



UNITED NATIONS  
INDUSTRIAL DEVELOPMENT ORGANIZATION



北京大学国家发展研究院  
National School of Development

# A Technical Note on the Analytical Framework of GIFIUD

(Growth Identification and Facilitation for Industrial Upgrading and Diversification)



A Technical Note on  
The Analytical Framework of GIFIUD

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This Technical Note has been prepared for the UNIDO project "Integrated Industrial Upgrading and Enterprise Development Approach". Comments and suggestions on issues raised in this document are welcome and may be addressed to Mohamed Lamine Dhaoui at [m.dhaoui@unido.org](mailto:m.dhaoui@unido.org).

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# FOREWORD

As the global community embarks on formulating a new development agenda to build on the foundation laid by the Millennium Development Goals, the need for integrating inclusive and sustainable industrial development (ISID) into this new agenda has been recognized widely and globally. ISID calls for an expansion of productive capacities and a growth of responsible value addition to encourage increased job creation and income generation, while respecting planetary boundaries and ensuring an efficient use of scarce resources.

Decent jobs arise out of economic development, from private entrepreneurs and governments generating new competitive businesses and economic activities. Sustained job creation requires structural change, or the ability of an economy to constantly generate new fast-growing activities characterized by higher value added and productivity and increasing returns to scale. Since the industrial revolution, manufacturing has been at the core of structural change, consistently creating higher levels of output and employment, and leading to an unprecedented growth in incomes.

It is therefore no surprise that more and more attention is being focused on the analysis of patterns of economic transformation. Within this field, the New Structural Economics (NSE), championed by Justin Lin, former Chief Economist of the World Bank and currently the Honorary Dean of the National School for Development of the Peking University, argues for the identification of sectors according to the economy's latent comparative advantages and the use of industrial policies and programs to facilitate rather than protect the prioritized sectors and calls it Growth Identification and Facilitation (GIF).

History tells us that sector-focused industrial policies have played an essential role to jump-start development and achieve dynamic structural change in a developing economy. It is a path to rapid, inclusive and sustained growth. Yet these very policies have failed in some countries where the targeted industries are not compatible with the country's comparative advantage, or where policy implementation is captured by special groups of influence. By contrast, they have succeeded where the prioritized sectors truly reflect the country's

existing and potential strengths and where the policy makers closely follow market trends.

Empirical evidence further suggests that focused investment promotion, industrial upgrading and industrial infrastructure support, such as special economic zones (SEZs) and industrial parks, are among the most effective tools to help countries overcome the hard and soft infrastructural bottlenecks to inclusive and sustainable industrialization.



This is particularly true for many lower-income countries, where the need for growth is urgent but improving the overall infrastructure and business environment will take time and require substantial resources. In these countries, the concentrated use of limited resources focused on specific sectors or locations can reap "quick wins". It should be stressed, however, that "quick wins" are not necessarily "easy wins". Political vision and public-private partnerships are preconditions for success, as are high levels of professionalism and transparency.

This technical report aims to demonstrate how the industrial policy implementation tools mentioned above that UNIDO deploys at the service of its Member States could be enhanced with innovative, new approaches such as GIFIUD, among others, for Growth Identification and Facilitation for Industrial Upgrading and Diversification (GIFIUD).

Since UNIDO and a small number of Member States have already started piloting GIFIUD to learn from experience, I invite the readers to actively follow up on results achieved in the field and to contribute their experiences and opinions to the debate.

A handwritten signature in blue ink, appearing to read "Li Yong".

LI Yong  
UNIDO Director General



## ACKNOWLEDGEMENTS

This Technical Note is an interim product of the Growth Identification and Facilitation for Industrial Upgrading and Diversification (GIFIUD) project, a joint effort of the United Nations Industrial Development Organization (UNIDO) and the National School of Development, Peking University (NSD/PKU).

Justin Lin, Honorary Dean of the NSD/PKU, serves as the chief technical advisor to the GIFIUD project, which is managed by Mohamed Lamine Dhaoui, Director of the Business Investment and Technology Services Branch of UNIDO. Fatma Nilgun Tas and Xiaofang Shen co-lead the joint project team composed of experts from UNIDO and NSD/PKU.

Yan Wang is the main contributor of the note with valuable inputs from Xiaofeng Hua, Xiaofang Shen, Fatma Nilgun Tas, and Nobuya Haraguchi. Haixiao Wu provided effective research assistance. Other team members with input are Rafik Feki, Nicola Cantore, and Charles Fang Chin Cheng. Staff of both institutions provided administrative and logistical support during the preparation of this note.

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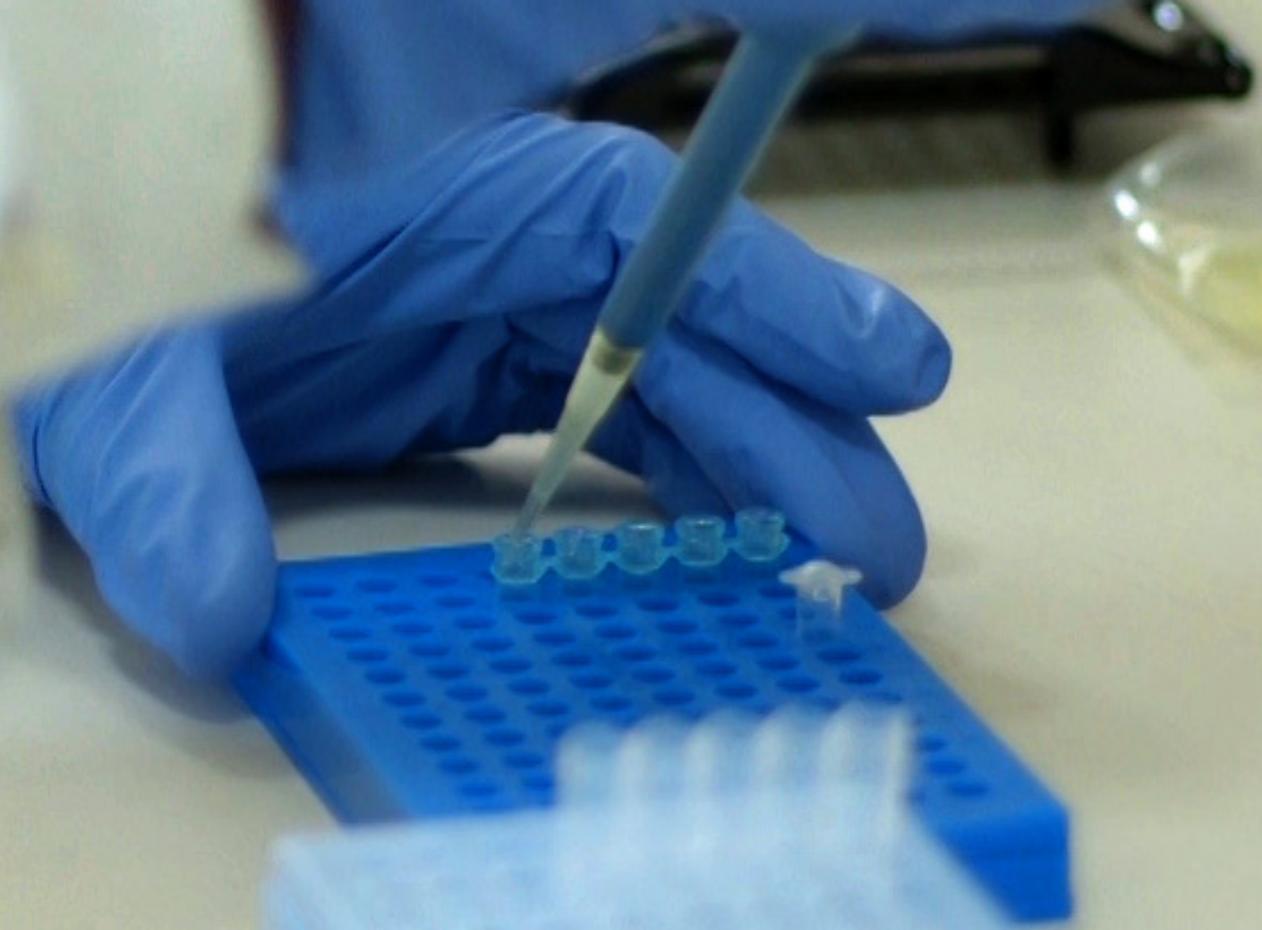
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## I. INTRODUCTION: DEVELOPING GIFIUD AS AN INNOVATIVE TOOL

The United Nations' post-2015 development agenda reinforces the international community's commitment to poverty eradication, especially for lower income developing countries. One of the major items on this agenda is Inclusive and Sustainable Industrial Development (ISID), the core of the new mandate given to United Nations Industrial Development Organization (UNIDO) by its Member States with the 2013 Lima Declaration.

To support this mandate, UNIDO, in collaboration with the National School of Development of Peking University (NSD/PKU), initiated the development of a tool, called Growth Identification and Facilitation for Industrial Upgrading and Diversification, or GIFIUD in short.

The primary objective of GIFIUD is to assist Governments of lower income developing countries in accelerating structural transformation through inclusive and sustainable industrial development.

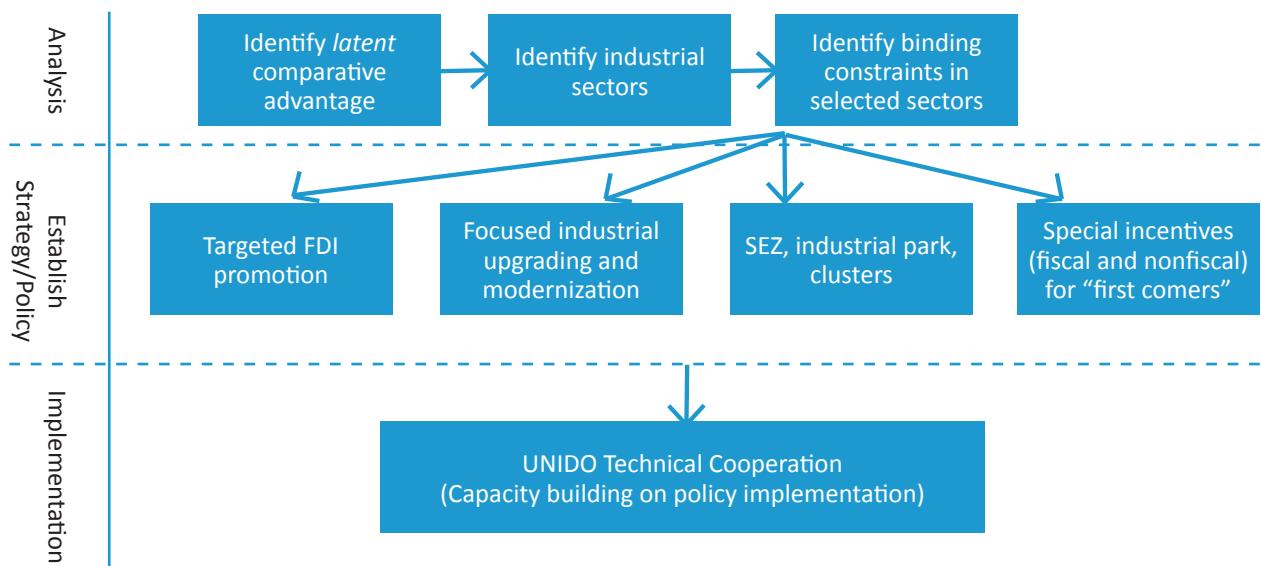
Historical evidence shows that sector-focused industrial policies have played an essential role to jump-start development and achieve dynamic structural change in a developing economy. The New Structural Economics (NSE), championed by Justin Lin<sup>1</sup>, argues for systematic industrial sector targeting and focused public policy and programmes supporting the targeted sectors to help developing countries accelerate industrialization.

Sector-focused industrial policies have failed in some countries where the targeted industries are not compatible with the country's comparative advantage, or where policy implementation is captured by special groups of influence. They succeeded where the prioritized sectors truly reflect the country's existing and potential strengths or its latent comparative advantage (LCA) and where the policy makers closely follow market trends. This new approach, known as Growth Identification and Facilitation (GIF), builds upon evidence of successes in recent world history, including the Asian economic miracle examples such as of Japan, the four "Asian tigers," and more recently China, as well as other countries around the developing world such as Bangladesh, Costa Rica, Ethiopia, and Mauritius. GIF has raised interest through its intuitive principles and pragmatic implementation approach and is gaining traction and taking root in the developing world, especially among lower-income countries, including many in Africa.

UNIDO recognizes the great potential in introducing NSE principles and GIF approaches to its toolkit through GIFIUD.

GIFIUD acts at three levels: (a) analysis enabling the targeting of sectors based on latent comparative advantage in line with NSE approaches; (b) identification of suitable policies to ensure flourishing of targeted sectors; and (c) capacity building of stakeholders for implementation of identified policies, as shown below.

**Figure 1: GIFIUD Building Blocks**



<sup>1</sup> Professor Justin Lin is the former Chief Economist and Senior Vice President of the World Bank and currently Honorary Dean of the National School of Development at the Peking University, China.

The Analytical Phase starts with a series of efforts to select the right sectors. This is the most critical first step, that is based on New Structural Economic principles and GIFT approaches. Picking right, all steps that follow to support the industries are likely to render maximum results; picking wrong, all the hard work and valuable resources to be deployed later may be wasted, and even be harmful.

Once the priority goals with respect to sectors to be targeted are set in the Analytical Phase, there are many industrial policy instruments to choose from in the Strategy/Policy Establishment Phase, and governments will need to carefully evaluate the needs and means when identifying the appropriate policy mix. A key guiding principle here is that decisions should aim for the maximum returns on limited resources and best chances of initial quick results that can create snowballing impact. UNIDO's toolkit contains much experience and best practices on industrial policy mixes and how, where and when they have worked or not.

Finally, the Phase of Implementation, highlighted at the base of the diagram, is where the actions on the ground start. Once the sectors are selected and

the policy and strategy instruments are determined, UNIDO's rich technical and knowledge inventory contains the necessary tools and expertise to help countries in building capacity to: (a) align legislative, regulatory and administrative frameworks to develop sectors having latent comparative advantage; (b) engage in targeted investment promotion to attract foreign investors and to upgrade and modernize domestic industries in targeted and supporting sectors; (c) develop industrial parks and SEZs to overcome hard and soft business infrastructure constraints; and, last but not least, (d) plan, design, establish and manage public-private partnerships.

The Technical Note is organized in three main parts. Section II, following this Introduction, provides a succinct view of the theoretical foundation of GIFIUD and the evolving economic development thinking supporting it. In Section III emphasis is on methodologies for identification of sectors with latent comparative advantage, which is GIFIUD's unique contribution. Section IV gives a brief overview of some of the policy instruments to implement quick win solutions.





## II. NEW STRUCTURAL ECONOMICS: THEORETICAL BASIS FOR GIFIUD

## 2.1 Historical Evidence of Structural Transformation

Structural transformation is critical to economic development, and it is the reason why some nations have prospered while others have languished. This has been observed throughout history since the industrial revolution. In the globalized world, structural transformation is even more critical and difficult because goods and services are traded across borders relatively freely; yet other factor endowments, physical, human and natural capital (e.g. land) are facing barriers or are completely immobile across borders.

Many developing countries have attempted to catch up with industrialized countries, but failed, with some seemingly being trapped in the position of natural resource and primary product exporters. In the last half a century, only 28 countries were able to close the income gap with industrial countries by 10 percent or more. Among these 28 countries, only 12 were non-European and non-resource-based countries.<sup>2</sup>

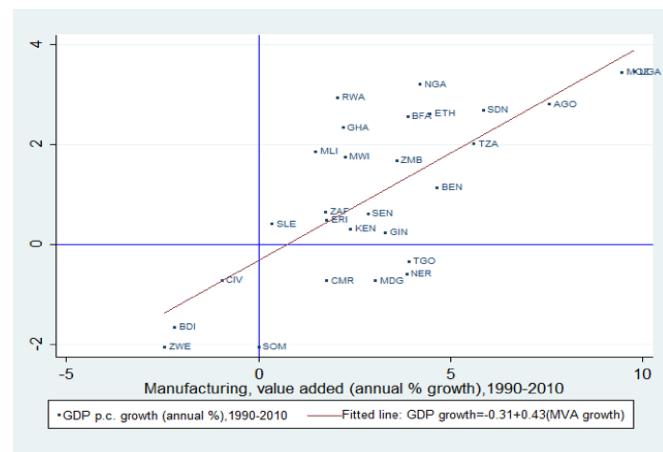
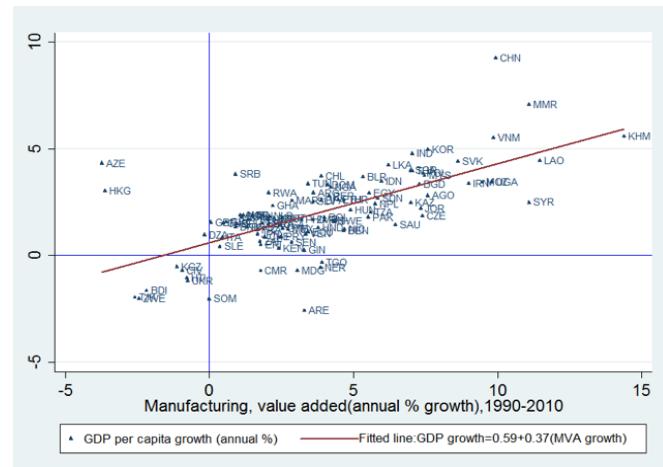
Industrialization is recognized as one of the main engines of economic growth, especially in the early stages of development. The manufacturing sector, in particular, offers new and boundless possibilities for the production of tradable goods, including technology. Manufacturing, furthermore, plays a crucial role in employment generation. In 2013, there were over half a billion jobs in manufacturing, or about one-fifth of the world's workforce, allowing for greater inclusiveness and gender equality.<sup>3</sup>

Figure 2 shows industrialization is an engine of growth. There is a positive and significant correlation between the growth of manufacturing value added (MVA), and per capita income growth in the World, and in the Africa region, between 1990 and 2010. Countries with rapid MVA growth have seen their per capita GDP per capita growth rising faster, such as Cambodia, China, Ethiopia, India, Korea, Myanmar, Uganda and Viet Nam.

Economists have established, at least since the early 1960s that manufacturing has always played a significant role in total output in richer countries and that countries with higher incomes are typically those with a substantially bigger economic contribution from the transport and machinery sectors<sup>4</sup>. In fact, as noted

by UNIDO, only in circumstances such as extraordinary abundance of resources have countries succeeded in developing without industrializing.<sup>5,6</sup> Yet few African countries have been successful in this transformation.

**Figure 2: Industrialization as an Engine of Growth: Manufacturing and Income Growth, 1993–2010**



Source: Updated by Yan Wang and Haixiao Wu, based on WDI data and Lin (2011).

Recent studies<sup>7,8</sup> indicate that many countries including those in Sub-Saharan Africa have deindustrialized, or their manufacturing sector has been stagnating for many years, in sharp contrast to the rapid structural transformation in the East Asian economies. Table 1 below shows clearly this trend.

<sup>2</sup> Lin, Y.F. (2012a). *The Quest for Prosperity: How Developing Economies can Take Off*. Princeton University Press, Princeton, New Jersey.

<sup>2</sup> Eiti, M. (2012a). *The Quest for Prosperity: How Developing Economies can Take Off*. Princeton University Press,

<sup>4</sup> UNIDO (2013), *Industrial Development Report 2013*, United Nations Industrial Development Organization, Vienna.

<sup>5</sup> Haraguchi, N. and G. Rezonja. 2010. "In Search of General Patterns of Manufacturing Development", Working Paper 2010/02, UNIDO, Vienna.

<sup>6</sup> UNIDO (2009). Industrial Development Report, 2009. United Nations Industrial Development Organization, Vienna.

<sup>7</sup> Page, J. (2012), "Aid, Structural Change, and the Private Sector in Africa," UNU-WIDER Working Paper 2012/7.

<sup>8</sup> <http://www.brookings.edu/research/papers/2014/11/industrialization-in-africa-and-emerging-asia>

**Table 1: Africa's deindustrialization is premature: 1960-2013 decade averages**

VALUE ADDED BY SECTOR (% OF GDP)	COUNTRY	1960-1969	1970-1979	1980-1989	1990-1999	2000-2009	2010-2013
Agriculture	Ethiopia	..	..	54.1	56.6	45.1	45.6
Industry	Ethiopia	..	..	10.2	9.9	12.6	10.7
<b>Manufacturing</b>	<b>Ethiopia</b>	<b>..</b>	<b>..</b>	<b>4.8</b>	<b>5.0</b>	<b>5.4</b>	<b>4.0</b>
Services	Ethiopia	..	..	35.7	33.6	42.4	43.7
Σ three sectors		..	..	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
Agriculture	Ghana	44.9	56.5	52.5	42.6	36.3	25.0
Industry	Ghana	21.9	19.0	13.8	24.5	24.8	25.5
<b>Manufacturing</b>	<b>Ghana</b>	<b>12.8</b>	<b>12.3</b>	<b>8.7</b>	<b>9.9</b>	<b>9.3</b>	<b>6.5</b>
Services	Ghana	29.7	24.6	33.6	32.9	38.9	49.6
Σ three sectors		<b>96.5</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
Agriculture	Kenya	37.5	35.6	32.4	30.8	27.5	29.0
Industry	Kenya	17.9	19.9	19.4	17.8	19.2	20.6
<b>Manufacturing</b>	<b>Kenya</b>	<b>10.5</b>	<b>11.9</b>	<b>12.0</b>	<b>11.5</b>	<b>12.3</b>	<b>12.4</b>
Services	Kenya	44.6	44.5	48.2	51.5	53.3	50.5
Σ three sectors		<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
Agriculture	Senegal	..	..	22.0	19.7	16.5	16.9
Industry	Senegal	..	..	20.7	23.5	24.0	24.1
<b>Manufacturing</b>	<b>Senegal</b>	<b>..</b>	<b>..</b>	<b>14.0</b>	<b>16.1</b>	<b>15.3</b>	<b>14.1</b>
Services	Senegal	..	..	57.3	56.8	59.5	59.0
Σ three sectors		..	..	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
Agriculture	Tanzania	..	..	..	44.5	31.9	32.7
Industry	Tanzania	..	..	..	16.4	21.3	22.7
<b>Manufacturing</b>	<b>Tanzania</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>8.3</b>	<b>8.5</b>	<b>7.7</b>
Services	Tanzania	..	..	..	39.1	46.8	44.6
Σ three sectors		..	..	..	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>COMPARATOR COUNTRIES IN ASIA</b>							
Agriculture	China	37.4	32.3	29.4	20.5	12.4	10.1
Industry	China	35.0	44.5	44.3	45.4	46.4	45.6
<b>Manufacturing</b>	<b>China</b>	<b>29.0</b>	<b>37.2</b>	<b>36.0</b>	<b>32.9</b>	<b>32.4</b>	<b>32.0</b>
Services	China	27.7	23.2	26.3	34.1	41.1	44.3
Σ three sectors		<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
Agriculture	Bangladesh	55.5	54.8	31.6	27.1	20.9	17.2
Industry	Bangladesh	8.8	12.1	21.2	23.9	26.1	26.7
<b>Manufacturing</b>	<b>Bangladesh</b>	<b>5.6</b>	<b>8.0</b>	<b>13.8</b>	<b>14.9</b>	<b>16.2</b>	<b>17.0</b>
Services	Bangladesh	35.8	33.1	47.2	48.9	52.9	56.0
Σ three sectors		<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
Agriculture	Cambodia	..	..	..	46.6	33.8	35.4
Industry	Cambodia	..	..	..	15.9	25.3	24.2
<b>Manufacturing</b>	<b>Cambodia</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>11.1</b>	<b>18.1</b>	<b>16.0</b>
Services	Cambodia	..	..	..	37.4	40.9	40.4
Σ three sectors		..	..	..	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

Agriculture	India	42.2	38.6	31.7	27.4	19.7	18.1
Industry	India	19.9	22.3	25.5	26.1	27.3	30.7
Manufacturing	India	13.8	15.2	16.0	15.8	15.3	17.0
Services	India	37.9	39.2	42.8	46.5	52.9	51.1
Σ three sectors		100.0	100.0	100.0	100.0	100.0	100.0
Agriculture	Viet Nam	..	..	41.4	30.2	20.3	19.3
Industry	Viet Nam	..	..	26.3	28.9	36.9	38.3
Manufacturing	Viet Nam	..	..	19.7	15.2	18.6	17.7
Services	Viet Nam	..	..	32.3	40.9	42.8	42.5
Σ three sectors		..	..	100.0	100.0	100.0	100.0

Source: Authors' calculation, based on Data from the World Bank's WDI database.

## 2.2 The Rise of New Structural Economics

Stagnation in industrialization and pre-mature deindustrialization concerns many. At the same time, economists and development specialists have observed a different development trend that has taken place elsewhere. Since the 1960s, a number of developing countries, notably the four Asian Tigers (Hong Kong, South Korea, Singapore and Taiwan), and more recently, several large emerging economies (China, Brazil and India), have transformed or are rapidly changing from agrarian to industrial societies, resulting in higher per capita income and reduced poverty. These countries differ in economic size, system and cultural background, but they all share similar development trajectories that resulted in dynamic structural changes.

To a certain extent, the sharp contrast between Africa and Asia seems to result from differences in developmental thinking. In the 1960s–1980s, many African industrialization efforts failed because they did not target industries compatible with a country's comparative advantage. In the 1990s and the early 2000s, the prevailing development concept in Africa advocated changes in the overall business environment and depended primarily on the market's self-correction capabilities. The results were stagnant economic growth and deindustrialization, in particular in many Sub-Saharan African countries, as shown in Table 1.

In contrast, in many Asian countries, sustained development was achieved through focused efforts for structural change, often in the form of targeted industrial policies aimed to support the emergence of new sectors consistent with the countries' dynamic comparative advantage.

Learning from the failed development attempts and efforts that succeeded, a new wave of development thinking has emerged that emphasizes strategies for structural change, whereby the market plays its basic

role in resource allocation and the government facilitates industrial upgrading and compensates first movers for externalities.

In his seminal book, "The Quest for Prosperity," Justin Lin proposes the new structural economics (NSE) model (Lin 2012a). This model argues that the best strategy for a country to catch up is to develop industries at any specific time according to the country's comparative advantage determined by its factor endowments at that time. In his words:

*Economic development is a continuous process that gives each country, following its comparative advantage, the opportunity to improve and adjust its optimal economic structure at each development level. That process makes countries competitive and able to benefit from advantages of backwardness in technological, industrial, and institutional innovations – and to upgrade their endowments and industrial structures in the fastest possible way.<sup>9</sup>*

Lin emphasizes the role of government policy in structural transformation, drawing lessons from the development history since the end of World War II. He elaborates that the key to successful structural transformation is to choose a path that helps policymakers in developing countries identify the industries in which their economies may have **latent comparative advantage (LCA)** based on their endowment structures (that is, what they have) and remove binding constraints to facilitate private firms' entry into and operation in those industries.<sup>10</sup>

<sup>9</sup> Justin Y. Lin, 2012a, "The Quest for Prosperity: How Developing Economies Can Take Off"; (Princeton Press, 2012), pp.118-119.

<sup>10</sup> Ibid. p.242

latent comparative advantage may not be competitive today in a given country due to high transaction costs arising from inadequate infrastructure, poor logistics networks, and a challenging business environment. But it is one that could become competitive based on

its factor costs of production, which are implied by the country's income level and endowment structure. The successful path that the Republic of Korea followed in upgrading its industrial structure is a case in point, Box 1.

#### Box 1: The Republic of Korea — A Successful Case for Industrial Upgrading

The industrial upgrading of the Republic of Korea since 1962 is often considered a big success in broad-based pro-poor growth and income generation. The share of manufactures in GDP rose from merely 9% in 1953 to 30.1% in 1988, while that of the agriculture and mining sectors shrunk to single digits in the 1990s.

During this phase of industrial upgrading guided by export-oriented industrialization, the benefits of economic backwardness were exploited with sequential structural transformation from labor-intensive industries (i.e., wood manufactures and clothing) to capital-intensive industries (i.e., machinery and transport equipment). Until the early 1980s, labor-intensive products, primarily wood manufactures and clothing, had a combined share of about 60% in total exports. Since 1983, capital-intensive machinery and transport equipment products have accounted for the majority of exports. After the mid-1990s, their share exceeded half of total exports.

Republic of Korea's success was due in part to its adherence to its comparative advantage, which evolved over time with changes in its factor endowments, suggesting flying geese catch-up patterns. The Republic of Korea successfully moved up the value chain from exports of clothing to exports of textiles and to production of synthetic fibers (Lim 2011). In the electronics industry, comparative advantage recorded by the net trade index reveals industrial upgrading from simple goods to more sophisticated goods. Starting with the assembly of radios from imported components, the Republic of Korea obtained a comparative advantage in the home appliance industry (World Bank 1987). The country started to gain comparative advantage in electronic parts and components (i.e., transistors and semiconductors) in the mid-1980s, and later on in information, communication, and industrial electronics in the 1990s. In terms of the inter-industrial dimension, the Republic of Korea maintained a high revealed comparative advantage (RCA) in clothing exports until the end of the 1960s, followed by footwear until the 1980s. In the 1990s, it rapidly developed a high RCA in electronics exports, which was more recently replaced by transport equipment exports.

Korea's upgrading process also had an international dimension involving the **relocation of an industry from one country to another**. For example, it gained a sharp increase in RCA in footwear in the mid-1960s partly as a result of manufacturing alliances and technology cooperation between local and Japanese firms prompted by increasing wages in Japan which had been weakening the latter's competitiveness in the sector. A steep decrease in its RCA in the mid-1990s indicates that higher wages in the Republic of Korea had led to a relocation of factories to the PRC, Indonesia, and Viet Nam (The Committee for the 60-year History of the Korean Economy 2010). Since the end of the 1980s when a liberal policy was adopted, outward foreign investment from the Republic of Korea's labor-intensive industries has increased, with its main destination being Asian countries.

Source: Chandra, Lin and Wang 2013, ADR, v.30 no.1.

An "**international**" orientation for being outward looking is also essential. In a rapidly globalized economy, capital, goods and services move increasingly freely around the world. Production is more often than not carried out along international value chains, with components of finished goods being produced where they can be done so most efficiently. Thus, countries having an inward-looking strategy may not go very far. Countries striving to excel in identified market niches in the global economy; making best use of FDI; and promoting other forms of domestic and international cooperation will have a much better chance to succeed. This is especially true for small-sized economies.

It is not an easy task for governments to pursue the NSE model, given the poor track records of so many countries that have embarked on the path of industrialization. But it is certainly not an impossible one, given that Brazil, China (Box 2), Finland, Indonesia, Ireland, Japan, the Republic of Korea, Malaysia, Mauritius, Singapore, and Viet Nam recorded rapid growth in the second half of the twentieth century. Policymakers there designed and successfully implemented an industrialization process that has transformed their subsistence, agrarian economies and lifted several hundred million people out of poverty in the space of one generation.

## Box 2. China: Industrial Upgrading with poverty reduction, and opportunities from industrial relocation

China's success over the past 3 decades is the result of a two-pillar strategy: (i) adopting a dual-track approach to reforms, giving transitory protection to capital-intensive sectors that are comparative advantage defying, and liberalizing entry to labor-intensive sectors, that are comparative advantage following, thereby achieving stability and dynamic transformation simultaneously; and (ii) as a latecomer, choosing an economic development strategy that tapped into the potential advantage of backwardness along the lines of the flying geese pattern.

Industrial development in China, after reforms in 1979, has basically followed the country's comparative advantage. China was an exporter of primary products. In 1984, nearly 50% of its exports were crude oil and agricultural products. The first industrial upgrade from resources to labor-intensive products happened in 1986, when exports of textiles and clothing exceeded crude oil. The second upgrade happened in 1995, when Chinese exports of machinery and electronics exceeded textiles and clothing. This indicated that the country had started the transition from exporting traditional labor-intensive products to non-traditional labor-intensive products (i.e. those produced in assembly lines). The third upgrade happened after 2001, following China's accession to the World Trade Organization, locking in liberalization of trade in goods and services and making its laws and regulations conform to international standards. Regulatory reforms led to rapidly rising FDI inflows, bringing in new technologies and processes. As a result, the level of product sophistication increased.

Inward FDI played a critical role in the PRC's industrial upgrading. Its experience shows

- Inward FDI helps industrial upgrading: Many studies have pointed out that foreign investors are quick to identify a country's comparative advantage and serve as the most dynamic forces in industrial development and upgrading. Foreign investors can serve as identifiers of growth sectors, providing advanced technology and helping reduce first-mover risks and transaction costs when firms attempt to enter a new product or market. The PRC's capital-labor ratio in the manufacturing sector increased from 0.4 in 1985 to nearly 4.0 in 2007. Foreign-invested enterprises accounted for about 20% of tax revenues, 55% of imports and exports, and over 80% of high-tech exports in 2011), according to the Ministry of Commerce.
- In the period from 2005–2009, FDI inflows have been shifting towards higher value-added products, parts and components, and subsectors including services. Investors from Taiwan, China have provided technology and managerial skills that firms need in electronics and information technology. These firms are moving the manufacturing of electronic parts and components to the PRC. Wholesale and retailing have shown the fastest growth rate in recent years, as the PRC moved toward promoting domestic consumption.
- The process of three-stage upgrading shows the importance of learning-by-exporting from lower-end manufactured goods to higher-value-added goods and subsequently to services. Initial learning activities occurred within sectors, then gradually spilled over horizontally to new sectors, and eventually diversified through outward FDI to other countries.

China is at a stage where the western countries and Japan had been during the 1970s and where other Asian economies (Hong Kong, China; the Republic of Korea; Singapore; and Taipei, China) found themselves in during the 1980s. As labor-intensive industries matured, wages increased, and firms moved into more technologically sophisticated industries in accordance with the upgrading of the underlying endowment structure. In the western countries and the Asian Tigers, as the capital intensity of production in manufacturing increased, there was an overall contraction in manufacturing jobs and a reallocation of resources towards the services sectors. For example the share of manufacturing employment in the US reduced from 17% in the 1980s to 9% in 2004, in Japan from 18% to 12% during the same period. When labor-intensive industries in the high-wage countries shut down, their jobs relocated to other lower-wage economies such as the East Asian tigers.

Evidently, rising wages in labor-intensive industries have already triggered relocation of low wage jobs overseas. Many lower-wage countries in China's neighborhood such as Cambodia, Lao People's Democratic Republic, and Viet Nam, and even Bangladesh are emerging as the new growth nodes for garment, footwear, and other labor-intensive industries. The number of jobs each country can attract depends on the incentives package it offers to investors.

### Huge Opportunities from China's Relocation of Industries to low-income countries

Currently, the PRC employs about 85 million workers nationwide in its manufacturing sector. Rising wages will force the PRC to upgrade to higher value-added and more capital-intensive and technology-intensive sectors and to relocate jobs in the existing sectors to countries that have a lower wage rate. India currently employs about 9 million workers and Brazil employs about 13 million. These emerging market countries employ about 120 million workers whose jobs could be relocated to other developing countries in the coming decades.

Source: Chandra, Lin and Wang 2013.



### III. GIFIUD: AN ANALYTICAL FRAMEWORK

#### 3.1 Historical Evolution

Lin's NSE approach has generated a great interest in the world development community. Many world prominent economists and development specialists have contributed their inputs to the NSE framework development since 2012.<sup>11</sup>

This new development thinking is also gaining traction among government policy makers in the developing world. However, there is an intense debate among economists whether targeting sectors or "picking winners" is a good idea for developing countries facing the challenges of weak institutional capacity and poor governance. As some scholars would caution, "[t]he first problem for the government in carrying out an industrial policy is that we actually know precious little about identifying a 'winning' industrial structure. There is not a set of economic criteria that determine what gives different countries preeminence in particular lines of business."<sup>12</sup>

In recent years, several economists have initiated new approaches intended to solve the issue of identifying the sectors with latent comparative advantage for a country, with only limited success:

- Growth Diagnostic Framework suggested by Hausmann and Rodrik et al (2008) focuses on binding constraints instead of a whole set of "first best" institutions (as the investment climate approach is). However, it relies on the survey of existing firms, which may be in a "wrong" sector as a result of "wrong" interventions in the past, and no firm would exist in the new industries where the country may have latent comparative advantage either.
- The "product space" suggested by C.A. Hidalgo, B. Klinger, A.-L. Barabási, R. Hausmann (2007) is based on the fact that *firms in existing sectors* own **tacit knowledge** that is helpful for successful upgrading in the product space. However, some sectors where the country may have latent comparative advantage may be totally new to the country as well. Moreover, tacit knowledge can be "imported" and transmitted through training and learning from senior workers in the foreign invested enterprises.

On the other hand, Lin and his colleagues consider that identifying the right target country (or countries) to follow and their industries with good potential for growth and competitiveness is a precondition for successful catch up (Lin and Monga 2010). Why?

First, governments always have limited resources to invest in hard and soft infrastructure, which are often sector specific. A developing country cannot be successful in all sectors. Successes are often found in individual sectors, such as textiles in Mauritius, apparel in Lesotho, cut flowers in Ethiopia, or gorilla tourism in Rwanda. For cut flowers, airport refrigeration facilities and regular flights are required to ship them to markets overseas, which are obviously different from the port facilities for Mauritius' textile exports. Government must therefore choose which infrastructure to improve and where to provide these services to facilitate private sector activities.

Second, identification is needed because industrial clustering is essential for economies of scale and to reduce costs. Specialization, agglomeration, and clustering are vital for reducing transaction costs in any given industry. Government needs to provide infrastructure services in certain locations or incentives for first movers in certain sectors; otherwise private firms may be spread too thinly over too many sectors. This would reduce the chances of these firms surviving and gaining competitive edge in the international market.

There are many examples of failures and successes in picking winners. Ireland has been both. In the 1950s, Ireland adopted an industrial policy called a "heavy state interventionist but hands-off approach", providing tax incentives, grants, and subsidies to encourage investments that targeted exports. But there were few takers and Ireland remained among Western Europe's poorest countries. In the 1980s, Ireland's Investment Development Authority started to pick winners — focusing on electronics, pharmaceuticals, software, and chemicals. It courted FDI in these industries from Germany, the UK, and the US, attracting nine of the world's top 10 pharmaceutical firms and 12 of the world's top 15 medical products companies. In addition to information and communications technology companies, leading e-business firms; among them, Google, Yahoo, eBay, and Amazon set up facilities in Ireland. The "Celtic tiger" became one of the most attractive destinations of migration from Eastern Europe (Lin 2012a, 153).

How best to identify the right target countries and the right target industries? Lin and Monga, (2010) provide the following six-step process, consisting of a "sector identification" formula, and five "sector facilitation/industrial policy" proposals.

11 See "New Structural Economics: A framework for Rethinking Development and Policy;" ed. by Justin Lin, 2012 (The World Bank. Washington DC)

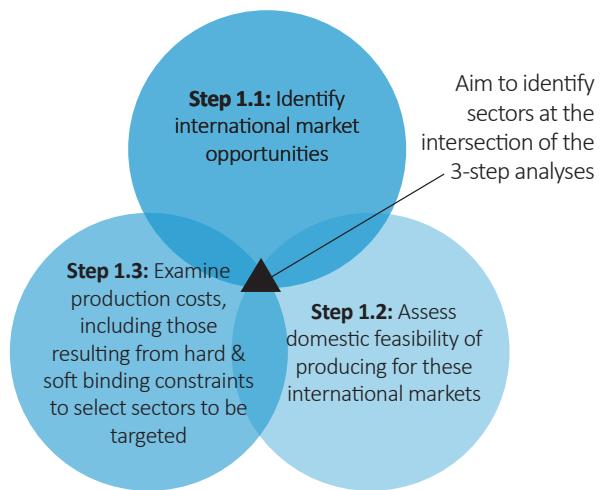
12 Charles Schultze 1983, "Industrial Policy: A Dissent", Brookings Review, October 1983, 3-y12.

- **Step 1: Choosing the right target country.** Policymakers should select dynamically growing countries with similar endowment structures and those with about 100% higher per capita incomes measured in purchasing power parity. They must then identify tradable goods and services that have grown well in those countries for the past 15–20 years. These are likely to be **new industries consistent with latent comparative advantage** in their own countries, as countries with similar endowments are likely to have similar comparative advantage. A fast-growing country that has produced certain goods and services for about 20 years will begin to lose its comparative advantage as wage levels rise, leaving space for countries with lower wages to enter those industries.
- **Step 2: Assisting domestic private firms.** If some private domestic firms are already present in those industries, these need tacit knowledge that lowers costs and makes them competitive (Hausmann et al 2013). Policymakers should identify obstacles preventing these firms from upgrading their products and barriers that limit entry to those industries by other private firms. Policies can then be implemented to remove the constraints and facilitate entry.
- **Step 3: Attracting global investors.** In the cases of industries in which no domestic firms are present, policymakers should try to attract FDI from countries listed in the first step or from other higher income countries producing those goods. Such foreign investors may well possess the general and tacit knowledge on certain products in their design, production technology, and their supply chain and distribution channels. Governments should also set up incubation programmes to encourage start-ups in these industries.
- **Step 4: Scaling up self-discoveries.** In addition to the industries identified in the first step, governments should pay attention to spontaneous self-discovery by private enterprises and support the scaling-up of successful private innovation in new industries. Due to rapid technological changes, many new opportunities arise—opportunities that would not have existed a decade or two ago, as those industries did not exist in the rapidly growing comparator countries. Examples include mobile phones and related e-services, social media, and green technologies.
- **Step 5: Recognizing the power of industrial parks.** In countries with poor infrastructure and an unfriendly business environment, the government can set up special economic zones or industrial parks to help overcome barriers to firm entry and foreign investment. These zones create preferential business environments that most governments, constrained by low budgets and capacity, are unable to implement quickly economy wide. Establishing industrial parks or zones can also facilitate the formation of industrial clusters and hence reduce production and transaction costs.
- **Step 6: Providing limited incentives to the right industries.** Policymakers can compensate pioneer firms in the industries identified earlier with time-limited tax incentives, co-financing for investments, or providing access to foreign exchange. This is to compensate for the externalities created by first movers and to encourage firms to form clusters. Because the identified industries are consistent with the country's latent comparative advantage, the incentives should be limited in both time and financial cost. To prevent rent seeking and political capture, governments should avoid incentives that create monopoly rents, high tariffs, or other distortions. Moreover, incentives should be linked to performance and be continuously evaluated against stated objectives (Lin 2012b).

### 3.2 Overview of Interactive, Three-Step Sector Identification Analysis

Sector identification (Step 1) is the most critical step under GIFIUD. Picking right, all steps that follow will support the industrial sectors that are likely to render maximum results; picking wrong, all the hard work and valuable resources to be deployed later may be wasted, and may even be harmful to long term prospects of the economy. The “right” sectors are those that best match the given country’s latent comparative advantage, and have the best opportunity to succeed in the international market.

Under GIFIUD and for the purpose of operationalizing sector targeting based on latent comparative advantage, the most critical of these steps on sector selection is unpacked into three sub-steps as illustrated in Figure 1. As can be seen, the three sub-steps interact with each other. The resultant central triangle where all three intersect is likely to be where the best opportunities exist for the country.

**Figure 3: Three-step Analyses for Sector Identification**

In **Step 1.1**, the objective is to identify international market spaces that are opening up due to loss of competitiveness of some types of production in what we would call “comparator or targeted countries.” Specifically, this step starts with desk research on economic growth data to select a group of countries, which will be used for international benchmarking for the pilot country. The comparator countries selected should meet the following criteria:

- 1.** *As we are aiming to identify “latent” comparative advantage, comparator (target) countries should have similar endowment structures with the country, measured by income level in purchasing power parity, and a development level that is not much more advanced than the country.*
- 2.** *A good measure is to identify comparator countries based on the above criteria is that they either have a current per capita income of about 100-300 percent higher than the country; or, their per capita income levels were about the same as that of the country 15-20 years ago.*
- 3.** *A second issue that is critical when selecting comparator countries is to focus on economies that have been growing dynamically and consistently. Thus, we search for those economies that have registered high growth rates consistently for the past 15-20 years.*

The use of GDP as a criterion for aiming for “similar endowment structure” when selecting “comparator countries” is based on the fact that a lower-income country with abundant labor or natural resources and scarce capital will have comparative advantage and be competitive in labor-intensive or resource-intensive industries. Similarly, a high-income country with abundant capital and scarce in labor will have comparative advantage and be competitive in capital-intensive industries.

Therefore, “the optimal industrial structure in a country, which will make the country most competitive, is endogenously determined by its endowment structure. For a developing country to reach the advanced countries’ income level, it needs to upgrade its industrial structure to the same relative capital-intensity of the advanced countries”<sup>13</sup>. Accordingly, differences in factor endowment structure imply different development potential for countries at different income levels.

The criterion “dynamically growing” is as important. Endowment structures do change over time. As a country develops, its income level rises; and as its income level rises, its comparative advantage shifts. Understanding where you currently are and where you want to be next is strategically important for development policy making. Aiming too high, a country can be led by unrealistic expectations without being supported by its realistic resource base. Setting the target too low is also dangerous, as it can prevent the country from achieving its best potential. The best option for a country to achieve quick and consistent economic catch-up is to target other countries that are of similar endowment structure as its own, but are a few points ahead of it.

This gradualist catching-up approach, sometimes known as the “flying geese” strategy, is empirically supported by the industrialization pattern observed in the post-World War II world history. For instance, in the 1950s, Japan at the beginning of its economic catching-up process, had per capita income level at 35% of that of the United States’, its target country for catch-up, Table 2. In the 1960s, Republic of Korea had an income level of 25% of Japan, which was its catch-up target country. Likewise, when China first embarked on its catching-up journey, in the 1980s, its income level was about one quarter of one of its major “comparator countries,” i.e., the Republic of Korea.

<sup>13</sup> Lin, J. Y., and C. Monga 2010, “Growth Identification and Facilitation: The Role of the State in the Dynamics of Structural Change”, Policy Research Working Paper 5313, World Bank, May, Washington, D.C. p. 4.

**Table 2: Catch-Up in the Pre-War, and Post-War Era**

	Europe targeted the UK, gaps were small		Japan targeted Germany during Meiji Restoration			Japan targeted the US after the WWII			
	per capita GDP by 1990 International GK dollars								
	1870	% of UK	1890	1900	% of Germany	1950	1960	% of the US	
France	1,876	59%	2,376	2,876		5,186	7,398		
Germany	1,839	58%	2,428	2,985	100% -	3,881	7,705		
U.K.	3,190	100%	4,009	4,492		6,939	8,645		
United States	2,445	77%	3,392	4,091		9,561	11,328	100%	
Japan	737		1,012	1,180	40%	1,921	3,986	35%	
	The East Asia NIEs (4 dragons) including S. Korea targeted Japan in the 1960-80s			China targeted the East Asian NIEs including S. Korea			Late comers started to target China after 2000		
	1960	1970	% of Japan	1980	1990	% of Korea	2000	2008	% of China
U.K.	8,645	10,767		12,931	16,430		20,353	23,742	
United States	11,328	15,030		18,577	23,201		28,467	31,178	
Japan	3,986	9,714	100%	13,428	18,789		20,738	22,816	
South Korea	1,226	2,167	25%	4,114	8,704	100%	14,375	19,614	
China	662	778		1,061	1,871	23%	3,421	6,725	100%
India	753	868		938	1,309		1,892	2,975	44%
Viet Nam	799	735		757	1,025		1,809	2,970	44%

Source: Chandra, Lin and Wang 2013. Authors calculation based on Maddison dataset.

Note: Targeted countries in red. Following countries are in blue.

A practical procedure for identifying “comparator countries” that a country can target for “catching up” is illustrated in Box 3 for the case of Senegal, and results are shown in Tables 3 and 4.

### Box 3: Identifying comparator countries of similar endowment structure – the Senegal Case

Identification of correct “comparator countries” which Senegal can target and follow by using GDP data can be done through the practical procedure below:

- 1) Extract GDP per capita growth rates, and GDP growth rates from the World Bank’s World Development Indicators (WDI) database, and population and GDP Purchasing Power Parity (PPP) per capita data (WB’s WDI database has data for 214 countries);
- 2) Apply Filter 1, if the country has too many missing values in growth rates (Number of observations<15), it is eliminated from the analysis;
- 3) Apply Filter 2, population is an important endowment; it is used as a filter. If the pilot country’s population is bigger than 5 million, 5 million is used as a benchmark. If a small country with a population smaller than 5 million, then it is eliminated from the analysis, (Senegal’s population is 14 million. Small island countries are not comparable to Senegal);
- 4) Apply Filter 3, GDP PPP per capita can be considered the best indicator of endowments. If the GDP PPP per capita is higher than \$15,000, they cannot be a good comparator for Senegal with a PPP per capita income of \$2,170 in 2013, hence countries having high income (>\$15,000 are eliminated from the analysis);

5) Next, the longest time series are shortened, from the 1960s to between 1990 and 2013, and the average GDP per capita growth for the period is calculated (because the focus is on **long-term and stable growth** for 20 or more years); at the same time, the standard deviation of the GDP per capita growth rate is also calculated. If the standard deviation is larger than 11, then these countries are also eliminated, since this level of standard deviation indicates an unstable growth pattern;

6) Then, the remaining data for 113 countries is sorted by the average growth rates for the period 1990-2013, and ranked from the highest growth rate to the lowest growth rate to produce Table 3.

Out of the countries in Table 3 below, China, India and Viet Nam are selected as comparators based on their ranking in GDP per capita growth rates in 1990-2013. Cambodia and Bangladesh are both dynamically growing, but their per capita income levels are not up to the criterion 1 “with per capita income 100% higher” than that of Senegal’s. Thus, they are not selected as comparators, but they can be considered in a peer group.

Source: Yan Wang and Justin Lin, NSD/PKU

**Table 3: Identifying comparator countries that Senegal can target**

Country	Rank	GDP per capita growth (1990-2013)	Selected or not, why PPP
China	1	8.85	Selected, dynamic, and its experience 15-20 years ago is relevant to Senegal (at 188% of Senegal’s income level in 2000)
Myanmar	2	7.06	No, too many missing values, not stable
Cambodia	3	5.56	No, it is dynamic, but per capita income is not up to the criterion 1: 100% higher than that of Senegal. It is considered a peer
Viet Nam	4	5.39	Selected, dynamically growing
India	5	4.69	Selected, dynamically growing
Lao PDR	6	4.66	No, a landlocked country
Sri Lanka	7	4.65	No, an island country
Korea, Rep	8	4.63	No, high-income country=\$32,708
Tajikistan	9	3.92	No, higher income=\$16,598
Thailand	10	3.82	No, higher income=\$13,931
Turkmenistan	11	3.82	No, higher income=\$13,554, landlocked
Chile	12	3.76	No, higher income=\$21,764
Singapore	13	3.73	No, high income country=\$76,236
Bangladesh	14	3.72	No, per capita income is not up to the criterion 1: 100% higher than that of Senegal. It is considered a peer.
Malaysia	15	3.70	No, higher income=\$22,555
Poland	16	3.68	No, higher income=\$22,513
Mozambique	17	3.64	No, income lower than Senegal
Indonesia	18	3.63	No, a resource-rich country

Source: Authors' calculation based on World Bank WDI Data, accessed 01/27/2015

**Table 4: Selection of Target/Comparator Countries for Senegal and Peers**

Country	GDP per capita, PPP (Constant 2011 Int'l \$)						GDP per capita annual growth	GDP Annual Growth
	Yr1990	% of Senegal	Yr2000	% of Senegal	Yr2013	% of Senegal	1990-2013	1990-2013
Senegal	1856	100	1916	100	2170	100	0.52	3.33
Viet Nam	1501	81	2650	138	5125	236	5.39	6.83
India	1812	98	2600	136	5238	241	4.69	6.39
China	1488	80	3609	188	11525	531	9.03	9.92
<b>Peer Countries</b>								
Bangladesh	1239	67	1606	84	2853	131	3.69	5.44
Cambodia	1004	54	1368	71	2944	136	5.56	7.73

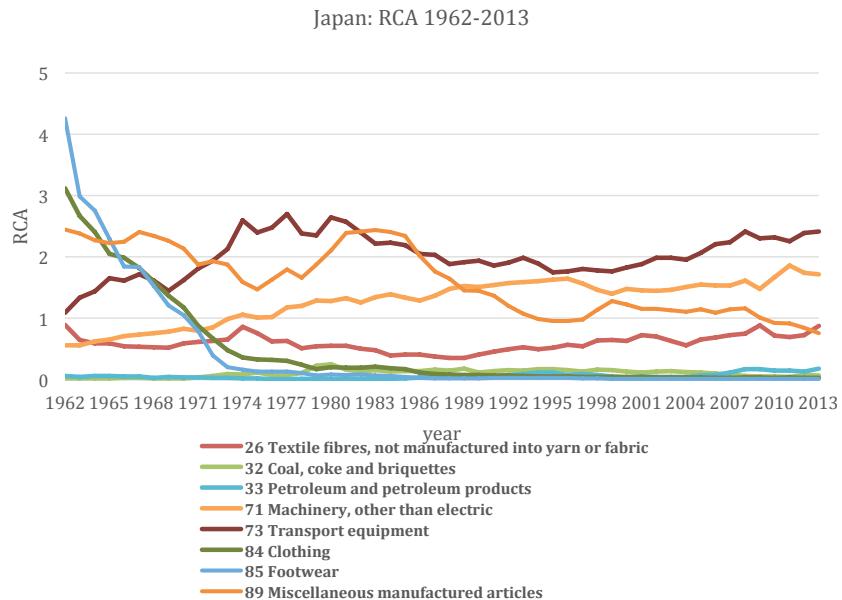
Source: Authors' calculation based on World Bank WDI Data, accessed 01/27/2015.

Having identified the right “comparator countries”, we focus on the “performance of the comparator countries’ export products over the past 15-20”, using a well-established criterion such as the revealed comparative advantage (RCA).

RCA is a useful concept based on Balassa (1965). It measures whether the country has revealed comparative advantage in a commodity that the country is already exporting. RCA shows existing comparative advantage in a product at any point in time and it will change over time. Thus, it is possible to identify certain tradable goods, which have performed well in international markets over previous periods, but have begun to lose competitiveness in that comparator country. This implies that some international market space for these

tradable goods may be opening up. In other words, “sunset” industries detected in a comparator country could well become “sunrise” industries for other countries. Additionally, when such shifts take place, these industries of the comparator countries are likely to look for relocating to new locations that will offer continued competitive conditions, for instance, with lower production costs, thus providing a source of FDI for countries interested in targeting those sectors.

Economists have used RCA analysis to explain the flying geese pattern and global industrial relocation. It is found that in earlier stages of development, latecomers are likely to engage in primary product exports and labor intensive light manufacturing. Figures 4, 5 and 6 provide several examples.

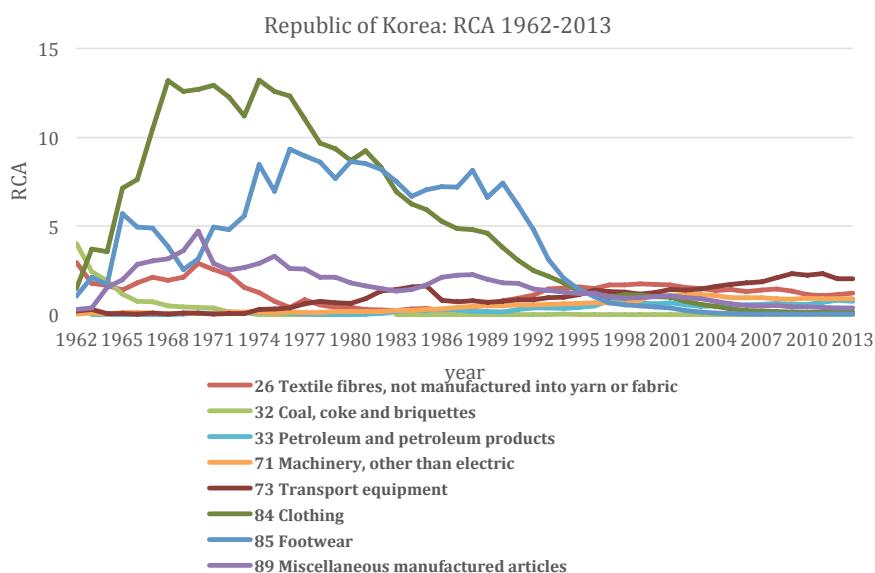
**Figure 4: Japan's Revealed Comparative Advantage: declined in labor-intensive sectors**

Note: RCA = share of an industry in the economy's exports / its share in global exports.

Source: Authors' calculation based on UN Comtrade data, SITC rev.1, 2-digits.

Before World War II, Japan was a country of labor-intensive industries, with textiles and other light industrial goods accounting for 60%–75% of its exports. But things started to change in the post-war era. By the 1960s, at a GDP per capita level that is about 35% of the US, Japan was targeting more capital-intensive industries that were moving out of America. Historical labor statistics show that a rising share of labor in Japan's manufacturing sector coincided with a declining share of labor in the US' manufacturing sector.

In the 1970s, Japan's RCA in labor intensive industries such as clothing and footwear sectors declined significantly, Figure 4, and its RCA in heavy manufacturing sectors, notably machinery and automobiles, was rising. In the 1980s and 1990s, just as the US was upgrading its industries, Japan acquired shares in the home appliance, electronics and computer markets. Similar flying-geese patterns have been observed in the Republic of Korea (Chandra, Lin and Wang 2013), Figure 5.

**Figure 5: Republic of Korea's Revealed Comparative Advantage: declined in labor-intensive sectors**

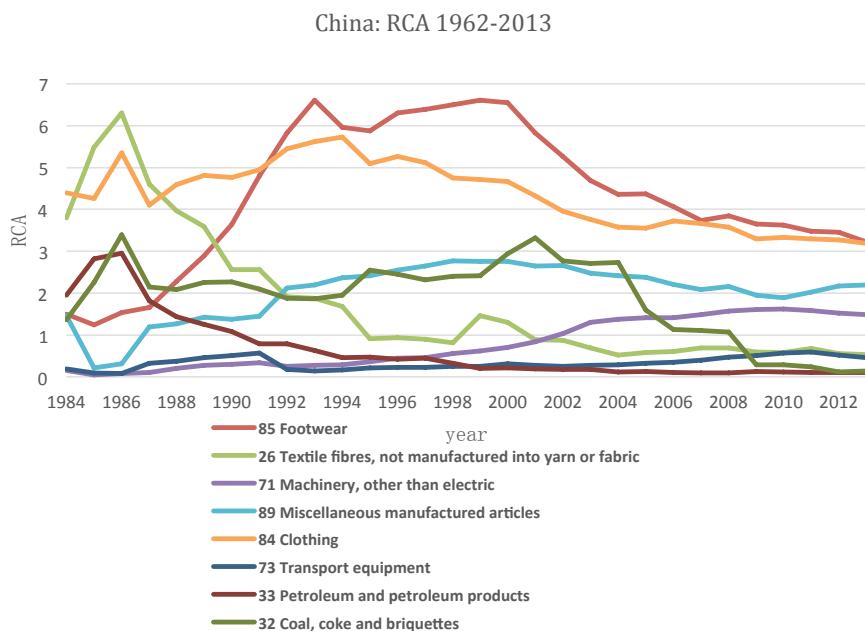
Note: RCA = share of an industry in the economy's exports / its share in global exports.

Source: Authors' calculation based on UN Comtrade data, SITC rev.1, 2-digits.

China is at a stage now where the western countries and Japan had been in the 1970s, and Korea, Taiwan, and Singapore in the 1980s with RCAs declining in some labor intensive sectors, Figure 6. As labor-intensive industries matured, wages increased, and firms moved into more technologically sophisticated industries in accordance with the upgrading of the endowment structure. China's labor costs are rising rapidly, for example, from an average of \$150 per month in 2005, to \$500 in 2012, and over \$600 in coastal regions in 2013 (growing at the rate of 15% annually plus currency appreciation of nearly

3%). More Chinese enterprises facing the pressure of seeking low-cost locations are moving inland or "going global". China has an estimated 85 million workers in manufacturing, most of them in labor-intensive sectors, as compared to 9.7 million in Japan in 1960 and 2.3 million in Korea in 1980. The reallocation of China's manufacturing to more sophisticated and higher value-added products and tasks will open great opportunities for labor-abundant, lower income countries to produce the labor-intensive light-manufacturing goods that China leaves behind. (Chandra, Lin, and Wang, 2013)

**Figure 6: China's export sectors that are declining**



Note: RCA = share of an industry in the economy's exports / its share in global exports.

Source: Authors' calculation based on UN Comtrade data, SITC rev.1, 2-digits.

RCAs in comparator countries are calculated using the formula explained in Box 4. We calculated RCAs for 213 countries in the world for many product groups from 1962 to 2013. If the RCA is above 1, the product group is considered to have revealed comparative advantage.

As RCA changes over time, we identify those sectors with RCAs that decline to under 1 in the comparator countries, and consider these product groups as experiencing "declining competitiveness in the comparator countries."

#### Box 4: Revealed Comparative Advantage

Revealed Comparative Advantage (RCA) is a useful concept based on Balassa (1965) to measure whether the country has "existing"; i.e. revealed comparative advantage in a commodity that the country is exporting. It is calculated as follows:

$$RCA_{ij} = \frac{x_{ij}/X_{it}}{x_{wj}/X_{wt}}$$

Where  $x_{ij}$  and  $x_{wj}$  are the values of country  $i$ 's export of product  $j$  and world exports of product  $j$  and where  $X_{it}$  and  $X_{wt}$  refer to the country's total exports and world total exports. Thus, if  $RCA < 1$ , the country has a revealed comparative disadvantage in the product, whilst if  $RCA > 1$ , the country has a revealed comparative advantage in the product.

Source: World Integrated Trade Solutions (WITS) dataset and Annexes.

Based on the RCA data, a simple time-series regression is run to identify those “tradable sectors” that have “run out of steam” in comparator countries, and those industries that are likely to relocate to other countries. This is done by regressing RCA on time /year to see rising or declining trends:

$$RCA_{ij} = a + b * year + \varepsilon_{ij}$$

where i is the country code, j is the commodity/sector code at SITC 2-digit level and  $\varepsilon$  is the error term, b is the slope coefficient – a negative value of b indicates a declining RCA.

Based on this regression, further screening along the following lines becomes possible:

- If a sector (or subsector)’s coefficient b is positive/negative and significant at 1% significance level, the sector is considered rising/declining significantly;
- Magnitude should be taken into consideration. Sectors rising/declining with the value of coefficient b greater than 0.03 are included and others excluded;
- Curve shapes over time are important. A bell shaped curve over a meaningful period of time indicates sustained growth earlier, followed by a decline later;

**Table 5: Sectors with international opportunities and aligned with Senegal’s RCA**

Product code	Product description	Viet Nam’s declining sectors	China’s declining sectors	India’s declining sectors
<b>3</b>	Fish and fish preparations	1	1	1
<b>5</b>	Fruit and vegetables	1	1	1
<b>22</b>	Oil seeds, oil nuts and oil kernels	1	1	1
<b>27</b>	Crude fertilizers and crude mineral	0	1	1
<b>29</b>	Crude animal and vegetable material	1	1	1
<b>61</b>	<b>Leather, leather products</b>	<b>0</b>	<b>1</b>	<b>1</b>
<b>83</b>	<b>Travel goods, handbags and similar products</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>84</b>	<b>Clothing</b>	<b>0</b>	<b>1</b>	<b>1</b>
<b>85</b>	<b>Footwear</b>	<b>1</b>	<b>1</b>	<b>1</b>

Note: Senegal is doing well already in agri-business and in the area of minerals processing; hence these sectors are not selected for quick wins in this Study, which focuses on sectors marked in blue.

The process described in Step 1.1 yields several candidate sectors that need to be further screened and prioritized based on the home country’s means and needs. This is the objective of **Step 1.2**. Several efforts are made in this step. The private sector capacity in the home country affect the country’s feasibility of entering into these new sectors identified in GIFIUD Step 1.1: whether the country has the needed endowment, raw materials and low-cost labor, whether these sectors are consistent with the countries comparative advantage, and whether there is a cluster of private enterprises that is producing them already but cannot export. This is also based on Ricardo Hausmann’s theory on tacit knowledge (Hausmann 2013).

- The sectors with a significantly declining RCA are assigned a value of 1, otherwise, it is assigned the 0 value;
- Last but not least, a criterion is used to show the “Common Set of declining sectors”. A sector is identified only if it is declining in “at least 2 comparator countries” in the regressions.

The resultant product groups/sub-sectors with dramatically declining RCAs for the comparator countries are likely to be the best target sectors for the pilot country looking for targeting appropriate industries to develop and expand.

Using Senegal as an example to illustrate, the following subsectors/product groups shown in Table 5 are considered to have good potential for Senegal to enter and develop, as there is market space and potential for relocation of firms from comparator countries to Senegal, together with their knowledge and access to international markets.

If the home country has relevant production capacity, a trend analysis should be undertaken to assess whether the industries are growing or declining. A home country with rapid growing capacity in an identified industry may indicate existence of improved domestic tacit knowledge. Tacit knowledge is knowledge that is difficult to codify, and thus cannot be easily transferred by textbooks or manuals. Many internalized and social skills (e.g. innovation and leadership) fall into this category. Tacit knowledge is a critical competitive niche since it cannot be simply copied. Even if an identified industry is declining the home country at least there may be some tradition in producing similar products. If no relevant capacity exists, a trend analysis at the sector level may still be useful: it helps to inform potential foreign investors who can bring in tacit knowledge.

A first investigation in Step 1.2, also primarily desk research, reviews the industrial data of the candidate sectors available for the given (home) country. UNIDO has, over the years, developed a comprehensive database showing manufacturing value added and employment share of each sector in a large number of developing countries, which provides a source of information for this analysis.

UNIDO's industrial statistics database contains data on manufacturing value added, employment, output, and indices of industrial production, wages and gross fixed capital formation since 1963, reported by National Statistics bodies. This database allows analysis by sub-sectoral and industrial levels for the given country. The UNIDO industrial statistics database presents manufacturing value added at the 2-, and 4-digit levels of ISIC<sup>14</sup>.

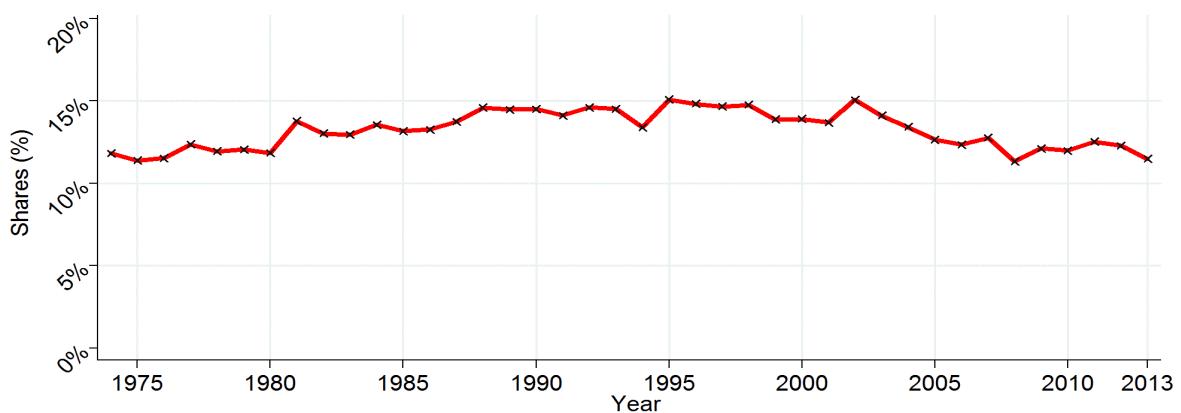
For instance, in the case of Senegal, Figure 7 presents the chart of the manufacturing sector's changing trend in terms of real manufacturing value added (rMVA) as a percentage of real gross domestic product (rGDP) over a period of 43 years from 1970 to 2013. The manufacturing value added (MVA) refers to the given country's manufacturing net output derived from the difference of gross output and intermediate consumption, while gross domestic product (GDP) provides an important point of reference for analysis of a country's overall economic development. Data for this was taken from United Nations System of National Accounts (SNA)<sup>15</sup>.

The real terms of rMVA and rGDP refer to quantity revaluation<sup>16</sup> on the base year of 2005. The share of rMVA to rGDP is a measure of industrial development.

$$rMVA Share_t = \frac{rMVA (\text{Constant 2005 US\$})_{t,j}}{rGDP (\text{Constant 2005 US\$})_{t,j}}$$

for  $t = \text{year}; j = \text{home country}$

**Figure 7: Real manufacturing value added shares to Real GDP: Senegal**



Source: UN Statistics Divison

MVA Shares: [(MVA (constant 2005 \\$) at time t) / (GDP (constant 2005 \\$) at time t)]

Second, Figure 8 presents the chart of the manufacturing sector's growth in terms of real manufacturing value

added (rMVA) over a period of 43 years from 1970 – 2013.

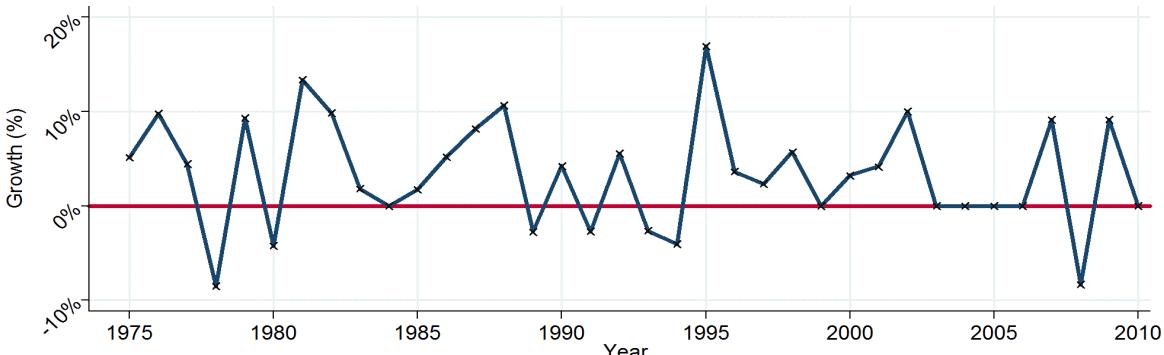
$$rmVAGrowth_t = \frac{[rMVA (\text{Constant 2005 US\$})_{t,j} - rMVA (\text{Constant 2005 US\$})_{t-1,j}]}{rMVA (\text{Constant 2005 US\$})_{t-1,j}}$$

for  $t = \text{year}; j = \text{home country}$

14 4-digit level of ISIC comprises 151 manufacturing industry groups.

15 The System of National Accounts (SNA) is the internationally agreed standard set of recommendations on how to compile measures of economic activity. The SNA describes a coherent, consistent and integrated set of macroeconomic accounts in the context of a set of internationally agreed concepts, definitions, classifications and accounting rules. In addition, the SNA provides an overview of economic processes, recording how production is distributed among consumers, businesses, government and foreign nations. It shows how income originating in production, modified by taxes and transfers, flows to these groups and how they allocate these flows to consumption, saving and investment. Consequently, the national accounts are one of the building blocks of macroeconomic statistics forming a basis for economic analysis and policy formulation. The SNA is intended for use by all countries, having been designed to accommodate the needs of countries at different stages of economic development. It also provides an overarching framework for standards in other domains of economic statistics, facilitating the integration of these statistical systems to achieve consistency with the national accounts.

16 Having the quantity component of a value and the price in the base period is substituted for that in the current period, multiplying the current period quantity by the base period (2005) price.

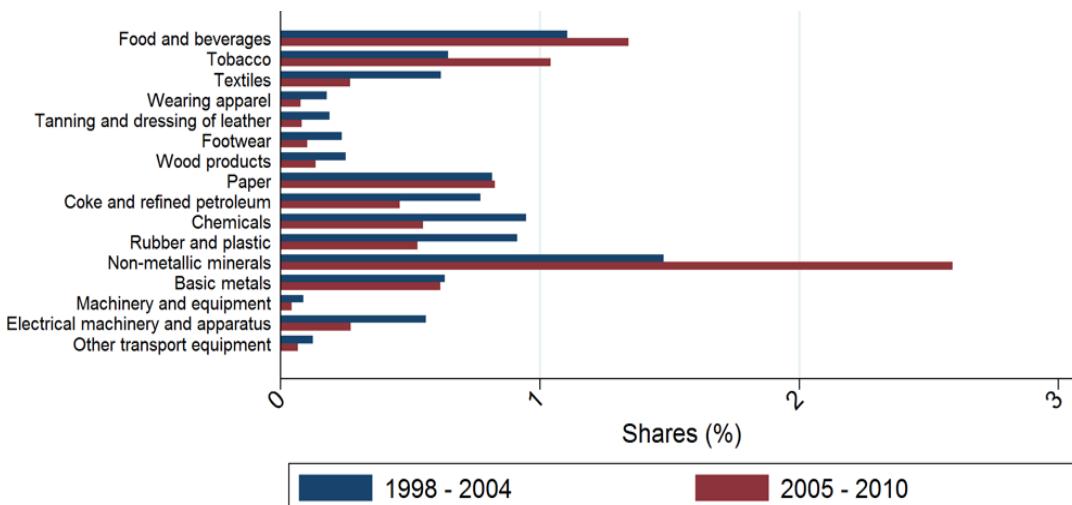
**Figure 8: Real manufacturing value added growth: Senegal**

Third, Figure 9 presents the bar chart of the identified sub-sectors/industries' real value added (rVA) average shares to real manufacturing value added (rMVA) under the time frames (1998-2004 & 2005-2010). The value added of sub-sectors/industries is a survey concept

that refers to the given industry's net output derived from the difference of gross output and intermediate consumption<sup>17</sup>. To adjust changes in price, the Indices of Industrial Production (IIP)<sup>18</sup> is used to calculate deflators (base year 2005) to construct RVA series.

$$\begin{aligned} rVA_{t,i,j} &= VA_{t,i,j} / \text{Deflator}_b2005_{t,i,j} \\ \text{Deflator}_b2005_{t,i,j} &= \frac{va_{t,i,j}}{va_{2005}} / IIP_{t,i,j} \\ rVAShare_{t,i,j} &= \frac{rVA (\text{Constant 2005 US\$})_{t,i,j}}{rmVA (\text{Constant 2005 US\$})_{t,j}} \end{aligned}$$

for  $t = \text{year}; i = \text{sub-sector/industry}; j = \text{home country}$

**Figure 9: Value added share of sub-sectors in total manufacturing value added: Senegal**

Source: UNIDO INSTAD REV 3, UN Statistics Division RVA shares: Real value added [(2005 constant / MVA (2005)) x 100]

17 Value added is calculated without deducing consumption of fixed assets represented by depreciation in economic accounting concepts. The social cost of producing value added is higher than that considered in the existing statistical practice, as it takes the depletion and degradation of natural resources into account. Depending on the survey method selected, industry value added may often refer to census value added which disregards the margin between the receipt from and payment for non-industrial services. Survey data on industry value added may also disregard the contribution of small and household-based manufacturing units, which are often excluded from the regular industrial survey programme. Estimates for such units are made separately for the compilation of national accounts. For these reasons, industry value added is used to measure the growth and structure, but not the level.

18 The Indices of Industrial Production (IIP, base year 2005) which show the real growth of the volume of production available at two-digit level of the International Standard Industrial Classification of All Economic Activities (ISIC) Revision 3 pertaining to the manufacturing sector, which comprises 23 industries.

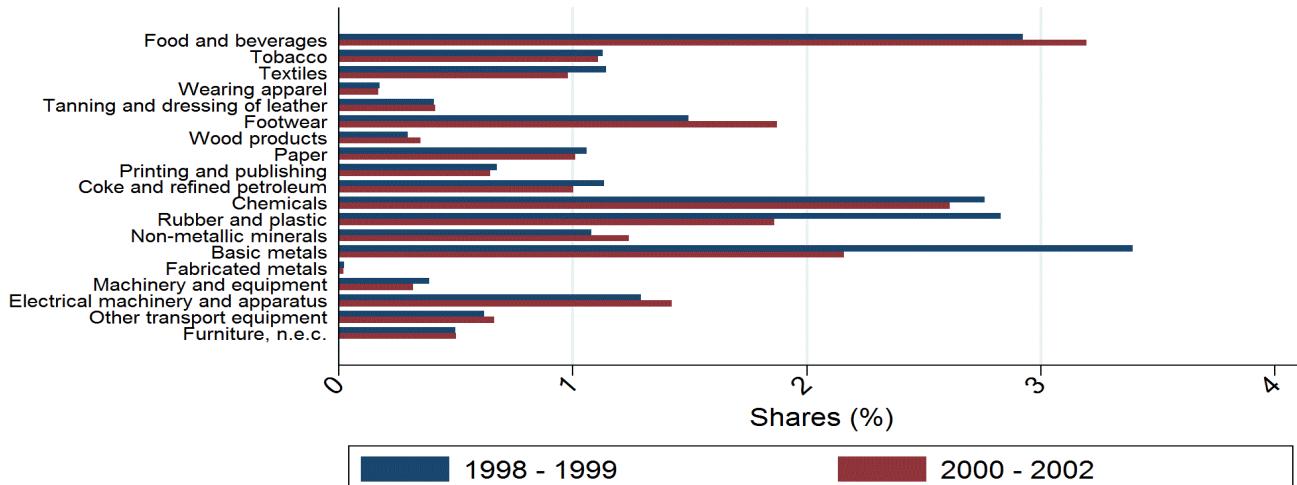
Finally, Figure 10 presents the bar chart of the identified sub-sectors/industries' formal manufacturing employment (EMP) average shares to total formal manufacturing employment (MEMP) under the time frames (1998-1999 & 2000-2002).

The number of employees (EMP) is including all persons engaged other than working proprietors, active business partners and unpaid family workers as well as employees.<sup>19</sup>

$$EmploymentShare_{t,i,j} = \frac{EMP_{t,i,j}}{MEMP_{t,j}}$$

for  $t = \text{year}$ ;  $i = \text{sub-sector/industry}$ ;  $j = \text{pilot country}$

**Figure 10: Employment shares of sub-sectors in total manufacturing employment: Senegal**



Source: UNIDO INSTAD REV 3, GGDC, KILM, and ILOSTAT EMP shares: [Formal employment / Manufacturing total employment formal] x 100

Supplementary industrial statistics gathered from the given (home) country could be used to further validate and update the picture. The results will show if there is a tradition of the industries identified by Step 1.1 for a given country, how these sectors have evolved over time, and where they stand now in the country's industrial structure and vis-à-vis its exports.

In some cases, especially with regard to lower income countries, existing industrial data may not be complete, or even absent. That is why a second effort under Step 1.2 is critical and involves fieldwork. This is not an unusual situation in low-income developing countries, including many in Africa.

Fieldwork should be conducted in close collaboration with the government counterparts and other local stakeholders. Through interviews with business leaders, industry associations, line ministries and agencies, the financial sector and local think tanks, all of which may have valuable information and views about the targeted sectors, an understanding and insight need to be formed. The information thus gathered may not be comprehensive or statistically significant, but helps gain a multi-faceted perspective, which

databases usually cannot capture. These are valuable inputs to further prioritize the sectors.

In the pilot case of Senegal, a small expert team conducted a two-week field investigation to gather supplementary data and inputs from local stakeholders. To maximize the efficiency of limited time and resources, the team focused on a narrow range of sectors identified through Step 1.1, shown in Table 5. The team interviewed existing domestic and foreign investors, business associations, and relevant government organizations, to gather the information. By mobilizing local partners, the team prepared specific "sector briefs" with insights of the history and current issues of the identified sectors. The findings validate the research results in general, and, in many cases, update important cost information (Step 1.3) that are not captured by the existing data.

**Step 1.3**, following the findings and observations of Steps 1.1 and 1.2, aims to investigate the production costs for sectors under consideration in the given country. Production costs are among the most important considerations of foreign and domestic investors when deciding whether or not to invest in a certain industry in a

<sup>19</sup> The figures reported refer normally to the average number of persons engaged during the reference year, obtained as the sum of the "average number of employees" during the year and the total number of other persons engaged measured for a single period of the year. However, home workers are excluded. The concept covers working proprietors, active business partners and unpaid family workers as well as employees.

given country. Moreover, production costs are comparable. In a globalized market, investors usually have more than one choice when seeking locations for their investment. In recent years, especially, countries including many lower income countries in South Asia, Africa and elsewhere, are stepping up their efforts to attract investment. Many are offering similar or better conditions to compete for the same international market space and FDI sources. To win its position in this competition, the given country must understand its relative strengths and weaknesses as a production site, and know what to do about them.

It is therefore very useful to start with a production cost comparison in Step 1.3. Gathering data needed for such a cross-country comparison can be time-consuming, but possible. It requires effort to draw from various studies conducted by national and international organizations.

Furthermore, learning from the industrial communities and the business intelligence sources on the ground will often lead to more accurate and updated business cost information. Initially, the information compiled may lack specificity and be limited to a few countries; but overtime, this knowledge and information can be accumulated based on systematic and consistent efforts.

For the purpose of GIFIUD diagnostics, production costs include those of the factors of production (i.e., labor, land and capital), taxation and other operational (transaction) costs incurred by a business (e.g. the price of inputs, electricity, water, telecom, transportation

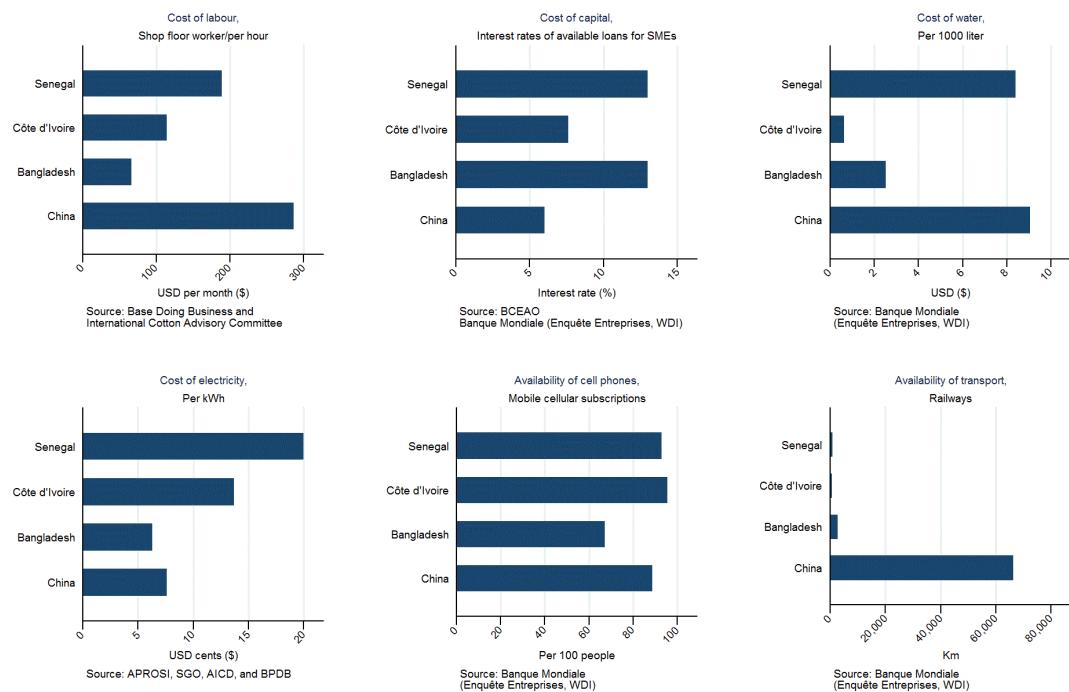
and trade logistics). These data will also reveal critical production constraints to domestic industrial upgrading and diversification, or to the introduction of foreign direct investment.

In many lower-income countries, consistent and reliable statistics on these costs are not available. Where such data exist, they are more often in aggregates rather than by sector and sub-sector.

Hence, data collection under this sub-step can be challenging. Efforts should be made to extract these types of data from sources such as the following: the World Bank's World Development Indicators and the Enterprise Surveys as well as country investment climate assessment reports. Similar data may also exist in other sources, such as the US Bureau of Labor's International Labor Comparison Programme database. Given the limitations, field visits should be used to verify reported data and collect further information. Customized mini business surveys and well-structured interviews with business managers are probably needed.

In the case of Senegal – again using it as an illustration – sector based production cost data is not readily available in any one statistics book. In this case, cost information extracted from various domestic and international organizations helped the team to put together an indicative picture comparing the key production cost elements of Senegal with those of potential competing countries.

**Figure 11: Operating Cost Comparison: Senegal, Côte d'Ivoire, Bangladesh and China**



Often, the general cost information is not enough for the investors in the targeted sectors. For instance, for those interested in labor-intensive production, more detailed labor cost assessment, including wages, benefits and other related labor costs, is critical. In the case of Senegal, the team made a special effort to investigate labor costs in more detail through company interviews. Based on the information gathered on the ground, the team was able to put together a more realistic and detailed<sup>20</sup> labor schedule which would be important to a real incoming investor<sup>1</sup>. The company interviews further helped the team to unearth the various transaction costs caused by regulatory impediments, such as hiring/firing restrictions, formal and informal employment procedures. Not all these costs can be quantified and compared across borders, but knowing them is important for an overall cost assessment.

The field investigation of production costs, thus, leads to the identification of the “binding constraints” causing transaction costs that may discourage investors, and the exploration of the likelihood of applying “quick win” solutions, i.e. targeted policy choices available to remove them so as to reduce such transaction costs.

Binding constraints that would discourage investments both by domestic and foreign enterprises in a country may also arise in relation to the potential impacts of regulatory compliance on business costs, as well as lack of access to production inputs under competitive conditions. Therefore, field level data collection in the areas listed below, among others, would be critical to assess where binding constraints are and how to address them to achieve “quick wins”:

- Labor laws and regulations;
- Taxation laws and regulations, in particular corporate income tax and business taxes, and customs duties and tariffs;
- Market entry and exit laws and regulations;

- Laws and regulations on external trade and foreign direct investments;
- Electricity supply;
- Water supply and treatment;
- Road, air and sea transportation;
- Telecommunications;
- Freight forward and logistics support;
- Banking and payments services;
- Other factors that affect business start-up and operation costs.

It suffices to say here that some of the high costs could be reduced relatively quickly, if issues are addressed pragmatically. For instance, if the cost of electricity and other industrial utilities are high, developing an industrial park with focused infrastructural support may meet the need of a group of factories in the targeted industries. Likewise, if the initial cost of capital and international market access are too high, policies and strategy to attract FDI can help jump start production in those sectors relatively quickly.

In summary, the three steps applied, as described above, are highly complementary and interactive. The final result of the three-step sector selection analysis coincides with the triangular area indicated in the middle of the diagram in Figure 3, where all three steps overlap. Sectors/product groups contained in this area meet three criteria: (a) they are consistent with the given country’s latent comparative advantage and face real opportunities to become internationally competitive; (b) they best reflect the country’s realistic capacity; and (c) their overall production costs, including labor, land, power, transportation, among other factors, are reasonable (or could be lowered relatively quickly to competitive levels) in the given country. Sectors that meet all these criteria have the highest potential for growth; they are the best candidates for prioritized “quick win” policy support.

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<sup>20</sup> See Table 3 “Sample monthly payroll of a permanent employee,” UNIDO-NSD/PKU, Senegal: A GIFIUD Pilot towards Quick Wins in Inclusive and Sustainable Industrialization” Draft for Consultations, 2015





## IV. NEXT STEPS: ESTABLISHING POLICIES AND ASSISTING IN IMPLEMENTATION

As indicated in Figure 1, the findings of the GIFIUD Analysis lead to the selection of the priority sectors with a good understanding of both opportunities and challenges. Such findings provide a sound basis for government decision making at the next stage, focusing on establishing policies and strategies. There are many industrial policy instruments that can be considered by governments at the decision making stage. Among those frequently selected by government are: (i) fiscal incentives, (ii) investment attraction programmes, (iii) training policies, (iv) focused infrastructural support, (v) specially designed trade measures, (vi) public procurement, (vii) financial mechanisms, and (viii) industrial restructuring schemes.<sup>21</sup> Choosing from the various policy instruments and designing/implementing specific implementation programmes are challenging in themselves, and Governments must make these choices based on their needs and means. At this stage, strong political will as well as the capacity for implementation emerge as the most significant factors that will affect the desired outcomes.

While no one solution fits all, a guiding principle of the GIFIUD is: to make best use of limited resources to achieve maximum returns. The goal of GIFIUD is to help public and private stakeholders to drive for quick, concrete results. Such results can create a “snowball effect” by demonstrating successes that are possible through focused actions in targeted sectors.

Some instruments that could be deployed for “quick wins” are FDI promotion, domestic industry upgrading, special economic zones and industrial parks, and fiscal and non-fiscal incentives for first movers/comers.

### 4.1 Sector Targeted FDI Promotion

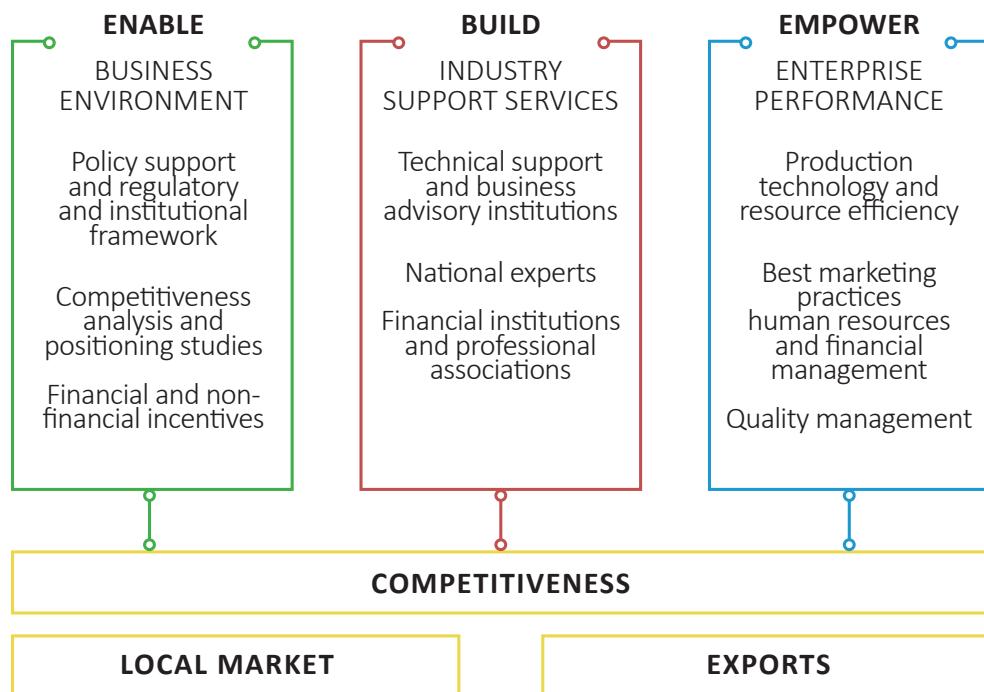
*Sector targeted FDI promotion*, for instance, may help create new industries with strong latent comparative advantage that do not exist today due to lack of information, initial capital and international market access. The strategy is particularly attractive when there is a strong signal in the global market that traditional global producers are actively looking for relocation due to increased labor costs at home (declining competitiveness), thus creating space for new countries to enter these markets.

### 4.2 Domestic Industry Upgrading

*Domestic industry upgrading*, likewise, may make best sense where there are existing or nascent industries in the home country that reflect its strong latent comparative advantage. These industries may not be currently competitive in the international market due to their lack of production scale, weak marketing skills, missing logistical support, and so on. In such cases, policies and programmes, for instance, UNIDO’s Industrial Upgrading and Modernization Programme (IUMP), specifically designed to help firms in the identified industries gain improved access to financing, workforce training, logistical support, marketing and technological upgrading and other focused assistance may help uplift the industries to the internationally competitive level and succeed in the global market, Figure 12 (on the next page).

<sup>21</sup> UNIDO advises governments on industrial policies and assists in implementation of industrial policy instruments; for a sample, see Selected References at the end of this document and for further information, see: [www.unido.org](http://www.unido.org)

**Figure 12: UNIDO's Industrial Upgrading and Modernization Programme (IUMP) Approach**



IUMP is sector focused and has a holistic approach, consisting of interventions at three levels: policies and governing frameworks, institutions and firms. In sectors “targeted” for support due to their latent comparative advantage, the sectoral business environment is reviewed with respect to legal, regulatory, administrative and institutional frameworks to identify main challenges and remedial actions; thus creating ENABLED conditions for firms in targeted sectors to invest and grow.

In targeted sectors, IUMP works with firms, technical and business support institutions, the domestic consulting sector, the financial sector and Ministries, Departments and Agencies of central and local government.

Institutional capacity bottlenecks that hinder the growth of targeted sectors are identified and institutional capacities are BUILT to ensure firms in the targeted sectors are able to access trained labor, finance, business development services, time-bound fiscal incentives, quality and technology development services and simple, transparent and least costly administrative procedures. As this package of incentives are sector targeted, successful results achieved in increased market access through exporting, innovation and value addition create success stories that can be replicated in new sectors/market niches.

At the firm level, IUMP works with individual and clusters of firms in targeted sectors. Firm or cluster level assistance is provided to improve firm level competitiveness or collective efficiencies for clusters of

firms. These interventions may cover upgrading internal capabilities for firms in managing human resources, marketing and finance, and green and cleaner technologies and innovation, including in establishing and managing business partnerships.

#### 4.3 Special Economic Zones and Industrial Parks

*Special economic zones (SEZ)* and industrial parks present another “quick win” approach. This approach is gaining popularity around the world, because it has proven effective in assisting countries to utilize limited resources and government implementation capacity to overcome common infrastructural and bureaucratic bottlenecks to businesses through localized areas.

Special economic zones (SEZ) and industrial parks are becoming a popular way to jump-start targeted industries and promote FDI in countries around the world, including Africa. Well-designed and implemented SEZ have proven effective in assisting countries to utilize limited public resources and capacity to overcome bottlenecks in hard and soft business infrastructure. For instance, they enable concentrated power, roads and other infrastructure development in localized areas; they allow specially designed policy support packages, including tax and customs incentives, on-site trade logistics operations, including customs clearance through bonded warehouses, simplified labor regulations, and streamlined licensing procedures.

Moreover, SEZs allow focused FDI promotion and targeted industrial upgrading, which, if done well, can become successful even when the overall business environment of the country is not quite ready.

From the public point of view, SEZs are vehicles to create jobs and increase exports, both significant for economic growth. Aligned and combined with FDI promotion and domestic industry upgrading targets, SEZs and industrial parks can help create enabling business spaces that allow relatively quick firm entry, job creation and industrial cluster fostering. They also make it possible to design and experiment new policy and regulatory reforms, enforce new performance standards for social and environmental impact enhancement, and monitor the compliance of firms within the created industrial space. Lessons learned from SEZs can later be replicated in other parts of the country, thus helping accelerate the overall reform process.

UNIDO is well-known for its capacity building assistance on industrial parks, special economic zones, eco-industrial parks, and on greening existing parks and zones, including the incorporation of energy efficiency and renewable energy schemes in business infrastructure and for industrial purposes.

#### **4.4 Fiscal and non-fiscal incentives for first movers/comers**

There are other policy tools that can be used in combination with all of the above. Fiscal and non-fiscal incentives, for instance, could be part of the recipe to help reduce the costs and risks for the “first comer” investors, domestic or foreign. Designing the incentive packages should take into account what is effective for business start-up or significant industrial upgrading and what is also sustainable and cost-effective for the overall economy.

These and many other industrial policy instruments are not new to the development community and UNIDO, but they are under constant debate. UNIDO has for decades worked closely with its Member States and other development partners in design of industrial policies and implementation of industrial policy instruments mentioned above on the ground. There are lessons of both successes and failures in practice. Sometimes, taking actions means taking risks. However, not taking actions is also dangerous – it further prevents the countries from catching up in a rapidly moving world economy.

Through the path from analysis to designing policy solutions and implementation, UNIDO is confident that it can achieve better results in assisting its Member States to move forward on inclusive and sustainable industrialization more rapidly through innovative and down-to-earth approaches like GIFIUD.

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