) – follows two main steps. The first one is aimed at reaching consensus around a broad set of goals and directions – i.e. a consensus-building process. The second one focuses on the documentation process – that is, the drafting, revisions and finalization of a policy document.

The involvement of different stakeholders and other MDAs in these two steps is acknowledged and encouraged, although the participation is often more formal than substantial. There are two main reasons. First, all MDAs tend to concentrate on their own specific mandate and policies, and are mainly concerned about protecting (or eventually increasing) their own share of the general budget that the Ministry of Finance will have to allocate. Second, the Ministry of Industry and Trade has no power over the other ministries, although the industrial policy mandate requires coordination among cross-ministerial and cross-sectoral interventions. As a result, often the Ministry of Industry and Trade limits itself to the production of a policy document, which has been only formally co-designed and whose implementation remains a challenge.

Apart from the challenge of inter-MDAs' coordination and different interests, the traditional model of approaching industrial policymaking presents other shortcomings.

Figure VI.1
Standard industrial policymaking process



Source: Authors

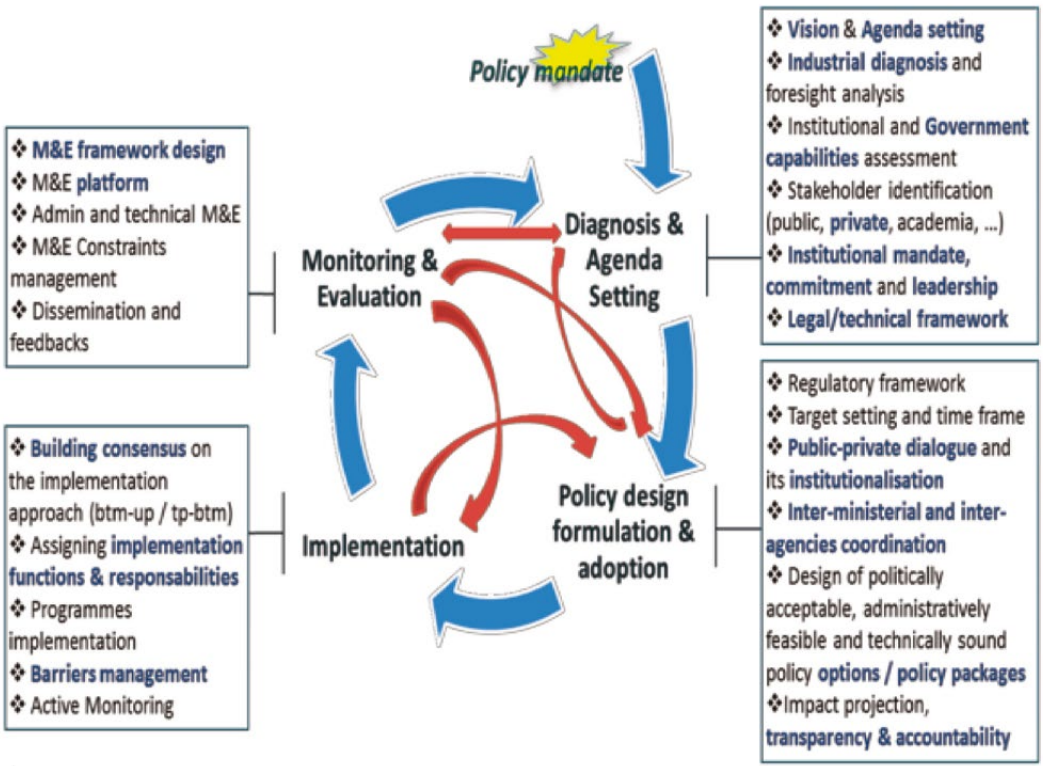
First, approaching industrial policymaking as a linear process made of a series of sequential steps tends to result in industrial policy documents and strategies in which design is de-linked from implementation. Policymakers tend to think about implementation until late in the process, when some form of consensus on the broad goals and directions have been reached. However, without any pre-assessment of the feasibility of certain intervention and "how" they are going to be implemented and enforced, the policy design will remain a pure theoretical exercise.

Second, linear models tend to forget some key stages such as "foresight analysis" or "monitoring and evaluation" (M&E). In other cases, when included, other stages such as M&E are mainly approached as an ex post exercise.

Finally, these types of linear–sequential industrial policymaking frameworks tend to take for granted that a new policy concept will flow through the process; they do not reflect the challenges of policymaking at each stage of the chain; and they tend to underestimate the government capabilities requirements and potential execution traps (see Pritchett et al., 2012). In reality, particularly in developing countries, a new policy idea/concept will face severe constraints and bottlenecks at each stage of the policy process and, as a result, may not get beyond mere discussions or general definitions.

To overcome such limitations, scholars and policymakers have increasingly stressed the importance of designing the industrial policymaking process within a "learning model framework". This more practice-based model stresses the importance of multiple loops and feedbacks throughout the policymaking process. Although this model represents a first step towards a more practice-oriented approach in the analysis of industrial policymaking, each stage presents unique context-specific challenges. Figure VI.2 shows these loops connecting the different stages of the policy process and, for each of them, a number of policy functions have been reported (see also table VI.1).

Figure VI.2
Policymaking process: Learning model



Source: Author.

The adoption of a learning model framework suggests the need to perform a number of key policy functions at each stage of the policy process, and the need to address emerging challenges as part of a circular process of continuous learning and adaptation. For example, in the policy design process, policymakers should already consider the implementability of the policy measures and instruments designed. In other words, the policy should be designed with a view to increase the chances of effective implementation. This means considering the extent to which a certain policy is feasible or not in a certain context – feasibility principle.

Policy targets need to be commensurate with the capabilities of the producers (and also those of the policymakers themselves). This is true for all countries, but particularly relevant for countries at early stages of development, whose inadequate productive capabilities make building productive capacities risky. Given the risk, these countries should not try to leap too far from where they are. However, the nature of the game is such that, without some risk-taking, industrial policy will achieve little (Chang in the Lin–Chang debate emphasizes this point; see Lin and Chang, 2009). Striking the balance between realism and the need for risk-taking is, of course, not easy, but it can be – and has been – done. So, for example, Japan and the Republic of Korea succeeded in their industrial upgrading efforts because they started developing difficult industries well before they looked "realistic" – the automobile industry for Japan in the 1950s or the steel industry for the Republic of Korea in the 1960s – by using the export earnings from industries such as textiles, cheap garments and electronics, which conformed to their comparative advantage at the time.

From a practical point of view, the following set of key policy functions can be stressed for each stage of the industrial policymaking process and a number of other principles/recommendations for effective industrial policymaking considered (table VI.1).

Table VI.1

Policy functions in a learning model for effective industrial policymaking

Phase 1: Diagnosis and agenda setting	
Policy functions	*Principles/Recommendations*
1.1 Vision building, agenda setting and sharing: ▪ Positioning productive capacity-building and transformation as national priority within a consistent policy vision ▪Identification of top issues for the country ▪Setting up of the consultation process ▪Evaluation of stakeholders' involvement and forms of engagement	1.1.1 The active participation of the private sector (and other stakeholders) since the beginning of the policy process is a key prerequisite for a successful industrial policy. The private and public elites need to coordinate their efforts and to build national coalitions around policy vision. This is extremely important for countries at early stages of industrial development. 1.1.2 The public–private joint-process of vision building is greatly facilitated by the production of a policy document which tends to play a catalytic role. Setting the policy vision encapsulated in a policy document is also crucial as it provides a focal point for private sector self-organization. 1.1.3 The participation of various stakeholders to private–public forums requires the development of a process/engagement protocol, selectivity and a certain degree of flexibility. The direct involvement of the President in the selection process can provide legitimacy and independence of participants.

1.2 Institutional mandate, commitment and leadership	1.2.1 Assess the political strength of the institution (e.g. ministry of industry, ministry of planning, inter-ministerial agency, council, etc.) in charge of industrial policy 1.2.2 The institutional mandate needs to be consolidated and formalized in a policy document: without a formal document, it is very difficult to coordinate the actors involved in the policy process. 1.2.3 "Commitment at the top" is crucial in accelerating and sustaining the policies throughout the learning process. Very often, the Ministry of Industry tends to be relatively weaker, especially if the mandate is not coming from the country's President or Prime Minister.
1.3 Industrial policy articulation within the legal/constitutional framework of the country	1.3.1 The development of specific guidelines for restructuring the legal/constitutional framework is critical to open the right space for policy measures and programmes. 1.3.2 Guidelines in policy documents favour the coordination and alignment of different policy programmes and measures. 1.3.3 Splitting policies that require different policy processes might be a way to better restructure the legal/constitutional framework.

1.4 Government capabilities in structural and industrial diagnosis for policy design ▪ Public managers' skills (organizational, technical and political perspective) and competences (policy acumen, analytical skills and managerial expertise) ▪ Distribution of competences across MDAs and coordination	1.4.1 Need for industry-tailored diagnostics beyond simple macroeconomic analysis, looking at both current industrial structure/strength/weaknesses and future potential trajectories and global megatrends. 1.4.2 Industrial diagnostics and analyses should be matched with in-depth studies of the distribution of power in the contested policy and economic space, vested interest, sectoral concentration of power and value/rents capture. 1.4.3 Benchmarking industrial development and competitiveness is particularly important, as it allows countries to understand how far they are from their respective "country model" and, thus, to calibrate their ambitions and relative strategies. 1.4.4 Government capability traps are pervasive, although government and bureaucratic capabilities can be built relatively quickly – for example, through the establishment of "pockets of excellence", that is, task force within the Government able to deliver industrial analyses and benchmarking.

1.5 Government process-capabilities and governance systems ▪ Government structure, governance system, allocation of responsibilities and enforcement mechanisms	1.5.1 The most effective way to build government process-capabilities is through learning by doing, that is, revision/establishment of organizational routines, changes in the governance structure, development of new processes and monitoring systems. 1.5.2 Demonstrative cases are critical to build related skills and confidence, even when the specific project or programme is relatively small or sector-specific. 1.5.3 Governance systems are critical in the implementation of the policies as well as their enforcement. The design of these systems must reflect the need for policy coordination as well as the distribution of power among the different MDAs to maximize implementation results.

Phase 2: Policy Design, Formulation and Adoption	
Policy functions	*Principles/Recommendations*
2.1 Policy measures and instruments identification: design, target setting, prioritization and trade-offs management.	2.1.1 Effective policy design and formulation require a certain degree of prioritization, coordination and targeting. In particular, prioritization tends to be affected by the fact that policymakers are biased towards short-term strategies. 2.1.2 Policy programmes, instruments and measures need to be formalized and accompanied by detailed guidelines so that, during the implementation phase, actors will have a clear point of reference for action. 2.1.3 In the design of new instruments and regulations, policymakers should take into account both the intended and unintended requirements and costs they may impose on the private sector.

2.2 Institutional structure for policymaking process	2.2.1 The institutional structure required to develop a set of policy options must be politically acceptable, administratively feasible and technically sound (political leadership at the top, coordination and deliberation council, mechanisms of transparency and accountability). 2.2.2 Given the systemic nature of productive capacity-building, industrial policy cannot be the exclusive mandate of Ministries of Industry; thus, it is necessary to create coordinating agencies and to restructure the policymaking governance in view of better information flows, more effectiveness in reaching systemic interests and ensuring responsibilities/accountability.

2.3 Public–private dialogue and policy consensus-building	2.3.1 Create, consolidate and sustain public–private dialogue to ensure permanent feedback for policy formulation, implementation and evaluation (i.e. setting up consultative bodies such as boards, commissions, tasks forces, etc.). 2.3.2 Private and mixed forums work better if the Government has a clear agenda (with a policy document) and defines the policy boundaries. The latter reduce lobbying dynamics and develop the Government's "embedded autonomy". 2.3.3 Favouring representation (not only participation), in particular by supporting SMEs' associations and confederations as well as private forums (e.g. through chambers of industry and trade, business association, etc.) is critical.

2.4 Inter-MDAs coordination mechanisms	2.4.1 Going beyond policy silos and fragmentation of the policy process by introducing mechanisms and networks among MDAs involved in policy formulation (such as inter-ministerial committees). 2.4.2 Ensure commitment in the process by developing strategic alliances among MDAs involved in policy formulation and implementation. One way to build alliances among public actors is to "combine policy results" – that is, identifying and stressing the spillovers and positive externalities generated by the development of the industrial sector.
2.5 Policy alignment within coherent policy packages	2.5.1 Adoption of tools for identifying policy instruments, trade-offs and complementarities. 2.5.2 Exploiting missing opportunities in policy packages towards most effective coordination and financial resource pulling. 2.5.3 Promoting inter-MDAs by coordinating policy instruments around specific goals and missions, instead of expecting each MDA attempting to achieve the same goals and mission in silos.

Phase 3: Policy implementation	
Policy functions	*Principles/Recommendations*
3.1 Building consensus on the implementation approach, accountability and enforcement - Intra-MDAs responsibilities allocation - Policies enforcement - Policy accountability	3.1.1 The adoption of a "step-by-step action-oriented approach", according to which the actors in charge of the policy process need to be mainly focused on implementing projects and programmes, has two fundamental advantages: it tends to make the overall policy process faster and more conducive to policy learning in implementation. 3.1.2 Combining short gains/results with long-term objectives tends to be very important for maintaining social and inter-ministerial consensus throughout the implementation phase. 3.1.3 Reduce the duplication of mandates across MDAs as policy duplication reduces policy effectiveness and coordination, and opens opportunities for misallocation of resources and linkages. 3.1.4 Implementation agencies can avoid bottlenecks in the industrial policy process and increase policy implementation coherence and speed. 3.1.5 Implementation agencies tend to be more effective if they operate as complements and not as substitutes of other ministries or government agencies. Thus, their main function is to enable the translation of a certain policy agenda and strategies (first two phases) into tangible, coordinatedand accountable policy actions.

3.2 Control mechanisms	3.2.1 Define legal and technical mechanisms for project implementation (technical committees, contracts, legal agreements, strategic roadmaps, etc.). 3.2.2 Frequent (monthly/quarterly) feedback meetings among different ministries' secretariats might be a very efficient way to control the process, exploit emerging opportunities and adjust implemented programmes. Their effectiveness is increased by the development of a strict protocol and a set of control tools.
3.3 Implementation barriers management	3.3.1 Introduce mechanisms to deal with policy implementation barriers, such as: (a) political barriers (slow authorization, weak political support, bureaucratic opposition, poor implementer incentives); (b) analytical competence barriers (vague or multiple missions, changing priorities, poor design, uneven feasibility); and (c) operational capacity barriers (fund limitations, weak management structure, weak network coordination capacity, lack of clarity in operational plans).

Phase 4: Monitoring and evaluation	
Policy functions	*Principles/Recommendations*
4.1 Building consensus on policy monitoring and evaluation and identification of key actors	4.1.1 Reaching consensus on the types of policy monitoring and evaluation: administrative and technical evaluations (effort evaluations, performance evaluations, process evaluations, efficiency evaluations, effectiveness evaluations); political evaluations (to support the Government in the industrial policy learning process, or to bring some issue of concern to the Government's attention – i.e. accountability); and evaluation for general audience and build consensus on industrial policymaking. 4.1.2 Reaching consensus on the main benchmarking parameters and the baselines for policy targets for the overall industrial policy and specific sets of interventions. 4.1.3 Identification of the players and platforms for monitoring ad evaluation (primary public agency in charge of policy implementation, researchers, think tanks, consulting firms, media, service users, general public, political parties). 4.1.4 The evaluation of the policy process (process results) and of the policy additionality (output result) requires a combination of internal and external validation.

4.2 Tools and mechanisms for data collection and analysis	4.2.1 Predispose tools for policy evaluation and strategies on how to set up them (i.e. technological platforms with assessment indicators, evaluation departments within and outside government agencies, economic experiments using experimental and control groups, questionnaire). 4.2.2 Identify mechanisms to generate baselines, collect and centralize data for monitoring and evaluation. 4.2.3 Experimentation and trial and error processes require timely performance and impact assessments – that is, a combination of short-term M&E (e.g. six months schema, Malaysia) and long-term outcome/impact evaluation.

4.3 Monitoring and evaluation constraints management	4.3.1 Predispose resources, processes and strategies to address the following constraints: lack of organizational support, lack of expertise in evaluation, narrow perception of the evaluation scope, lack of capacity in data collection, politically charged environment for policy evaluation, unclear goals and subjectivity in interpreting results, self-interest of public managers. 4.3.2 Evaluation of industrial policy (output results) is made complex by the existence of time lags, a period of time in which what is additionality generated by the policy is still not measurable. Mixed methodologies and triangulation of results over time are necessary.
4.4 Mechanisms to disseminate evaluation results	4.4.1 Identify dissemination mechanism to keep stakeholders informed and engaged through the evaluation cycle (i.e. workshops, conferences, expositions, etc.).

Source: Authors

Across all the different phases and policy functions detailed above, government capabilities and leadership matter. Not only the relevant government ministries and public agencies, but also the private sector agencies needed in implementing some of the policy measures (e.g. employers' association, industry associations, trade unions), need to have adequate policy capabilities. This requires staffing these organizations with individuals with appropriate skills and experiences and a strong pragmatic attitude beyond ideological preconception on the why, what and how of industrial policy should be adopted.

One important thing to note is that capabilities here do not imply training in standard economics, as testified to by the fact that the industrial policymakers of the East Asian "miracle" economies were mainly non-economists – lawyers in Japan and, to a lesser extent, the Republic of Korea, and scientists and engineers in China and Taiwan Province of China (see Chang, 2011). Moreover, capabilities are not just those possessed by the individuals working in those organisations. Organisations themselves possess capabilities in the forms of particular command structure, institutional routines, and organisational 'memories' (e.g., past records). Of course, the difficulty is that it takes time and investments to build up these capabilities, although they are not as difficult to build up as many critics of industrial policy would like us to believe (see Chang, 2011).

Developing countries are often locked up in what Pritchett et al. (2012) calls a "capability trap". This refers to a situation in which a developing country Government develops only a narrow set of standard capabilities that are necessary for the continuous attraction of foreign aid, which in the long run undermine its ability to develop policies that are genuinely necessary for the country. The development of government capabilities in MDAs might also be shaped by distorted incentives, such as the possibility of capturing personal opportunities or resources associated with certain activities. Paradoxically, training activities for government bureaucrats can themselves become an opportunity for personal returns which does not translate in better policymaking. As a result of these capability traps – specialization in narrow sets of standard capabilities, distorted incentives, and concentration in activities which do not lead to developing relevant capabilities – Governments in LDCs find it very difficult to develop, implement and enforce industrial policy, especially when these policies require significant inter-MDAs coordination.

B. Industrial policy packages: Policy alignment and inter-MDAs coordination

Industrial policymaking is a complex process, as it entails the management of multiple interactive measures and instruments. In his account of the lessons learned from East Asia, Stiglitz (1996) emphasizes how these countries can only be understood by analysing their "packages of interactive measures", whereby companies were exposed to different types of internal and external competitive pressures. This policy option is also stressed by Chang (2011:100) when he writes, "In East Asia, free trade, export promotion (which is, of course, not free trade), and infant industry protection were organically integrated, both in cross-section terms (so there always will be some industries subject to each category of policy, sometimes more than one at the same time) and over time (so, the same industry may be subject to more than one of the three over time)." Finally, in the context of

Scandinavian countries, Landesmann (1992:242) stresses how these countries adopted an "interesting mix of both defensive and constructive policies".

The design, implementation and enforcement of these packages of interactive instruments and measures also require the involvement of different MDAs – ministries, departments, agencies – operating at different levels, from the regional to the national level, and sometimes supranational as well, as in the case of regional blocks (Stiglitz, 1996; Chang, 2011; Andreoni, 2016). Therefore, not only the capabilities of but also the interactions between the organizations implementing industrial policy are important. The relevant bodies (public and private) need to have good working relationships with each other, and ways to align their underlying interests must be identified (see section 6.3). They also need some mechanisms to coordinate their actions, whether through some intellectual exercises (e.g. indicative planning, foresight exercise) or through organizational structures that make coordination easier (e.g. some coordinating super-ministry, such as France's Planning Commission or the Republic of Korea's Economic Planning Board).

As shown in Andreoni (2016), policy matrixes are useful tools in addressing the challenges industrial policymakers face in aligning and coordinating packages of interactive measures across different policy targets and areas. First, a policy matrix allows for mapping out the different policy instruments – such as those discussed in chapter V – a given government is implementing. In doing so, policy matrixes provide a good basis for reflecting upon the degree of targeting of each policy instrument and how it is governed. Secondly, the policy matrix helps in identifying the potential interactions linking the different policy instruments adopted by different MDAs and implemented across different policy areas. Finally, by revealing the presence of policy interactions within the overall policy package, through the policy matrix it is possible to identify potential policy misalignment or trade-offs which would remain unnoticed otherwise. These misalignments might also be related to lack of coordination or duplication among MDAs, as well as the fact that the instruments adopted by one Government are not synchronized with those left by previous Governments.

The policy matrix proposed by Andreoni, 2016 considers three main axes (figure VI.3):

(a) Industrial policy governance model

This axis defined the extent to which policies are implemented by MDAs at the regional/state level or at the national/federal levels. Of course, as in the case of regional agreements such as the East African Community, there is also a supranational level of policymaking (see chapter V, Uganda case study).

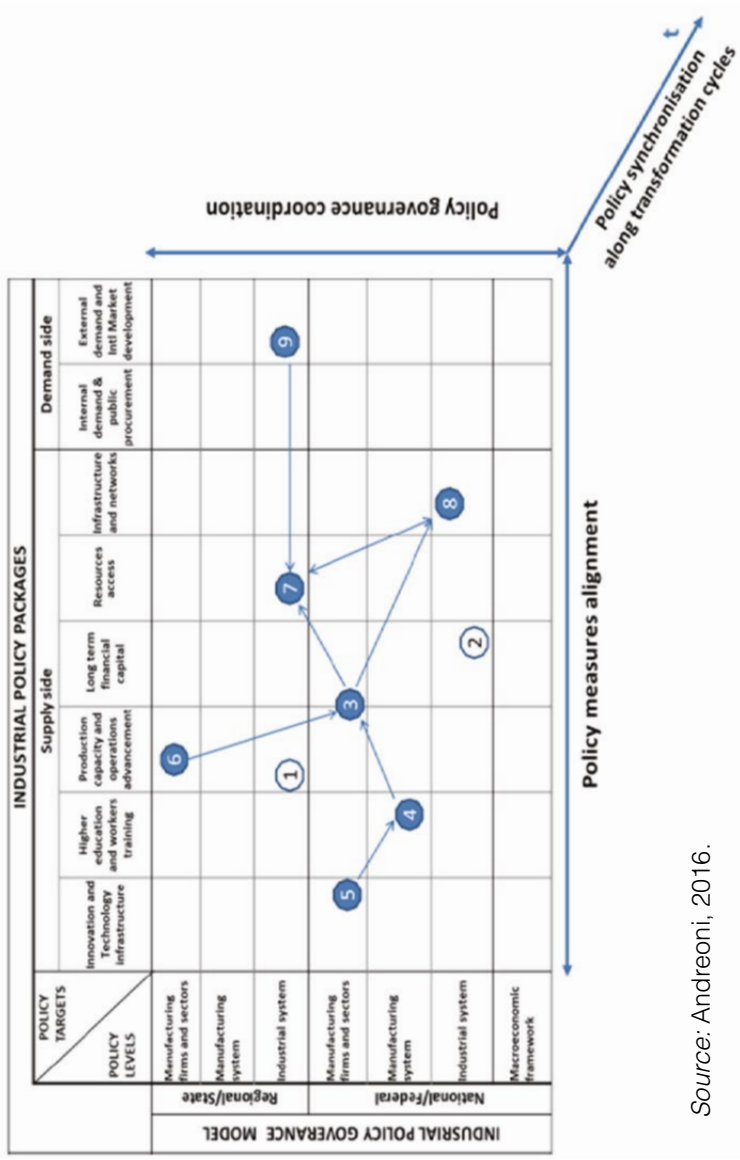
(b) Industrial policy targets and areas

Each industrial policy instrument targets a specific set of goals, which can be clustered in various policy areas – for example, R&D credit, standardization policy and public technology intermediaries are all instruments/measures/institutions targeting the "Innovation and Technology Infrastructure" policy area. While industrial policy generally relies on supply side instruments, there are also clusters of policy areas, including demand-side type of instruments such as procurement policy and external market development policies.

(c) Industrial policy levels of intervention

Each industrial policy instrument can be more or less selective. Some policy instruments are tailored as sector-specific measures and can also target specific firms within those sectors (SMEs in the food supply chain, for example). There are then policies which are focused on the manufacturing system as a whole, in particular those targeting export promotion or development of technology platforms that are critical for manufacturing development (e.g. capabilities in machine tools). Some industrial policy instruments can be more openly focusing on cross-sectoral targets in the industrial system – for example, those targeting better integration between agriculture and manufacturing industries. Finally, there are policies that are more macroeconomic in nature, such as interest rate and exchange rate policies. Despite the fact that they will affect the overall economy, this does not mean that they will affect all sectors of the economy in the same way. A certain interest rate policy will affect sectors with different degrees of capital intensity differently.

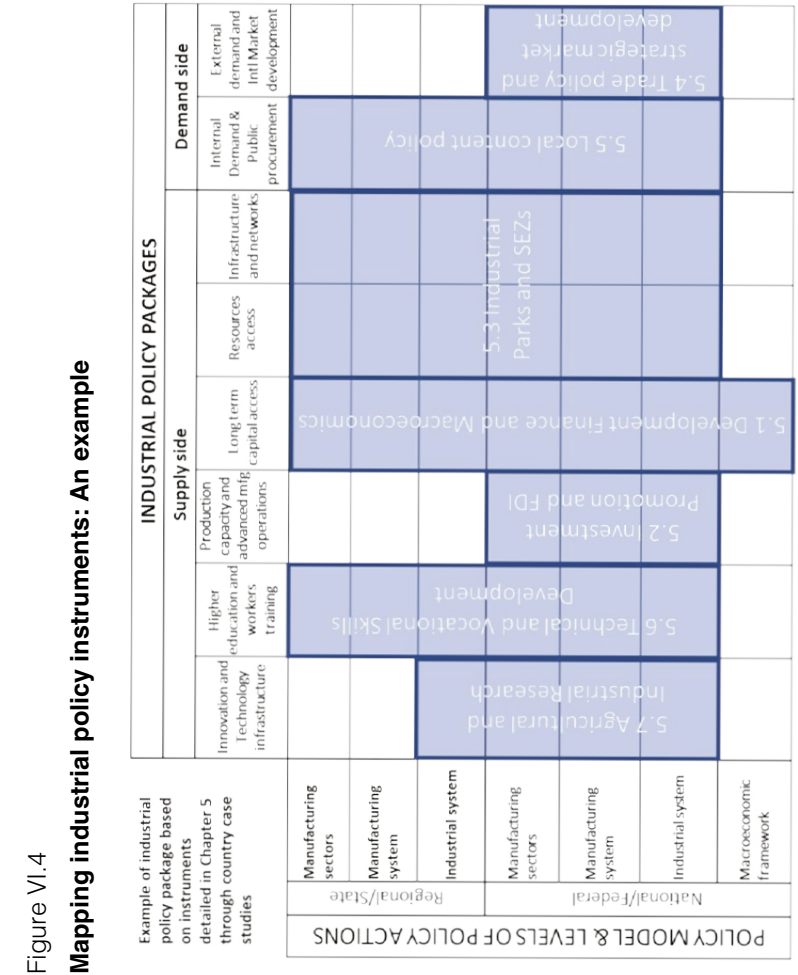
Figure VI.3
Policy matrix for industrial policy package analysis



Source: Andreoni, 2016.

In chapter V, we analysed seven different types of policy instruments which can be mapped out in the policy matrix to reconstruct the policy package of a country and assess their policy alignment, coordination and synchronization. The policy matrix in figure VI.4 is a general country case example showing the set of policy instruments discussed in chapter V.

Figure VI.4
Mapping industrial policy instruments: An example



Source: Adapted from Andreoni (2016).

Countries can adopt different packages of industrial policy measures and can coordinate different policy instruments, either to have a combined effect on the same target or to manage potential trade-offs among different goals. For example, education policies can be aligned to labour market reforms to improve workers' conditions. Technology policies can also be aligned to trade policies or public procurement measures supporting domestic industrial sectors development. Potential trade-offs arising between economic growth and increasing pressure on natural resources can be counterbalanced with aligning sectoral policies and technology policy, in particular green technologies development and deployment over time. In sum, the effectiveness of a single policy measure depends on its linkages with other policy measures acting upon the same companies, sectors and specific institutions. This implies that the policy effectiveness of a certain instrument might be improved by both/either using the instruments more effectively and/or by changing or introducing other complementary instruments. The combined effect of different policy instruments tends to be different from the one that the Government can achieve by the independent implementation in time of the same policy measures.

C. Governance and political economy of industrial policy

The governance of industrial policy as packages of interactive measures presents several challenges that are particularly severe in African countries and LDCs. These challenges often result in policy instrument misalignments, duplication of mandates, institutions and misallocation of scarce resources, ultimately lack of coordination among different MDAs and ineffective implementation/enforcement of policies. Moreover, these governance challenges within the public sector are often intertwined with political economy factors and dynamics involving both the public and private sectors. Understanding the roots of these governance challenges and political economy dynamics is an important first step in identifying effective strategies for their mitigation and better coordination in implementation and policy enforcement.

Industrial policy governance challenges are due to multiple factors and dynamics which operate and unfold in three areas: (a) the public sector, (b) the interaction between public MDAs and private sector constituencies, and (c) the private sector among different powerful groups and interests.

1. Governance challenges in the public sector

Within the public sector, the Government is articulated in different MDAs operating at both the national and subnational levels. While a number of these institutions are settled to perform critical industrial policy functions – thus allocating rents in the

form of subsidies, licensees, tax exemptions, etc. – in many LDCs public department and agencies have often been proliferating as a result of political processes of consensus and client list network building. This means that, despite their official mandate, de facto, these institutions do not perform any specific industrial development and productive capabilities-building function. In some extreme cases, they are not simply ineffective, they can become rigidities in the Government institutional structure and strong forces resisting any change.

Another critical governance challenge in the public sector is related to the fact that the mandate of some government institutions is often unclear, and duplication across MDAs is very common. As a result, when policymakers attempt to design instruments for productive capacity-building, they often face a highly dysfunctional and rigid institutional structure. This is particularly the case when the implementation of certain policy instruments cannot prescind from inter-MDAs coordination. The reason why reforming these institutional and governance structures is particularly difficult depends on the fact that MDAs are often focused on preserving their policy space and resources, thus they are not willing to restructure institutions or reduce duplications. In particular, MDAs compete for protecting and eventually increasing the resources they have been allocated from the central government budget. This is particularly the case in LDCs, where central government budget resources are pretty limited, and a significant part of the resources allocated to MDAs is used for the recurrent budget, that is, the salaries and other expenses related to the running of MDAs.

In several countries, one way to address these competing and conflicting dynamics across MDAs has been to move the industrial policy mandate at the highest policy level – that is, the country Prime Minister or President. The establishment of national councils often under the chairmanship of the President is a way to profile the industrial policy as a national effort and a matter of national interest beyond silos policies. To the extent that these councils are able to identify key policy priorities and orchestrate different MDAs' contributions around them, industrial policy coordination in the implementation can be improved.

Alongside the introduction of national councils, the revision of budgeting procedures and related incentives in budget allocation can also play important roles and result in more accountable systems. Traditionally, the budget allocated to the Ministry of Industry is relatively small. However, there are various budgeted resources whose use could be aligned with industrial policy and productive capacity-building objectives. For example, local content policies and strategic public procurement can open important market opportunities for domestic companies. While these

resources are not directly controlled by the Ministry of Industry, they can be indirectly channelled towards industrial policy goals. In some other cases, budgets can be more directly focused. This is the case of the education budget and the emphasis given to different types of skills at different stages of industrial transformation.

2. Governance challenges and political economy dynamics in the interaction between public and private sectors

The relationship between the Government and the private sector matters. Experiences show the importance of continuous dialogue and exchange of information between the two, if the policies are going to be well informed and relevant. However, it is also important that the Government does not get beholden to particular industrial interests and thus avoid the danger of "capture". Peter Evans (1995) has captured this point with the notion of "embedded autonomy", which means that the Government needs to have roots in the society ("embeddedness") but also must have its own will and power ("autonomy") in order to be effective in its intervention.

Historically, countries with a strong landlord class or a strong financial capitalist class have always found it difficult to implement good industrial policy, as those classes want policies that may be detrimental to productive capacities development. One such prominent example is the United States landlords in the South up until the Civil War constantly putting pressure for free trade, despite the fact that it would have deterred the development of the country's manufacturing sector. In the more recent period, we have seen the strong financial capitalist classes of the United Kingdom and Brazil wanting policies that lead to overvalued exchange rates, thereby destroying large swathes of their export-oriented manufacturing industries.

However, all of this does not mean that a country is bound by its history. New political coalitions can be built, and policies changed. For example, in the late nineteenth century, Bismarck managed to make the landlord class (the Junkers) accept high tariff protection and other industrial policy measures for the emerging heavy and chemical industries by providing it with its own protection, too – in the so-called "marriage of iron and rye". For another example, in 1860, the Northern manufacturing states of the United States established their national hegemony by establishing the Republican Party, which brought on board the Western states, traditionally in favour of free trade, by offering them free distribution of public land (embodied in the Homestead Act of 1862) – and eventually winning the Civil War.

In understanding the relationship between the government and private sector in today's LDCs and African countries, it is critical to start from assessing the distribution of organizational power in both the public and private sectors – thus, the countries' "political settlement" (Khan, 2010) – and the relationship between powerful organizations (including elites and intermediate groups) operating in both (and at the interface between) the public and private sectors. Khan (2010:4) defines the political settlement as "a combination of power and institutions that is mutually compatible and also sustainable in terms of economic and political viability". The analysis of a country's political settlement allows for the assessment of the feasibility of certain policy intervention and, thus, the extent to which a certain policy instrument can be implemented and enforced in a given political settlement.

3. Governance challenges and political economy dynamics in the private sector

The private sector in Africa and LDCs is characterized by a limited number of industrialists capable of investing in a competitive market setting and a plurality of big players involved in trading activities, construction and services (Khan et al., 2016; Andreoni, 2018). The lack of medium-size companies and the dominance of micro and small enterprises often operating informally complete the private sector scenario in Africa and LDCs. In such a business environment, power is mainly concentrated in the hands of big players in the importing, construction and service industries. These players tend to have conflicting interests with industrialists and other SMEs – for example, with respect to the competition for the internal market.

Private sector investment in productive capacity-building is particularly difficult in LDCs, as the distribution of power and incentive structure discourage productive investments. Given the lack of productive capacities, importing products from other countries tends to be cheaper and less risky. Moreover, investments in productive activities is perceived to be riskier than operating in the construction or services industries. As a result, financial capital and interest rates mostly favour the latter sectors, and investments in productive activities remain limited in scale and scope. Finally, given the lack of medium-size companies, the few big industrialists are able to squeeze their local supply chains, which remain disarticulated and incapable of reach efficient scale.

Industrial policy for productive capacity-building can play a central role in transforming the private sector and moving towards a more balanced distribution of power. By mobilizing resources towards productive forces in the private sector and creating incentives for the building up of the local production system, industrial policy can make productive investments feasible and profitable. However, to be effective, the design, implementation and enforcement of industrial policy must take

into consideration what are the specific resources and incentives that different players along different sectoral value chains will need to become more productive. The governance of industrial policy at the sectoral value chain levels often requires close coordination and strategic alliances between productive forces in both the public and private sectors. From the government perspective, industrial policy must have a tangible political dividend. The private sector must perceive the investment feasible as a viable alternative way for profit-making.

D. Industrial policy learning: Monitoring, adapting and evaluating

Equipping policymakers with a monitoring and evaluation (M&E) framework able to support industrial policy learning throughout the full policy cycle is of paramount importance. There are five main reasons why the Government should equip itself with an M&E framework and related system of indicators:

(a) Policy monitoring (and learning in the making): Industrial policymaking is a trial and error process, especially in early stages of implementation with limited government capabilities and resources. By monitoring the implementation process (process indicators) and the extent to which the instruments are reaching the targets (output indicators), the Government can develop and cumulate important capabilities, which can be transferred across policy areas.

(b) Policy dialogue (and trust building): Industrial policymaking depends critically on the establishment of a strong relationship between the public and private sectors. The dialogue between Government and private companies is often compromised by the lack of reciprocal trust. The regular production of evidence showing the ways in which resources have been allocated and have been utilized provides an evidence-based platform for public–private dialogue

(c) Policy adaptation (and phasing-out): Policy targets need to be adjusted according to changes in conditions, especially the country's technological capabilities (which take long and cumulative processes to build and efforts to maintain, as emphasized above) and the world market conditions (e.g. overall demand conditions, what the existing and potential competitors are doing). It is widely recognized that, as the country moves up the technological ladder, the focus of industrial policy needs to shift accordingly to meet the new challenges in the industrial system. This includes the timely but orderly phasing-out of "geriatric" (as opposed to "infant") industries.

(d) Policy accountability (and governance improvements): By developing a system of indicators attached to each policy instrument within the implementation strategy, the Government is effectively developing an accountability instrument. These indicators can help in tracking flows and allocation of resources, their utilization (or lack of spending/implementation capacity in MDAs), leakages and overall distribution of the central budget. The improvement of accountability across MDAs is also important in processes of governance and institutional reforms, especially when resistances to change must be overcome.

(e) Policy evaluation (and demonstration effect): The M&E framework is finally critical to providing evidence of the outcome and impact that a certain policy instrument has had on the targeted sectors of the economy. The evaluation is also important in showing policy results – demonstration effect, and thus triggering replications across other sectors. Positive evaluations also tend to reflect improved government capabilities and are useful in maintaining support around industrial policy.

Industrial policy monitoring and evaluation present a number of difficulties. First, there are inherent difficulties in clearly linking the observed changes in the targeted sector (or firms) with the implemented policy. This is because it is not easy to understand how policies implemented in different sectors, geographical locations and timing interact with each other (Woolcock, 2009; Andreoni, 2011).

Moreover, our definition and discussions above emphasized that, while industrial policy may target certain industries (or even firms), this is done ultimately for the benefit of the overall economy – a lot of selective industrial policy is about externalities, linkages, coordination and shifts across industries, with the aim of upgrading the structure of the entire economy. If this is the case, it would be wrong to evaluate industrial policy only in terms of its direct outcomes in the targeted industries. We also need to look at its indirect impacts on the rest of the economy by adopting system-level evaluation techniques. For example, when we assess the industrial policy of a particular country, we need to look at things like its ability to generate new technologies, make structural shifts, and compete in the world market, and not just what is going on in the targeted industries. All of these will be ultimately reflected in the country's growth rate, but it is a rather catch-all indicator, so we may have to supplement it with more specific indicators regarding things like the (overall and sectoral) balance of payments, changes in the share of manufacturing in total output, or the changes in the world market share overall and, in particular, "leading" industries with technological dynamism and demand expansion (see, for example, the EQuIP Tool box produced by UNIDO and GIZ).

The problem of evaluating industrial policies does not end with the difficulties related to addressing systemic effects (such as displacement effects or linkage effects) of the policy. An added layer of problem is that the evaluation framework has to account for the existence of long-term effects arising from cumulative dynamics. Even if we recognize the existence of "time lags" – and thus of qualitative transformations, discontinuities, truncations and reversals – we still have to explicitly take into account the question of time scale – that is, the amount of time that firms require to build productive capabilities (as a result of, say, an infant industry policy) and move from low- to medium- and high-tech industries (Andreoni, 2011).

These time issues become increasingly complex when we attempt an evaluation of a full package of industrial policies, but are also extremely relevant even in the narrower evaluation of specific policies, such as the increasingly widely-adopted randomized control trials. This technique implicitly assumes that the effect of a certain treatment (i.e. policy) unfolds in a "proper" way – that is, in a monotonically increasing and linear manner. However, this is not often the case, and therefore we can come out with completely different evaluation results, depending on the moment we compare the observed (e.g. treated firms) and the counterfactual (non-treated firms). As Woolcock (2009:3) highlighted, "We know we need 'baseline' (at time t0) and follow-up data (at time t1), but the content and shape of the proverbial 'black box' connecting these data points remains wholly a mystery, to the development industry's peril."

References

Andreoni, A (2011). Productive Capabilities Indicators for Industrial Policy Design. UNIDO Working Paper 17/2017.

_____ (2016). Varieties of Industrial Policy: Models, Packages and Transformation Cycles. In: Noman, A and Stiglitz, J, eds. *Efficiency, Finance and Varieties of Industrial Policy*. Columbia University Press. New York: 245–305..

_____ (2018). A Generalized Linkage Approach to Local Production Systems Development in the Era of Global Value Chains, with special reference to Africa. In: Noman, A and Stiglitz, J, eds. *Quality of Growth in Africa*. Columbia University Press.

Birkland, TA (2005). *An Introduction to the Policy Process: Theories, Concepts, and Models of Public Policy Making.* M. E. Sharpe. New York.

Chang, H-J (2011). Industrial Policy: Can We Go Beyond an Unproductive Debate? In: Lin, JY and Pleskovic, B, eds. *Lessons from East Asia and the Global Financial Crisis*. ABCDE, Annual World Bank Conference on Development Economics:83–109.

Evans, P (1995). *Embedded Autonomy: States and Industrial Transformation.* Princeton University Press. Princeton, New Jersey.

Khan, MH (2010). *Political Settlements and the governance of growth-enhancing institutions*. Mimeo. SOAS University of London.

Khan, MH, Andreoni, A and Roy, P (2016). Anti-Corruption Evidence: A strategic approach. Mimeo. ACE Anti-Corruption Evidence Research Consortium. Available at https://ace.soas.ac.uk/ (accessed 5 October 2019).

Landesmann, M (1992). Industrial Policies and Social Corporatism. In: Pekkarinen, J, Pohjola, M and Rowthorn, R, eds. *Social Corporatism: A Superior Economic System.* Oxford University Press. New York: 242–279).

Lin, J and Chang, H-J (2009). Should industrial policy in developing countries conform to comparative advantage or defy it? A Debate between Justin Lin and Ha-Joon Chang. *Development Policy Review*. 27(5):483–502.

Ohno, K (2013). *Learning to Industrialize: From Given Growth to Policy-Aided Value Creation.* Routledge. New York.

Pritchett, L, Woolcock, M and Andrews, M (2012). Looking Like a State: Techniques of Persistent Failure in State Capability for Implementation. *UNU-WIDER Working Paper No. 2012/63*.

Stiglitz, JE (1996). Some Lessons from the East Asian Miracle. *The World Bank Research Observer*. 11(2):151–177.

Woolcock, M (2009) Toward a plurality of methods in project evaluation: a contextualised approach to understanding impact trajectories and efficacy, *Journal of Development Effectiveness*. 1:(1)1–14.