Applying the Growth Identification and Facilitation Framework (GIFF) to the Least-Developed Countries (LDCs): The Case of Uganda

Justin Yifu Lin[·] and Jiajun Xu[··]

Abstract:
This paper aims to draw insights from New Structural Economics by applying its practical policy tool – the Growth Identification and Facilitation Framework (GIFF) – to least-developed countries (LDCs) with a special focus on the case of Uganda. The GIFF offers practical development paths for enabling developing countries to follow comparative advantage in its industrial development and to tap into the potential of advantages of backwardness in industrial upgrading in an effort to achieve sustained and dynamic growth. After a brief introduction of the GIFF, we present an overview of Uganda's recent economic and social performance and analyses Uganda's factor endowments, i.e., land (or natural resources), labour and capital that can be used in the production process. After identifying tradable goods and services which would fit Uganda's latent comparative advantage, we diagnose sector-specific binding constraints in starting and scaling up the selected subsectors and discuss how to remove or mitigate these key constraints. Finally, we conclude with main findings and policy recommendations. The take-home message is that developing countries should not focus on what they *lack* but what they *have* when formulating their development strategies.

Keywords: New Structural Economics, Growth Identification and Facilitation Framework, latent comparative advantage, growth diagnostics, least-developed countries, Uganda

[·] Justin Yifu Lin is professor and the honorary dean of National School of Development and the Director of the Centre for New Structural Economics at Peking University.

[··] Jiajun Xu is assistant professor and the Executive Deputy Director of the Centre for New Structural Economics at Peking University. Email: jiajunxu@nsd.pku.edu.cn.

The authors would like to thank the excellent research assistance by Wei Lin.

I. Introduction

The least developed countries (LDCs), consisting of 48 countries with a total population of 932 million in 2014, represent the poorest and weakest segment of the international community. According to the United Nations (UN), a country is classified as a LDC if it meets three criteria: (1) low per capita income, (2) poor human resources, and (3) economic vulnerability. The Committee for Development Policy (CDP), a subsidiary body of the UN Economic and Social Council, is – inter alia – mandated to review the category of LDCs every three years and monitor their progress after graduation from the category. While the group of LDCs enjoy a vibrant annual GDP growth rate of over 6 per cent after entering the new millennium, their economic growth cannot be sustained without a structural transformation that lifts workers from low-productivity agriculture and the informal sector to higher-productivity activities. Yet industrialization is yet to take place in LDCs.

This paper aims to draw insights from New Structural Economics by applying its practical policy tool – the Growth Identification and Facilitation Framework (GIFF) –to least-developed countries (LDCs) with a special focus on the case of Uganda. The GIFF offers practical development paths for enabling developing countries to follow comparative advantage in its industrial development and to tap into the potential of advantages of backwardness in industrial upgrading in an effort to achieve sustained, dynamic growth.

"New Structural Economics (NSE)" is a framework proposed by Justin Yifu Lin for rethinking development. NSE proposes to use neoclassical economic approach to study the determinants of economic structure, including technology, industry, finance, infrastructure and institution, and its evolution in the process of economic development. The starting point of analysis in NSE is an economy's endowments and endowments structure, which are given at any specific time and changeable over times. From the perspective of NSE, the best way to achieve dynamic, inclusive and sustainable growth in a country is for the country to develop its industries according to the comparative advantage determined by its endowments in a market economy with a facilitating state. As the third wave of development thinking, NSE aims to advance theoretical innovations in economics discipline by systematically analyzing structural differences between advanced economies and developing economies (Lin, 2012a).

The GIFF is designed to help policymakers in catching-up developing countries to develop feasible and sharply focused policies in an effort to identify and unlock their latent comparative advantage to achieve structural transformation. At the heart of the GIFF is the principle that developing countries should not focus on what they do *not* have but what they *do* have in an effort to unleash their latent comparative advantages.

The application of the GIFF entails six steps (Lin, 2012b):

Step One: choosing the right target. The government in a developing country can identify the list of tradeable goods and services that have been produced for about 20 years in dynamically growing countries with similar endowment

structures and a per capita income that is about 100% to 300% higher than their own (or a similar per capital income about 20 years ago).

Step Two: removing binding constraints. The government may give priority to those which some domestic private firms have already entered spontaneously, and try to identify constraints to quality upgrading or further firm entry. Take action to remove these constraints.

Step Three: attracting global investors. In industries where no domestic firms are currently present, or only a few domestic firms are doing exports, seek foreign direct investment (FDI) from countries examined in step 1, or organize new firm incubation programs.

Step Four: scaling-up self-discoveries. Due to the fact that every country may have some unique endowments, which may produce goods valuable for the market, and some new technologies/industries might not exist 20 years ago, in addition to the industries identified in step 1, the government should also pay attention to spontaneous self-discovery by private enterprises and give support to scale up successful private innovations in new industries.

Step Five: recognizing the power and magic of industrial parks. In countries with poor infrastructure and bad business environments, special economic zones or industrial parks may be used to overcome barriers to firm entry, attract FDI, and encourage industrial clusters.

Step Six: providing limited incentives to the right industries. The government may compensate pioneer firms identified above with: tax incentives for a limited period; direct credits for investments; and access to foreign exchange.

The GIFF was first applied to the case of Nigeria by Justin Yifu Lin and Volker Treichel (Lin, 2012). Later the application of the GIFF has been extended to small islands economies (Lin and Dinh, 2014) and Kazakhstan (Lin and Wang, 2014). Yet so far the GIFF has not been applied to LDCs. The present paper aims to fill this gap.

Given the regional distribution and geographical features of LDCs, Uganda – a landlocked Sub-Saharan African country – is a representative case worth in-depth investigation. As of the 2015 triennial review, there are 48 LDCs worldwide with 33 in Africa, 13 in Asia and the Pacific, 1 in Americas and 1 in Arab States. Among these LDCs, 17 are landlocked developing countries and 9 are small islands developing countries.

Yet the present paper comes with a caveat that it does not claim that its Uganda-specific findings apply to all LDCs, although there are some commonalities among the LDCs in terms of their structural impediments. Nevertheless the analytical approach applied to Uganda can be replicated in other LDCs to derive specific diagnoses and propose solutions tailored to country circumstances.

This paper proceeds as follows: Section II presents an overview of Uganda's recent economic and social performance; Section III analyses Uganda's factor endowments, i.e., land (or natural resources), labour and capital that can be used in the production process; Section IV identifies, according to a range of criteria proposed by the GIFF, tradable goods and services which would fit Uganda's latent

comparative advantage; Section V diagnoses sector-specific binding constraints in starting and scaling up the selected subsectors and discusses how to remove or mitigate these key constraints; Section VI concludes with main findings and policy recommendations.

II. Recent Economic and Social Development in Uganda

Since her independence from the colonial rule of the United Kingdom in the early 1960s, Uganda once suffered from such a prolonged period of civil war that her national economy bore the brunt of conflicts and chaos. Since the mid-1980s after President Yoweri Museveni came into power, the economy has moved from recovery to growth.

After entering the new millennium, Uganda grew consistently at an average of about 7 percent while the economic growth rate has slowed down a bit since 2012 (See Table 1). The robust growth has boosted the national confidence in the pursuit of economic take-off. In order to consolidate and accelerate this growth process, the Government of Uganda in 2007 set the vision of transforming the Ugandan society from a peasant to a modern and prosperous country within 30 years. To operationalise this vision statement, *Uganda Vision 2040* provides development paths and strategies for transforming Uganda from a predominantly peasant and low income country to a competitive upper middle income country.

Table 1 Macroeconomics aggregates (%) of Uganda

Year	Real GDP Growth Rate	Inflation Rate (CPI)	Current account balance as a % of GDP	Foreign Exchange Reserve as a % of GDP
2001	5.18	1.87	-5.88	17.35
2002	8.73	-0.29	-3.61	16.98
2003	6.47	8.68	-1.53	16.66
2004	6.81	3.72	-0.95	18.92
2005	6.33	8.45	-0.14	18.60
2006	10.78	7.31	-3.66	12.87
2007	8.41	6.14	-5.04	14.24
2008	8.71	12.05	-8.92	15.43
2009	7.25	13.02	-6.43	15.00
2010	5.17	3.98	-9.02	14.55
2011	9.67	18.69	-11.29	11.67
2012	4.41	14.02	-7.03	12.29
2013	3.27	5.46	-8.09	-
2014	4.51	4.29	-	-

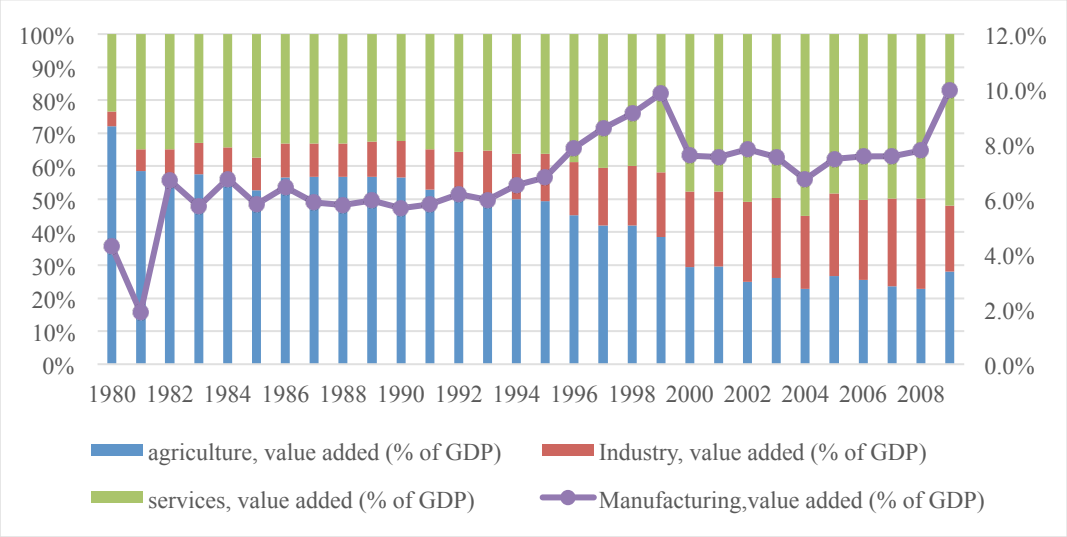
Sources: Foreign Exchange Reserve data are taken from Uganda Bureau of Statistics, Statistical Abstract 2001-2013, see http://www.ubos.org/publications/statistical-abstract/; other data come from World Development Indicators, see http://data.worldbank.org/indicator.

Note: '-'denotes that data is unavailable (applied to the following tables, otherwise indicated).

Despite the aspirational national vision, Uganda's economic development is facing compelling challenges ahead:

First, industrialization is yet to take place. Figure 1 shows that while the service sector has grown robustly, the Uganda's industrial sector has lagged far behind. For example, the proportion of its manufacturing's contribution to GDP is merely as low as 10 percent well below the average 20 percent of all developing countries. The slow development of labour-intensive manufacturing, coupled with rapid population growth, has resulted in a high rate of youth unemployment. Table 2 indicates that while the formal youth unemployment rate is relatively low at the level of about 5 percent, about one fifth (18 percent) of the youth population were jobless. The Jobless constitute persons who are either unemployed or inactive but not in education. The indicator of 'joblessness' has the advantage of reflecting both unemployed and discouraged workers who have left or not entered the workforce.

Figure 1 Contributions of Three Industries and Manufacturing to GDP



Data source: World Development Indicators.

Note: Added value of three industries are in the left axis. Manufacturing share is in the right axis.

Table 2 Distribution of Youth Population by Activity Status and Gender (%) (2011/2012)

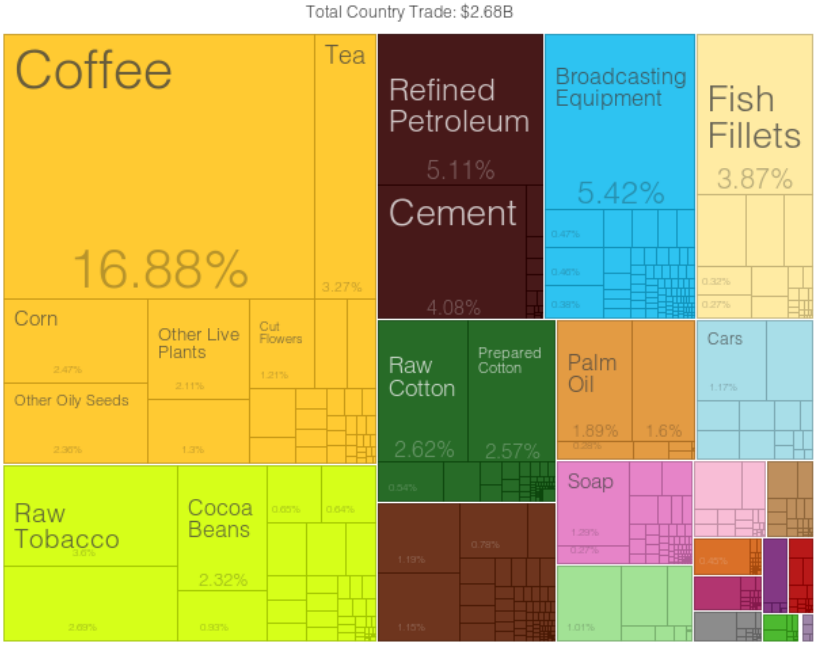
Age Band	15-24			Youth (18-30)		
Indicator	Male	Female	Total	Male	Female	Total
In employment only	32.2	35.4	33.8	60.6	58.5	59.5

In education only	36.9	33.2	35.1	17.7	12.7	15.0
In both	21.8	13.2	17.4	11.4	4.5	7.7
None	9.0	18.2	13.7	10.4	24.3	17.8
Total	100	100	100	100	100	100
% in labour force	56.0	50.9	53.4	74.3	66.9	70.4
% in employment	53.5	48.0	50.7	71.5	62.7	66.8
% in education	58.7	46.4	52.5	29.1	17.2	22.7
% looking for work	4.4	5.6	5.0	3.8	6.3	5.1
% jobless	9.0	18.2	13.7	10.4	24.3	17.8

Source: The National Labour Force and Child Activities Survey, 2011/12, National Labour Force Survey Report, p.140, see **http://www.ubos.org/onlinefiles/uploads/ubos/pdf%20documents/Labour%20force%20Report%2010th%20Dec%20%202013.pdf**.

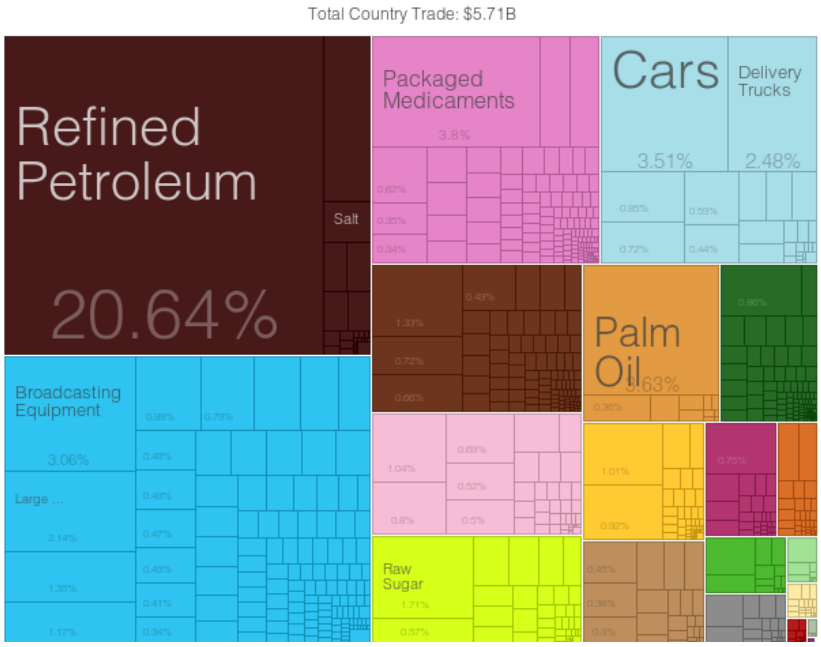
Second, partly due to the underdevelopment of manufacturing sectors, Uganda has mainly exported low-value raw materials and unprocessed agricultural products whereas it imported high-value manufactured products (see Figure 2 and 3). This results in persistent trade deficits as seen in Table 3.

Figure 2 Composition of Uganda's Exports in 4-digit, 2012



Source: Country profile, Observatory of Economic Complexity, MIT.

Figure 3 Composition of Imports in 4-digit, 2012



Source: Country profile, Observatory of Economic Complexity, MIT.

Table 3 Summary of external trade statistics: 2009-2013 (current US$ million)

Trade Flow	2009		2010		2011		2012		2013	
	US$ million	% of GDP	US$ million	% of GDP	US$ million	% of GDP	US$ million	% of GDP	US$ million	% of GDP
Informal Exports	798.5	4.70	528.5	2.81	355.8	1.91	453.7	1.91	421.3	1.71
Formal Exports	1,567.6	9.23	1,618.6	8.61	2,159.1	11.57	2,357.5	9.94	2,407.7	9.75
Total Exports	2,366.2	13.92	2,146.9	11.42	2,514.9	13.48	2,811.2	11.85	2,829.0	11.45
Informal Imports	82.0	0.48	66.5	0.35	53.9	0.29	53.0	0.22	53.7	0.22
Formal Imports	4,257.6	25.06	4,664.3	24.81	5,630.9	30.17	6,042.8	25.47	5,817.5	23.55
Total Imports	4,339.6	25.54	4,730.8	25.16	5,684.8	30.46	6,095.8	25.69	5,871.2	23.77
Trade Balance	-1,973.5	**-11.61**	-2,583.9	**-13.74**	-3,169.9	**-16.99**	-3,284.6	**-13.84**	-3,042.1	**-12.31**

Source: Uganda Bureau of Statistics, 2014 Statistical Abstract, see http://www.ubos.org/onlinefiles/uploads/ubos/statistical_abstracts/Statistical%20Abstract%202014.pdf

Note: The percentage of trade to GDP is calculated by authors.

When it comes to social development, Uganda has made great strides in poverty alleviation. Table 4 shows that according to the standard international poverty line, the percentage of poor people in the total population has reduced from 72 percent 1992 to 38 percent in 2012. Yet despite this achievement, more than a third of the total population live below $1.25 a day. Income inequality is another acute concern.

Table 4 Poverty Indicators and GINI coefficient

	Poverty headcount ratio at national poverty lines (% of population)	Poverty headcount ratio at $1.25 a day (PPP) (% of population)	Gini coefficient
1992	56.4	71.92	0.426
1996	44.4	63.01	0.371
2002	38.8	56.57	0.428
2005	31.1	51.72	0.432
2009	24.5	37.91	0.426
2010	-	-	0.423
2012	19.5	37.78	-

Sources: Poverty headcount ratio at national poverty lines (% of population) and Poverty headcount ratio at $1.25 a day (PPP) (% of population) are taken from World Development Indicators. http://data.worldbank.org/indicator/SI.POV.GAPS and http://data.worldbank.org/indicator/SI.POV.NAGP. World Development Indicators only offer Gini coefficient of year 1996, 1999, 2002, 2005, 2009 and 2012, see http://data.worldbank.org/indicator/SI.POV.GINI. And data in the other years is completed by National Household Survey, Uganda Statistical Abstract.

III. Factor Endowment Analysis: What does Uganda have?

From a comparative perspective, Uganda is a labour-abundant, capital-poor and resource-rich country.

Compared with its neighbouring countries, Uganda has a relatively high population density (see Table 5). Currently, the child dependence ratio is as high as 50 percent (see Table 6), this ratio is expected to sharply decline to a third in 2050 (see Table 7). According to the projections by the United Nations Population Division, its working age population (aged 15-59) will grow substantially from 50 percent in 2025 to 60 percent in 2050 (see Table 6). Hence, it is expected that Uganda has a sustained labour supply in the foreseeable future.

Table 5 Population Density: Uganda and its Neighbours

(persons per square km)

Year	Uganda	South Sudan	Kenya	Tanzania	Rwanda	The Democratic Republic of Congo
1995	102.2	8.9	48.1	33.8	239.7	18.6
2000	118.9	11.0	54.6	38.4	325.2	21.2
2005	140.3	13.3	62.1	44.1	365.1	24.7
2010	165.9	16.5	70.9	51.5	417.3	29.1
2015	195.3	20.2	80.9	60.4	470.6	34.1
2020	229.5	23.1	91.7	70.3	526.8	39.8
2025	267.7	26.1	103.0	81.3	582.8	46.1
2030	309.9	29.2	114.9	93.6	639.8	53.1
Land area (sq. km)	199,810	2,376,000	569,140	885,800	24,670	2,267,050

Source: medium variant estimations, from the UN Population Statistics, see http://unstats.un.org/unsd/snaama/selbasicFast.asp.

Table 6 Distribution of Population by Age

	2013		2014		2015*	
	Population	Percentage to total population	Population	Percentage to total population	Population	Percentage to total population
0-4	7,085,400	21.03%	7,250,200	20.90%	7,424,300	20.76%
5-9	5,841,800	17.34%	5,999,700	17.30%	6,170,200	17.26%
10-14	4,226,200	12.54%	4,486,500	12.93%	4,774,200	13.35%
15-19	3,579,700	10.63%	3,643,700	10.50%	3,706,800	10.37%
20-24	2,985,400	8.86%	3,064,100	8.83%	3,148,000	8.80%
25-29	2,427,200	7.20%	2,489,500	7.18%	2,558,100	7.15%
30-34	1,940,700	5.76%	1,994,900	5.75%	2,053,600	5.74%
35-39	1,525,600	4.53%	1,566,800	4.52%	1,611,600	4.51%
40-44	1,188,400	3.53%	1,220,500	3.52%	1,255,200	3.51%
45-49	913,500	2.71%	937,500	2.70%	963,200	2.69%
50-54	686,100	2.04%	705,100	2.03%	724,900	2.03%
55-59	494,800	1.47%	508,500	1.47%	523,200	1.46%
60-64	339,300	1.01%	348,400	1.00%	358,600	1.00%
65-69	217,900	0.65%	223,700	0.64%	230,100	0.64%
70-74	128,400	0.38%	131,800	0.38%	135,700	0.38%
75-79	67,100	0.20%	69,200	0.20%	71,300	0.20%
80+	43,500	0.13%	45,800	0.13%	48,000	0.13%
Total	33,691,000	100.00%	34,685,900	100.00%	35,757,000	100.00%

Data source: Uganda Bureau of Statistics 2014, page 107.

Note: *2015 is projected

Table 7 Population Projections

Age	**2000**		**2025**		**2050**	
	thousands	*percentage*	*thousands*	*percentage*	*thousands*	*percentage*
Total	23,300.2	100.00%	53,764.9	100.00%	101,523.7	100.00%
0 - 14	11,466.1	49.21%	24,910.9	46.33%	35,362.3	34.83%
15 - 59	10,948.7	46.99%	27,060.1	50.33%	60,386.1	59.48%
60 - 64	299.4	1.28%	625.9	1.16%	2,070.7	2.04%
65 - 69	250.0	1.07%	467.0	0.87%	1,546.7	1.52%
70-74	172.2	0.74%	334.2	0.62%	1,065.3	1.05%
75-79	101.8	0.44%	211.9	0.39%	629.8	0.62%
80-84	45.9	0.20%	107.3	0.20%	310.5	0.31%
85 -89	13.4	0.06%	36.2	0.07%	115.8	0.11%
90 - 94	2.4	0.01%	9.8	0.02%	30.9	0.03%
95 - 99	0.3	0.00%	1.4	0.00%	5.0	0.00%
100+	0.0	0.00%	0.1	0.00%	0.4	0.00%

Source: Projections by United Nations Population Division.

A close look at Uganda's employment structures reveals two salient features: one is that its employment is largely agro-based; the other is that informal sectors attract more workers than formal sectors.

First, agricultural sectors employ a majority of Uganda's the total working-age population. As seen in Table 8, more than 70 percent of the total working-age population makes a living in the sector of agriculture, forestry and fishing. While the service sectors employ about 16 percent of the total working-age population, the manufacturing sector merely employs less than 5 percent. Table 9 provides information on youth employment by occupation in 2013, which reveals a similar pattern – a majority of the youth employment on average falls into the category of skilled agricultural and fishery workers, although about a third of the urban youth chooses service sectors as the first choice.

Table 8 Status in Employment and Industry of Working Population

(aged 14-64 years in 2012/13)

Sector of working population(ISIC Rev 4)	% of the Total
Agriculture, forestry and fishing	71.9
Production	4.4
Manufacturing	4.4
Services	15.8
Wholesale and retail trade; repair of motor vehicles and motorcycles	9.5
Education	2.6
Transport storage and communications	2.2
Hotels and restaurants	1.5
Others	7.8
Total	100.0

Source: Uganda Bureau of Statistics, 2014 Statistical Abstract, page 20, see http://www.ubos.org/onlinefiles/uploads/ubos/statistical_abstracts/Statistical%20Abstract%202014.pdf

Table 9 Employed youth by occupation in 2013, according to area of residence and gender (%)

Occupation(ISCO-08)	Total	Male	Female	Rural	Urban
Legislators, senior officials and managers	0.7	1.1	0.2	0.3	2.0
Professionals	3.3	2.8	3.9	3.1	4.2
Technicians and associate professionals	1.3	1.4	1.2	0.8	3.0
Clerks	0.3	0.2	0.4	0.0	1.0
Service workers, shop and market sales workers	19.1	13.9	24.1	14.6	33.9
Skilled agricultural and fishery workers	52.3	46.7	57.8	59.6	28.0
Craft and related trade workers	7.5	11.6	3.6	6.0	12.4
Plant and machine operators and assemblers	3.0	5.9	0.3	2.5	4.8
Elementary occupations	12.3	16.3	81	12.9	10.4
Armed forces	0.2	0.2	0.2	0.2	0.3
Total	100	100	100	100	100

Source: School-to-work transition survey (SWTS) micro data files, see from Jimrex Byamugisha, Leyla

Shamchiyeva and Takaaki Kizu (2014): Labour market transitions of young women and men in Uganda, International Labour Organisation Work4Youth Publication Series No. 24, see http://www.ilo.org/employment/areas/WCMS_234860/lang-en/index.htm.

Second, informal sectors outperform formal sectors in attracting employment. As shown in Table 10, nearly 60 percent of the total non-agricultural employment works in informal sectors. In particular, more male workers are employed by informal sectors than female ones, and more rural workers work in informal sectors than urban ones. As in most developing economies, the majority of self-employed workers operate in the informal sector. Table 11 further shows that above half of youth workers are self-employed without employees, and that this ratio is even high in rural areas.

Table 10 Employment in the informal sector as a percentage of non-agricultural employment in 2009 by estimate

	Employment in the informal sector outside agriculture	Total employment outside agriculture	Percentage (%)
Gender			
Female	1,172,538	2,131,454	55.0
Male	1 022 126	1 649,851	62.0
Area of residence			
Urban	906,989	1,682,195	53.9
Rural	1,287,675	2,099,110	61.3
Total	2,194,664	3,781,305	58.0

Source: UBOS, Uganda National Household Survey 2009/10, Abridged report, November 2010, from Jimrex Byamugisha, Leyla Shamchiyeva and Takaaki Kizu (2014): Labour market transitions of young women and men in Uganda, International Labour Organisation Work4Youth Publication Series No. 24, p. 8, http://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/documents/publication/wcms_326255.pdf

Table 11 Young workers by status in employment, according to area of residence and gender (%)

Employment status	Rural			Urban			Total
	Female	Male	Total	Female	Male	Total	
Wage and salaried workers (employees)	12.8	28.8	20.6	30.1	45.7	38.1	24.6
Self-employed with employees (employers)	1.6	3.2	2.4	2.2	4.2	3.3	2.6
Self-employed without employees (own account worker)	60.0	47.5	53.9	47.1	31.7	39.2	50.5
Member of a producers' cooperative	0.3	0.2	0.3	0.0	0.0	0.0	0.2
Contributing family workers	24.6	20.0	22.4	19.9	16.5	18.2	21.4
Not classifiable by status	0.7	0.2	0.4	0.7	1.9	1.3	0.6
Total	100	100	100	100	100	100	100

Source: UBOS, SWTS-Uganda, 2013, Jimrex Byamugisha, Leyla Shamchiyeva and Takaaki Kizu (2014): Labour market transitions of young women and men in Uganda, p. 22.

Uganda's wage levels are relatively low. As seen in Table 12, the average monthly wage of young workers is as low as US$ 20. Income inequality features high: the average monthly wage of self-employed young workers is merely about a fifth of that of wage and salaried workers; male workers earn much more than female ones; rural workers earn much less than urban ones. There is a general pattern that the more educated young workers are, the higher wages they earn.

Table 12 Average monthly wages of young workers (wage and salaried workers and self-employed workers) by gender, area of residence and level of completed education (US$)

		Wage and salaried workers		Own-account workers and employers		ALL	
		Average monthly wage	S.D.	Average monthly wage	S.D.	Average monthly wage	S.D.
Total		47.45	0.04	9.02	0.03	20.54	0.03
Gender	Female	39.74	0.04	5.08	0.05	12.54	0.03
	Male	51.68	0.05	14.50	0.04	28.91	0.04
Area of residence	Rural	46.63	0.05	6.27	0.03	16.01	0.03
	Urban	48.83	0.04	21.66	0.10	35.07	0.06
Level of education	Never attended	23.91	0.03	7.58	0.09	15	0.08
	Less than primary	38.44	0.04	3.36	0.04	11.93	0.04
	Primary	41.55	0.03	15.81	0.07	21.97	0.05
	Secondary	39.32	0.02	25.93	0.13	33.48	0.08
	Tertiary	88.61	0.06	88.57	0.52	88.60	0.16

Source: School-to-work transition survey (SWTS) micro data files.

http://www.ilo.org/employment/areas/WCMS_234860/lang-en/index.htm

Note: S.D. = standard deviation; exchange rate: 1 Ugandan shilling= 0.0003 US$

Recently, there seems to be a high demand for manufacturing workers, as the survey data shows that the average monthly employee in the manufacturing subsectors such as paper, publishing and printing has increased over the past five years (see Table 13).

Table 13 Average monthly employee earnings by survey data, 2009-2012

(for the 121 manufacturing and hotel establishments) (US$)

Activity	2009	2010	2011	2012	2013	% change (2012 to 2013)
Food processing, beverages and tobacco	48.3	54	58.8	81	79.2	-2.2
Textiles, cloth and foot wear	78.6	67.5	74.7	81	84	3.7
Paper, publishing and printing	385.5	406.8	466.2	513.6	593.1	15.5
Chemicals ,paint, and soap	109.2	117.6	128.1	160.5	183	14.0
Cement ,clay and ceramic products	101.1	110.4	107.4	127.8	119.7	-6.3
Metal products	228.6	207	243.6	225.3	283.5	25.8
Hotels and restaurants	57	62.7	63.9	77.4	67.8	-12.4
Miscellaneous	91.5	100.2	112.8	134.1	132	-1.6
Total	96	102.3	115.2	138	147.3	6.7

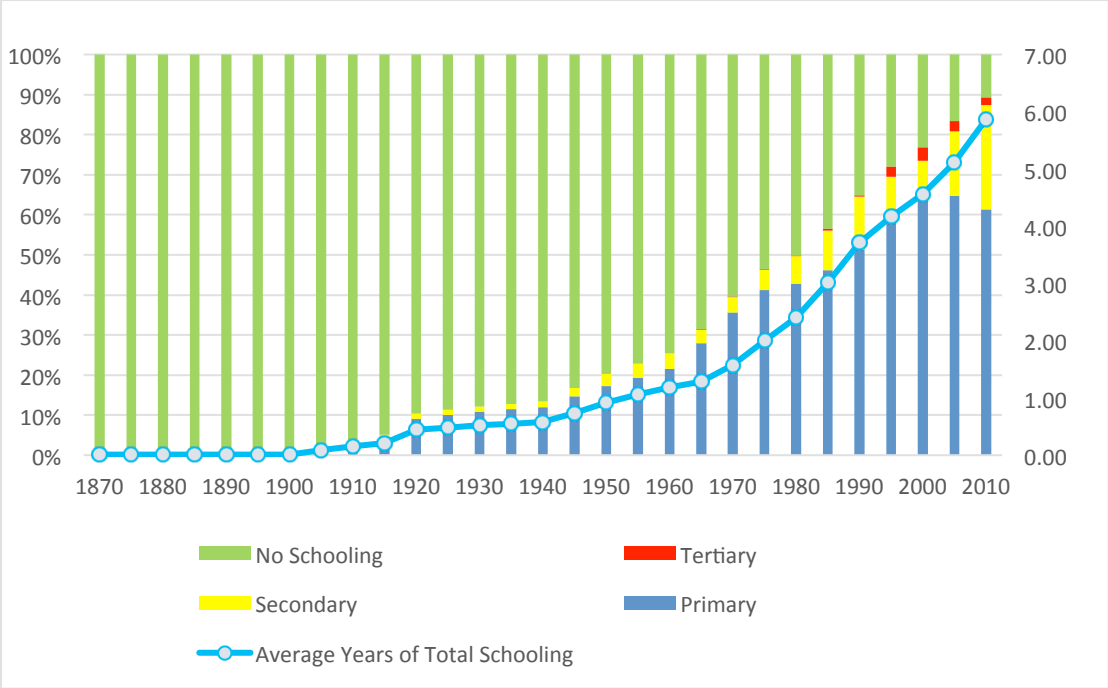
Source: Establishment survey, Uganda Bureau of Statistics, 2014 Statistical Abstract, page 149.

http://www.ubos.org/onlinefiles/uploads/ubos/statistical_abstracts/Statistical%20Abstract%202014.pdf

Note: Exchange rate: 1 Ugandan shilling= 0.0003 US$

In order to harness the expected potential of abundant labour force, the Government of Uganda has to establish a high-quality education system. Since Uganda has implemented universal primary education in 1997, its human capital is improving from a very low base. Yet, Uganda still has a large youthful labour force that is poorly educated and skilled (The Government of Uganda, 6).

Figure 4 Education Levels of Uganda's Population

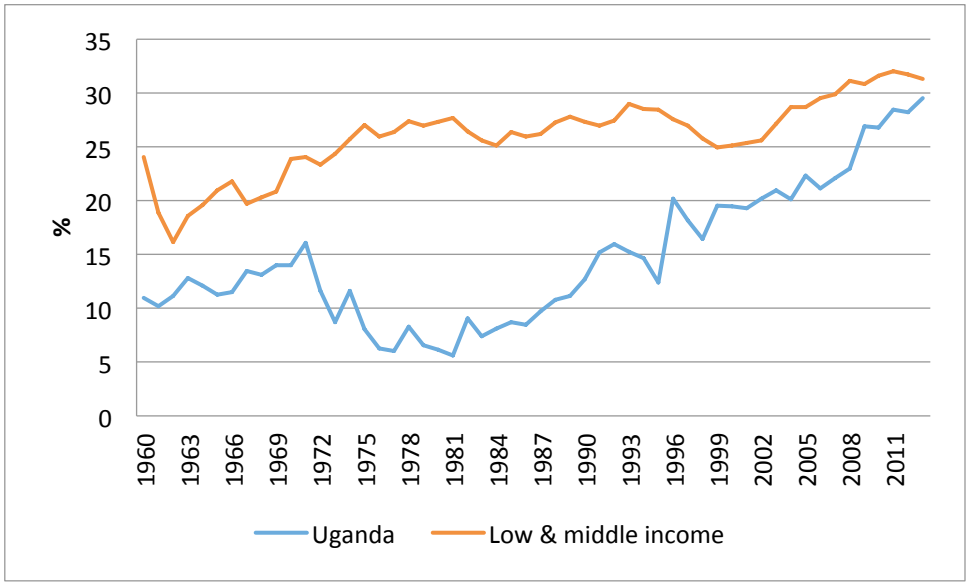


Data source: Barro, Robert and Jong-Wha Lee, April 2010, "A New Data Set of Educational Attainment in the World, 1950-2010." *Journal of Development Economics*, Vol. 104, pp.184-198. http://barrolee.com/

Note: No Schooling, Tertiary, Secondary and Primary are in the left axis. Average Years of Total School is in the right axis.

Despite its abundant labour, Uganda is relatively poor in capital supply. Human capital accumulation has exceeded physical capital accumulation since the mid-1970s. As seen in Figure 5, the gross capital formation as a percentage of GDP in Uganda has been well below the average level of developing countries, although the gap has been substantially narrowed recently. Decomposition of gross fixed capital formation indicates a significant increase in real commercial buildings investment, and falls in equipment investment as a share of GDP, which investment could signal a growth concern (World Bank, 2007: 19). The slow rate of accumulation of equipment, coupled with rapid population growth, may suggest capital shallowing in the economy.

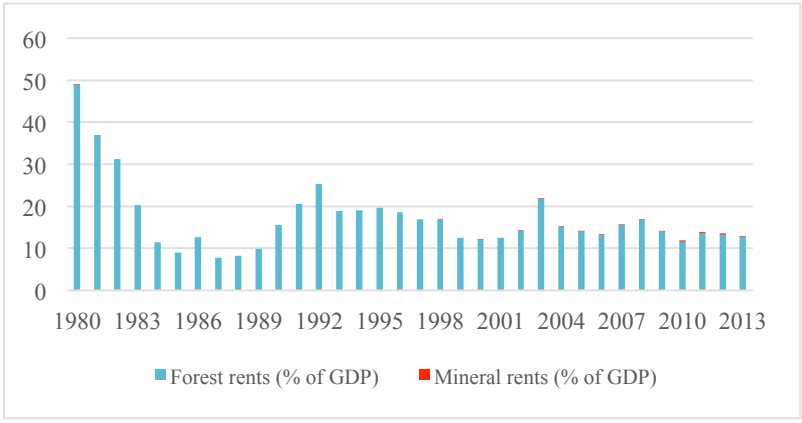
Figure 5 Gross Capital Formation (% of GDP)



Source: WDI, see http://data.worldbank.org/indicator/NE.GDI.TOTL.ZS/countries.

Uganda is a resource-rich country. Located around the equator, Uganda is endowed with abundant forests. Figure 6 shows that forest rents have accounted for a substantial share of the contribution of natural resources to GDP. Although it is landlocked, Uganda contains many large lakes such as Lake Victoria, Lake Albert, and Lake Kyoga where fishes are abundant.

Figure 6 The Contribution of Resource Rents to GDP



Source: World Development Indicators.

Uganda used to be poor in oil and gas, but in 2006 Uganda confirmed the existence of commercially viable petroleum reserves in the Albertine Graben. In terms of potential capacity, the reserves are estimated at 3.5 billion barrels of oil equivalent. More commercially viable oil and gas deposits are expected to be discovered as continuous explorations are being carried out in the Albertine Graben and other potential areas (The Government of Uganda, 47). Uganda imposed a moratorium on oil licensing in 2007, shortly before exploration companies confirmed commercial oil reserves. The ban was intended to allow the country enough time to put in place the

necessary regulatory framework to ensure the development of the newly found oil and gas reserves would benefit Uganda.

IV. Latent Comparative Advantages: What can Uganda potentially do well?

The first step in the GIFF is to choose the right targets, i.e., tradable goods and services that have been produced for the past 20 years in fast-growing countries with similar factor endowment and a per capita income that is not too far ahead of the home country.

In order to identify Uganda's latent comparative advantages, it is crucial to selecting right benchmark countries. Historical lessons inform us that many developing countries fail to catch up with developed countries because their development strategies defied their comparative advantages. For example, in the wake of World War II and decolonization movements, many developing countries tried to emulate advanced heavy industries in rich countries although most developing countries were constrained by capital shortage. It turned out that few succeeded in the catch-up process by overtly defying their comparative advantages. To avoid repeating similar historical mistakes, the GIFF suggests that selecting dynamically growing countries with similar factor endowments and with GDP per capita about 100-300 percent higher than Uganda's (or with a similar per capita income twenty years ago as Uganda's today. By doing so, it can help to avoid setting too ambitious goals.

Using the first criterion of GDP per capita, we get two lists of countries: one list of countries that have a per capita income 100-300 percent above Uganda's (see Table 14); the other list of countries that have a similar per capita income twenty years ago as Uganda's today (see Table 15). Removing slowly growing countries, i.e., countries with annual average growth rates less than 6 percent in the past twenty years, leaves the following countries: Cabo Verde, China, Equatorial Guinea, India, Laos, Nigeria, Sudan, Uzbekistan[1], and Vietnam.

Applying the second criterion of factor endowment coupled with the third criterion of a good manufacturing performance as measured by manufacturing value added (MVA) as a percentage of GDP, Uzbekistan stands out as the country with the greatest similarity with Uganda because Uzbekistan is a landlocked country with abundant labour and rich natural resources. Uzbekistan is Central Asia's most populous country. Its gold deposits rank the fourth in the world, copper deposits tenth and uranium deposits twelfth. Uzbekistan is also rich in oil and gas. Uzbekistan's MVA stands at the level of about 13 percent above 10 percent in the case of Uganda.

Though not landlocked, Nigeria is a labour-abundant and resource-rich country with similar factor endowment as Uganda. Moreover, Nigeria has a similar

[1] While Uzbekistan experienced sluggish economic growth after its independence in 1991 following the breakup of the Soviet Union, its economy has enjoyed robust growth at a rate of about 8 percent since 2004 onwards.

history as Uganda since they were both colonised by the United Kingdom and declared their independence in the early 1960s. In recent years, Nigeria has rapidly expanded its manufacturing sectors as its manufacturing value added as a percentage of GDP has grown from 3 percent in 2002 to 10 percent in 2014. Uganda can learn from Nigeria how to step up its efforts to industrialise its economy.

While not resource-rich countries, China, India and Vietnam are good at labour-intensive manufacturing and have experienced fast economic growth in the past 20 years. As wages are rising in China and other Asian developing countries, it may present a golden opportunity for Uganda to develop labour-intensive products where China, India and Vietnam are losing their comparative advantages.

Neither Sudan nor Laos are labour-abundant countries, as their population density is about 20 and 30 persons per square kilometer. Both Sudan and Laos have very weak industrial bases, as their MVA is about 8 percent even below the level of 9 percent in the case of Uganda.

Equatorial Guinea is small country in west central Africa with five small islands. Its economy primarily relies on the export of crude petroleum so that its manufacturing is underdeveloped. Unlike Uganda, Equatorial Guinea is not labour-abundant as its population density is only about 30 persons per square kilometers.

Cabo Verde has the least similarity with Uganda because it is a small island economy with a small population in the North Atlantics Ocean. Cabo Verde's economy primarily relies on tourism with retarded manufacturing sectors.

On balance, we choose China, India, Nigeria, Uzbekistan and Vietnam as the benchmarked countries. Among the five benchmark countries, China, India and Vietnam are labour-abundant and resource-poor countries with well-developed labour-intensive industries, whereas Nigeria and Uzbekistan are rich in both labour and resource in the rapid process of industrialization.

Table 14 Countries with GDP per capita 100-300% higher than Uganda's
(constant 2011 international $, PPP)

Country	GDP per capita, PPP 2014	Ratio to Uganda's	Growth rate of real GDP between 2001-2011	Growth rate of real GDP between 1992-2011	Manufacturing value added, % of GDP, 2013
Uganda	1,684.509	1.00	6.90	7.22	9.97 (2009)
Zambia	3724.527	2.21	5.73	3.70	8.18
Mauritania	3731.903	2.22	5.06	4.11	8.14
Sudan	3881.783	2.30	6.18	6.22	8.10
Ghana	3901.802	2.32	6.70	5.56	5.45
Honduras	4372.168	2.60	4.15	3.59	18.61
Pakistan	4621.496	2.74	4.65	3.95	14.01
Nicaragua	4692.14	2.79	-	-	14.95
Moldova	4753.549	2.82	5.16	0.22	14.08
Tonga	4971.515	2.95	-	-	7.16
Lao PDR	**5075.733**	**3.01**	**7.38**	**6.92**	**8.25**
Uzbekistan	5319.501	3.16	**7.39**	4.65	13.08
Vietnam	**5370.145**	**3.19**	**7.16**	**7.35**	**17.49**
India	**5445.229**	**3.23**	**7.71**	**6.91**	**17.26**
Samoa	5524.571	3.28	-	-	-
Nigeria	**5639.447**	**3.35**	**8.87**	**6.01**	**9.03/9.74(2014)**
Congo, Rep.	5975.051	3.55	4.74	3.17	4.30
Swaziland	6051.041	3.59	2.30	2.56	43.83(2011)
Cabo Verde	6216.051	3.69	5.96	6.80	5.81 (2006)
Bolivia	6319.526	3.75	4.19	3.91	0.98(2012)
Philippines	6661.409	3.95	4.85	4.23	20.40

Data source: GNI per capita, PPP (current international $) is taken from World Development Indicators.

Note: The growth rate is calculated by authors using real GDP from Penn World Table 8.0.

Table 15 Countries with a similar per capita income level 20 years ago to Uganda's today

PPP (constant 2011 international $)

Country	GDP per capita 1994	Ratio to Uganda's	Growth rate of real GDP between 2001-2011	Growth rate of real GDP between 1992-2011	Manufacturing value added, % of GDP, 2013
Guinea-Bissau	1542.492	0.92	2.96	1.82	-
Equatorial Guinea	1564.954	0.93	12.71	20.01	-
Senegal	1730.944	1.03	3.87	3.80	13.56
Kyrgyz Republic	1811.643	1.08	4.14	1.50	18.32
Lao PDR	**1831.192**	**1.09**	**7.38**	**6.92**	**8.25**
Sudan	1870.721	1.11	6.18	6.22	8.10
Vietnam	**1894.746**	**1.12**	**7.16**	**7.35**	**17.49**
India	**1950.425**	**1.16**	**7.71**	**6.91**	**17.26**
Armenia	1988.215	1.18	7.64	5.98	11.41
Zambia	2006.749	1.19	5.73	3.70	8.18
Ghana	2035.728	1.21	6.70	5.56	5.45
Cameroon	2160.418	1.28	3.27	3.22	14.39
Kenya	2169.87	1.29	4.20	3.37	11.93
Solomon Islands	2170.846	1.29	-	-	-
Cabo Verde	2179.809	1.29	5.96	6.80	5.81 (2006)
Georgia	2181.128	1.29	6.45	2.80	-
Papua New Guinea	2270.106	1.35	-	-	-
Uzbekistan	2274.027	1.35	**7.39**	4.65	13.08
China	**2323.301**	**1.38**	**10.56**	**10.26**	**30.79**
Zimbabwe	2445.903	1.45	0.11	0.41	12.82
Djibouti	2450.863	1.45	4.84	3.18	-

Data source: GDP per capita, PPP (constant 2011 international $) is taken from World Development Indicators.

Note: Growth rates are calculated by authors using real GDP from Penn World Table 8.0.

After selecting the five benchmark countries, the next step is to identify tradable goods and services produced in these target countries, where Uganda would have potential comparative advantages. A typical way of completing this task is to rank aggregate export shares over the past 20 years in the declining order of a given target country. Here we use a modified approach by comparing the top 10 exports of a given benchmark country almost every five years (i.e., in 1995, 2000, 2005, 2010, and 2012). By doing so, we can better identify which sectors are losing their comparative advantages in the case of China, India and Vietnam and which manufacturing sectors are emerging in the case of Nigeria and Uzbekistan.

Take China for example, some labour-intensive subsectors have been gradually losing their comparative advantages. For instance, Table 16 shows that export shares of non-knit men's suits have declined from 1.72 percent in 1995 to 0.57 percent in 2012. Similarly, export shares of radio receivers have decreased from 2 percent in 1995 to 0.38 percent in 2012. In addition, several other labour-intensive sectors (such as leather footwear, non-knit women's suits, industrial printers, video displays, video recording equipment, and models and stuffed animals) witness declining export shares in global markets. These sectors may become the competitive edge of Uganda in the near future.

In the case of Uzbekistan, several manufacturing sectors are emerging outperforming its traditional export of natural resources and raw agricultural products (see Table 17). Raw cotton used to its primary export accounting for more than 70 percent of total exports in 1995, but its export share has declined substantially to 15 percent in 2012. Similarly, the export share of gold has dropped from 13 percent in 1995 to 2.4 percent in 2012. Correspondingly, cars became Uzbekistan's top 10 exports for the first time in 2000, and its export share has consistently grown to 15 percent in 2012 ranking no. 2 among all exports. In addition, export shares of processed raw materials are also rising, such as processed copper and cotton yarn.

Table 16 Identifying Sectors for Growth: Key Exports of China

Year	Ranking			
1995				
	1	9503	Models and Stuffed Animals	2.86%
	2	6403	Leather Footwear	2.81%
	3	4202	Trunks and Cases	2.50%
	4	6110	Knit Sweaters	2.45%
	5	6402	Rubber Footwear	2.37%
	6	6204	Non-Knit Women's Suits	2.29%
	7	8527	Radio Receivers	2.00%
	8	8473	Office Machine Parts	1.84%
	9	6203	Non-Knit Men's Suits	1.72%
	10	8471	Computers	1.68%
2000				
	1	8471	Computers	4.64%
	2	8473	Office Machine Parts	3.67%
	3	9503	Models and Stuffed Animals	2.59%
	4	6403	Leather Footwear	2.20%
	5	6110	Knit Sweaters	2.09%
	6	8504	Electrical Transformers	2.05%
	7	6204	Non-Knit Women's Suits	1.93%
	8	4202	Trunks and Cases	1.77%
	9	6402	Rubber Footwear	1.75%
	10	8517	Telephones	1.70%

11	**8527**	**Radio Receivers**	**1.62%**
15	**6203**	**Non-Knit Men's Suits**	**1.24%**
2005			
1	8471	Computers	9.44%
2	8473	Office Machine Parts	4.81%
3	8525	Broadcasting Equipment	3.24%
4	8521	Video Recording Equipment	2.17%
5	8529	Broadcasting Accessories	1.86%
6	8542	Integrated Circuits	1.85%
7	6204	Non-Knit Women's Suits	1.67%
8	8517	Telephones	1.57%
9	8504	Electrical Transformers	1.42%
10	6110	Knit Sweaters	1.38%
14	**9503**	**Models and Stuffed Animals**	**1.19%**
15	**6403**	**Leather Footwear**	**1.19%**
13	**4202**	**Trunks and Cases**	**1.28%**
18	**6402**	**Rubber Footwear**	**1.02%**
24	**8527**	**Radio Receivers**	**0.81%**
25	**6203**	**Non-Knit Men's Suits**	**0.81%**
2010			
1	8471	Computers	9.00%
2	8517	Telephones	4.22%
3	8525	Broadcasting Equipment	3.96%
4	8473	Office Machine Parts	2.71%
5	8443	Industrial Printers	2.07%
6	8542	Integrated Circuits	2.03%
7	8541	Semiconductor Devices	1.89%
8	8528	Video Displays	1.55%
9	8529	Broadcasting Accessories	1.50%
10	8504	Electrical Transformers	1.39%
38	**8521**	**Video Recording Equipment**	**0.52%**
6	**8542**	**Integrated Circuits**	**2.03%**
14	**6204**	**Non-Knit Women's Suits**	**1.18%**
13	**6110**	**Knit Sweaters**	**1.23%**
23	**9503**	**Models and Stuffed Animals**	**0.81%**
18	**6403**	**Leather Footwear**	**1.00%**
44	**8527**	**Radio Receivers**	**0.42%**
31	**6203**	**Non-Knit Men's Suits**	**0.66%**
2012			
1	8471	Computers	9.93%
2	8525	Broadcasting Equipment	5.24%

3	8517	Telephones	4.33%
4	8473	Office Machine Parts	2.22%
5	8542	Integrated Circuits	1.97%
6	8529	Broadcasting Accessories	1.39%
7	8541	Semiconductor Devices	1.37%
8	8504	Electrical Transformers	1.19%
9	9403	Other Furniture	1.18%
10	6110	Knit Sweaters	1.14%
21	**8443**	**Industrial Printers**	**0.87%**
12	**8528**	**Video Displays**	**1.04%**
17	**8521**	**Video Recording Equipment**	**0.95%**
15	**6204**	**Non-Knit Women's Suits**	**1.00%**
29	**9503**	**Models and Stuffed Animals**	**0.72%**
27	**6403**	**Leather Footwear**	**0.75%**
46	**8527**	**Radio Receivers**	**0.38%**
36	**6203**	**Non-Knit Men's Suits**	**0.57%**

Table 17 Identifying Sectors for Growth: Key Exports of Uzbekistan

Year	Ranking			
1995				
	1	2631	Raw Cotton	72.15%
	2	9710	Gold	13.19%
	3	6861	Unwrought Zinc	2.08%
	4	6521	Unbleached Cotton Woven Fabrics	1.44%
	5	5241	Radioactive Chemicals	1.39%
	6	2632	Cotton Linters	1.27%
	7	5621	Nitrogenous Fertilizers	1.11%
	8	6821	Copper	0.89%
	9	2614	Worm Cocoon	0.61%
	10	813	Oilcake	0.51%
2000				
	1	2631	Raw Cotton	43.08%
	2	3414	Petroleum Gases	9.52%
	3	9710	Gold	8.13%
	4	6513	Cotton Yarn	4.30%
	5	7810	Cars	3.06%
	6	6821	Copper	2.57%
	7	6861	Unwrought Zinc	2.08%
	8	579	Miscellaneous Fruit	2.04%
	9	575	Grapes	1.93%
	10	6521	Unbleached Cotton Woven Fabrics	1.86%
	16	**5241**	**Radioactive Chemicals**	**0.94%**

	19	**2632**	**Cotton Linters**	**0.70%**
	182	**5621**	**Nitrogenous Fertilizers**	**0.01%**
	65	**2614**	**Worm Cocoon**	**0.07%**
	27	**813**	**Oilcake**	**0.31%**
2005				
	1	2631	Raw Cotton	26.94%
	2	3414	Petroleum Gases	14.41%
	3	7810	Cars	8.17%
	4	6821	Copper	7.70%
	5	9710	Gold	5.85%
	6	6513	Cotton Yarn	3.84%
	7	5241	Radioactive Chemicals	3.36%
	8	579	Miscellaneous Fruit	3.17%
	9	575	Grapes	2.33%
	10	5831	Polyethylene	1.99%
	15	**6861**	**Unwrought Zinc**	**0.94%**
	16	**6521**	**Unbleached Cotton Woven Fabrics**	**0.90%**
	28	**2632**	**Cotton Linters**	**0.34%**
	14	**5621**	**Nitrogenous Fertilizers**	**1.05%**
	85	**2614**	**Worm Cocoon**	**0.04%**
	53	**813**	**Oilcake**	**0.13%**
2010				
	1	2631	Raw Cotton	17.36%
	2	5241	Radioactive Chemicals	11.42%
	3	7810	Cars	9.01%
	4	6821	Copper	8.58%
	5	6513	Cotton Yarn	7.09%
	6	3414	Petroleum Gases	4.82%
	7	579	Miscellaneous Fruit	4.24%
	8	9710	Gold	3.41%
	9	3345	Lubricating Petroleum Oils	3.02%
	10	5621	Nitrogenous Fertilizers	2.35%
	13	**575**	**Grapes**	**1.72%**
	17	**5831**	**Polyethylene**	**1.26%**
	11	**6861**	**Unwrought Zinc**	**2.01%**
	21	**6521**	**Unbleached Cotton Woven Fabrics**	**0.68%**
	31	**2632**	**Cotton Linters**	**0.32%**
	94	**2614**	**Worm Cocoon**	**0.05%**
	null	**813**	**Oilcake**	**null**
2012				
	1	2631	Raw Cotton	15.38%
	2	7810	Cars	14.59%

3	6821	Copper	9.23%
4	6513	Cotton Yarn	6.56%
5	5241	Radioactive Chemicals	6.10%
6	3414	Petroleum Gases	5.15%
7	6822	Processed Copper	3.54%
8	579	Miscellaneous Fruit	3.44%
9	575	Grapes	3.29%
10	5621	Nitrogenous Fertilizers	2.72%
12	**9710**	**Gold**	**2.40%**
231	**3345**	**Lubricating Petroleum Oils**	**0.00%**
17	**5831**	**Polyethylene**	**0.81%**
13	**6861**	**Unwrought Zinc**	**2.24%**
20	**6521**	**Unbleached Cotton Woven Fabrics**	**0.74%**
78	**2632**	**Cotton Linters**	**0.07%**
120	**2614**	**Worm Cocoon**	**0.02%**
null	**813**	**Oilcake**	**null**

Similar exercises can be made in the cases of India, Nigeria, and Vietnam (see Annex I for more detailed analysis). Table 18 summarises sectors where Uganda could have potential comparative advantages.

Table 18 Windows of Opportunities: Sectors that Uganda could potentially enter

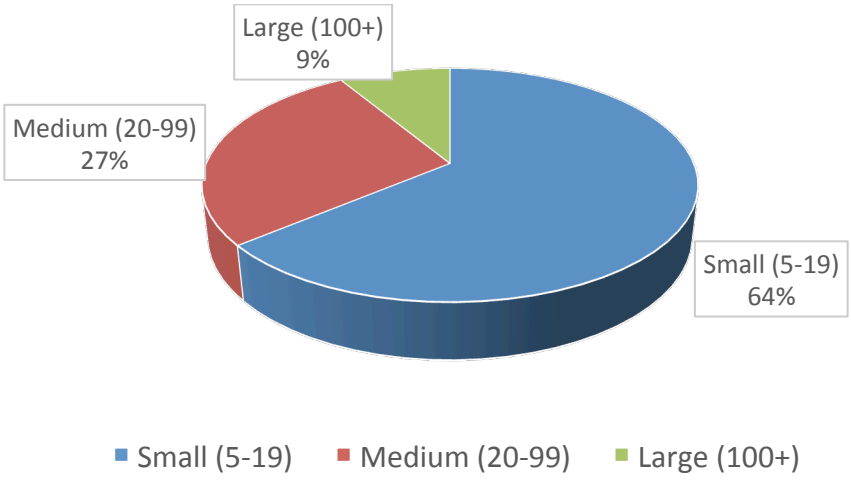
Sector/Product Codes	Sector/Product Descriptions	Note
6203, 6204, 6206, 6205, 6109	Non-Knit Men's Suits, Non-Knit Women's Suits, Non-Knit Women's Shirts, Non-Knit Men's Shirts, Knit T-shirts	As wages are rising, these labour-intensive sectors are losing comparative advantages in China, India, and/or Vietnam.
4203, 6403, 6402	Leather Footwear, Leather Apparel, Rubber Footwear	Ibid.
4202	Trunks and Cases	Ibid.
8527, 8521, 8528	Radio Receivers, Video Recording Equipment, Video Displays	These assembly industries are losing cost competitiveness in China.
4113, 8905	Processed leather, Light-vessels, fire-floats, dredgers, floating cranes and other vessels	Nigeria is building up these new sector.
6513	Cotton Yarn	Uzbekistan is strengthening this new sector.
7810	Cars	Ibid.

In order to select the subsectors where Uganda really has latent comparative advantages, we apply the pre-screening criteria. The purpose is to select those subsectors which have both the potential for growth and the feasibility for production.

The potential for growth largely depends on market demands. Apart from international markets, a significant demand in domestic markets is vital too. Here we use the declining import shares as an indicator for gauging the size of domestic markets (see Table 20 and Table 21). The feasibility for production hinges on the scale of capital requirements, the size of production firms, and factor endowment. Since most informal firms in Uganda are very small and a majority of register firms (about 90 percent) are small and medium-sized enterprises (see Figure 7), the feasibility study requires selecting those subsectors that have been produced by small and medium-size enterprises in the benchmark countries.

Apart from the above pre-screening criteria, it is indispensable to analyse how the Uganda's landlocked situation affects the transportation costs of potential subsectors. At first glance, monetary transport cost disadvantage of a landlocked country may be exaggerated, because of the imbalance between volume of exports and imports and the tendency to offer discounts on export transport costs owing to excess transport capacity in returning to the coast. But uncertainty regarding delivery times, and high costs of delivering bulky items can seriously reduce competitive advantage of firms in landlocked countries. Hence, we add an additional pre-screening criterion to see whether the selected subsectors are bulky or time-sensitive.

Figure 7 Firm Size of Uganda's Registered Enterprises



Source: World Bank: Enterprise Surveys (2013b); business owners and top managers in 762 firms were interviewed from January 2013 through July 2014.

Most subsectors meet the pre-screening criteria, as seen in Table 19, with an exception of trunks and cases, vessels, and cars. Due to the landlocked situation, international transportation costs are relatively high for bulky and time-sensitive products such as trunks and cases and vessels. Cars are produced by large firms, which have high capital requirements. Moreover, domestic supply chains seldom exist in Uganda. With regard to the size of the market, Table 20 shows that import shares of

motor vehicles or cycles are relatively high in Uganda.[2] Table 21 further shows that import shares of manufacturing sectors, which indicates that road vehicles accounted for nearly 15 percent of the total manufacturing imports in 2013. So it might be reasonable for Uganda to develop low-tech motor cycles before entering into the more sophisticated car industry. Table 21 also shows that there is high market demand for electric machinery and recording equipment.

[2] In a visit to Uzbekistan, we found that its production and export of cars are highly subsidized by the state with its government provide a long-term interest free loan for capital investment and subsidized loan for working capital to the join-ventured GM firm.

Table 19 Criteria for Screening Potential Subsectors

Product Group	Criteria 1: There is a significant domestic market	Criteria 2: How Uganda's landlocked situation affect its latent comparative advantage?	Criteria 3: Production has low capital requirements; production in benchmark countries is by small and medium-size enterprises	Criteria 4: There is some factor endowment in Uganda (easily transferable labour skills; domestic or imported raw materials)
Non-Knit Men's Suits, Non-Knit Women's Suits, Non-Knit Women's Shirts, Non-Knit Men's Shirts, Knit T-shirts	Yes	Largely negative, if these garments are fashionable and thus time-sensitive. Neutral, if these clothes are relatively less time-sensitive.	Yes	Yes. Uganda has raw materials such as cotton, since its export ranked No. 9 in 2012.
Leather Footwear, Leather Apparel, Processed leather, Rubber Footwear	Yes	Relatively neutral, if these products are less time-sensitive.	Yes	Yes. Labour skills are transferable, and raw materials can be imported.
Trunks and Cases	Yes	Negative. Trunks and cases are bulky items.	In some cases	Yes.
Radio Receivers, Video Recording Equipment, Video Displays	Yes	Neutral. These products are relatively light and less time-sensitive.	Yes	Uganda has already exported broadcasting equipments, which indicates that supply chain exists.

Light-vessels, fire-floats, dredgers, floating cranes and other vessels	Yes	Negative. These products are bulky items.		Yes	Yes
Cotton Yarn	Yes	Neutral. This product is relatively light and less time-sensitive.		Yes	Yes
Cars	No	Negative. It is difficult to transport cars to the port.	No	(high capital requirements)	Not yet. The supply chain rarely exists.

Table 20 Top 15 imports by Uganda (in 4-digits; the latest year 2013)

No.	Commodity Code	Commodity	Trade Value (1000 US$)	% of total imports
1	3346	Petroleum oils & oils obtained from bituminous minerals (other than crude) & preparations n.e.s., containing by weight 70 %/more of petroleum oils/of oils obtained from bituminous minerals, these oils being the basic constituents of the preparations, other than waste oils	1,280,372.55	22.02
2	5429	Medicaments, n.e.s.	279,394.38	4.80
3	4222	Palm oil and its fractions	209,877.32	3.61
4	7812	Motor vehicles for the transport of persons, n.e.s.	208,961.80	3.59
5	7641	Telephone sets, including telephones for cellular networks or for other wireless networks; other apparatus for the transmission or reception of voice, images or other data, including apparatus for communication in a wired or wireless network	165,879.82	2.85
6	0612	Other beet or cane sugar and chemically pure sucrose, in solid form	117,774.44	2.03
7	7821	Motor vehicles for the transport of goods	112,391.76	1.93
8	9310	Special transactions & commodities not classified according to kind	104,461.49	1.80
9	6612	Portland cement, aluminous cement, slag cement, supersulphate cement and similar hydraulic cements, whether or not coloured or in the form of clinkers.	84,812.73	1.46
10	6732	Flat-rolled products of iron or non-alloy steel, not clad, plated or coated, not further worked than hot-rolled	75,584.57	1.30
11	8722	Instruments and appliances used in medical, surgical or veterinary sciences (including sight-testing instruments but excluding electrodiagnostic and radiological instruments and apparatus)	65,090.34	1.12
12	7851	Motor cycles (including mopeds) and cycles fitted with an auxiliary motor, with or without side-cars; side-cars	61,928.19	1.06
13	0412	Other wheat (including spelt) & meslin, unmilled	61,620.28	1.06
14	2690	Worn clothing and other worn textile articles; rags	61,492.77	1.06
15	5711	Polyethylene	60,308.97	1.04

Data source: UN Comtrade Database. http://comtrade.un.org/data/

Table 21 Descending Import Shares of Manufacturing Subsectors

Commodity Code	Commodity	Trade Value (US$)	As a % of total manufacturing imports (%)	As a % of total imports

				(%)
78	Road vehicles	516,098,778	14.49%	8.87%
54	Medicinal and pharmaceutical products	350,038,573	9.83%	6.02%
67	Iron and steel	258,717,489	7.26%	4.45%
72	Machinery specialized for particular industries	226,804,946	6.37%	3.90%
76	Telecommunications, sound recording and reproducing equipment	212,106,079	5.95%	3.65%
58	Artificial resins and plastic materials, and cellulose esters etc	187,210,466	5.25%	3.22%
77	Electric machinery, apparatus and appliances, nes, and parts, nes	145,436,230	4.08%	2.50%
87	Professional, scientific, controlling instruments, apparatus, nes	145,467,789	4.08%	2.50%
66	Non-metallic mineral manufactures, nes	142,292,779	3.99%	2.45%
64	Paper, paperboard, and articles of pulp, of paper or of paperboard	134,880,546	3.79%	2.32%
74	General industrial machinery and equipment, nes, and parts of, nes	125,078,582	3.51%	2.15%
89	Miscellaneous manufactured articles, nes	117,031,531	3.28%	2.01%
65	Textile yarn, fabrics, made-up articles, nes, and related products	112,748,003	3.16%	1.94%
69	Manufactures of metals, nes	106,900,246	3.00%	1.84%
55	Oils and perfume materials; toilet and cleansing preparations	104,397,474	2.93%	1.79%
51	Organic chemicals	82,385,734	2.31%	1.42%
75	Office machines and automatic data processing equipment	79,471,156	2.23%	1.37%
59	Chemical materials and products, nes	76,070,544	2.14%	1.31%
62	Rubber manufactures, nes	66,272,067	1.86%	1.14%
85	Footwear	50,462,916	1.42%	0.87%
56	Fertilizers, manufactured	49,564,219	1.39%	0.85%
79	Other transport equipment	47,745,456	1.34%	0.82%
84	Articles of apparel and clothing accessories	46,141,192	1.30%	0.79%
52	Inorganic chemicals	38,594,892	1.08%	0.66%
71	Power generating machinery and equipment	37,283,649	1.05%	0.64%
82	Furniture and parts thereof	22,232,944	0.62%	0.38%
53	Dyeing, tanning and colouring materials	21,464,378	0.60%	0.37%
73	Metalworking machinery	14,091,614	0.40%	0.24%
63	Cork and wood, cork manufactures	12,052,375	0.34%	0.21%

81	Sanitary, plumbing, heating, lighting fixtures and fittings, nes	10,891,120	0.31%	0.19%
83	Travel goods, handbags and similar containers	10,321,334	0.29%	0.18%
88	Photographic equipment and supplies, optical goods; watches, etc	8,555,243	0.24%	0.15%
57	Explosives and pyrotechnic products	2,992,756	0.08%	0.05%
61	Leather, leather manufactures, nes, and dressed furskins	914,291	0.03%	0.02%

Data source: UN Comtrade Database. http://comtrade.un.org/data/

Note: Commodity Code indicates 2-digit SITC.

Apart from identifying subsectors in the benchmark countries where Uganda would have potential comparative advantages, it is also important to scale up self-discoveries by domestic private firms. One way of identifying such self-discoveries is to find sectors where Uganda has been gaining competitiveness in the global market. A useful indicator is Revealed Comparative Advantage (RCA).

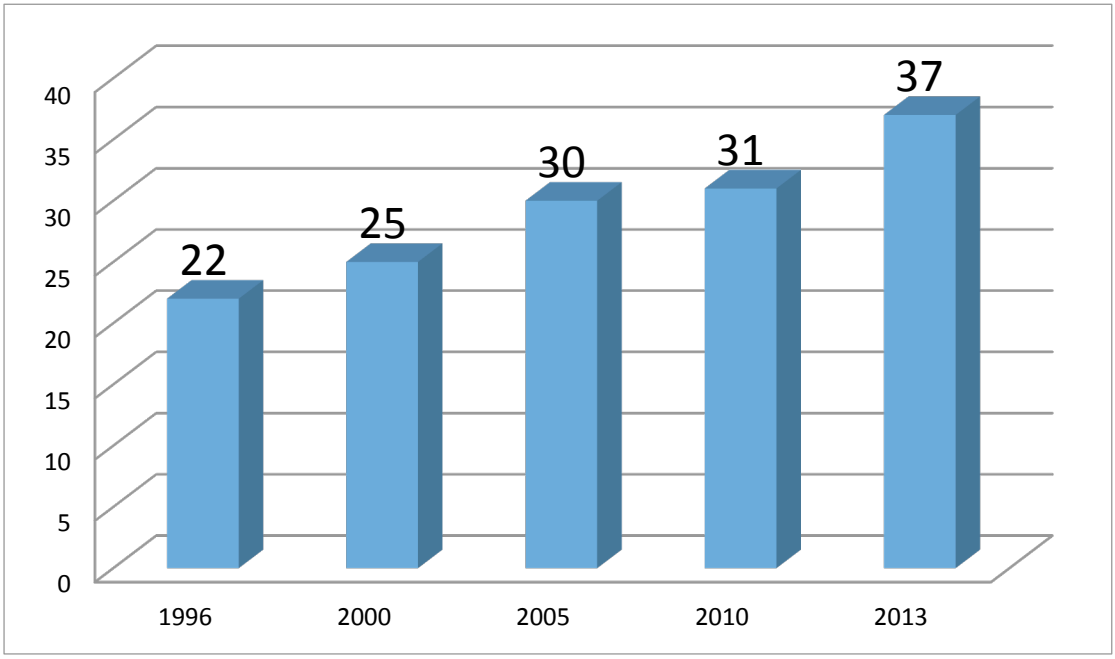
$$RCA_{ij} = \frac{x_{ij}/X_{jt}}{x_{wj}/X_{wt}}$$

Where x_{ij} and x_{wj} are the values of country i's exports 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, while RCA > 1 means the country has a revealed comparative advantage in the product.

Figure 8 shows that the number of sectors where Uganda's exports have RCA has consistently grown from 22 sectors in 1996 to 37 sectors in 2013. Table 22 offers detailed information about which sectors gained RCA and which sectors lost RCA. Emerging industries include agro-processing business, iron and steel, paper production, dyeing/colouring materials, printing industries, and glass and glassware.

It is worth noting that Uganda's private firms are utilising its rich land resources to diversify agricultural resource-based industries and add value to agricultural exports. This potentially leads to an agricultural-led industrialization strategy. Indeed, an agricultural-led industrialization strategy is complementary with introducing new tradables sectors through FDI in the type of light manufacturing sectors as identified earlier.

Figure 8 Number of Sectors with RCA in Uganda's Exports



Source: UNcomtrade.

Table 22 Summary of sectors that lost RCA and sectors that gained RCA

2000		2005		2010		2013	
Sectors that lost RCA	**Sectors that gained RCA**	**Sectors that lost RCA**	**Sectors that gained RCA**	**Sectors that lost RCA**	**Sectors that gained RCA**	**Sectors that lost RCA**	**Sectors that gained RCA**
Preparations of vegetables, fruit, nuts or other parts of plants	Meat and edible meat offal	Dairy products, eggs, honey, edible animal product nes	Preparations of meat, of fish or of crustaceans	Edible fruit and nuts; peel of citrus fruit or melons	Dairy products, eggs, honey, edible animal product nes		Edible fruit and nuts; peel of citrus fruit or melons
Salt; sulphur; earths and stone; plastering materials, lime and cement	Dairy products, eggs, honey, edible animal product nes	Lac, gums, resins, vegetable saps and extracts nes	Beverages, spirits and vinegar	Preparations of meat, of fish or of crustaceans	Preparations of vegetables, fruit, nuts or other parts of plants		Preparations of meat, of fish or of crustaceans
Inorganic chemicals, precious metal compound, isotopes	Sugars and sugar confectionery		Residues and waste from the food industries; prepared animal fodder	Ores, slag and ash	Miscellaneous edible preparations		Tanning or dyeing extracts; tannins and their derivatives; dyes, pigments and other colouring matter; etc
	Cocoa and cocoa preparations		Salt; sulphur; earths and stone; plastering materials, lime and cement	Pearls, precious stones, metals, coins, etc	Articles of iron or steel		Paper and paperboard; articles of paper pulp, of paper or of paperboard
	Preparations of cereals, flour, starch or milk; pastrycooks' products		Essential oils and resinoids; perfumery, cosmetic or toilet preparations		Other base metals; cermets; articles thereof		Printed books, newspapers, pictures and other products of the printing industry; manuscripts, typescripts and plans
	Ores, slag and ash		Iron and steel				Glass and glassware

In summary, combining subsectors from the benchmark countries as well as the self-discoveries by Uganda's domestic firms, the following subsectors stand out including garments, footwear, trunks and cases, video and radio equipment, cotton yarn, agro-processing business (such as preparations of meat, of fish or of crustaceans, dairy products, eggs, honey, edible animal product, and prepared animal fodder), iron and steel, paper production, dyeing/colouring materials, printing industries, and glass and glassware.

Before making specific recommendations about which subsectors that Uganda should enter, it is important to conduct rigorous comparative value chain analysis (World Bank, 2011). The purpose is to screen out sectors where Uganda does not actually have comparative, and to identify key sector-specific constraints. At the heart of the comparative value chain analysis is to compare the cost of production in benchmark countries in order to evaluate the cost competitiveness of Uganda's production of particular products, chosen to be as like-for-like as possible. Data needs to be gathered from a reasonable sample of firms in Uganda and benchmark countries producing similar products in each identified sub-sector in order to make a quantitative breakdown of the proportion and cost of inputs, efficiency input use, logistic costs, labor productivity, production wastage and efficiency etc.

V. Policy Recommendations: How to identify and remove key constraints?

This section will first try to identify key constraints to quality upgrading or further firm entry, discuss how FDI can help to incubate new industries with a special focus on China's FDI flows into Uganda, and finally propose how to enhance the role of industrial parks in Uganda's industrial upgrading.

A. Identify Key Constraints

Infrastructure deficits have been identified as the biggest obstacle in facilitating industrial development. As a landlocked country, Uganda faces compelling challenges in improving trade logistics. According to World Development Indicators (WDI), while Uganda's logistics performance index (which measures the quality of trade and transport-related infrastructure) has been improved from 2.17 in 2007 to 2.35 in 2010 (1=low, 5=high), the country still ranked 66th in the world suggesting that more needed to be done to further improve the country's performance in trade logistics and therefore its competitiveness. In 2012, only 18 percent of population had access to electricity. Moreover, there was a stark urban-rural disparity: 71 percent of urban population had access to electricity, whereas only 8 percent of rural population did in 2012 (the latest available data).

One compelling challenge of infrastructure gaps is electricity deficits. The underdevelopment of electricity supply from the public grid has compelled enterprises

to generate electricity by themselves, which incurs much higher cost. According to the World Bank's Regional Program for Enterprise Development surveys, running a generator was between 2 and 6 times more expensive than obtaining electricity from the public grid; moreover, the smaller firms were, the more expensive self-generated electricity was (World Bank, 2007: 120).

Recently, the bottleneck of electricity deficits has been relieved to some extent. According to the World Bank's latest Enterprise Surveys in 2013, the percentage of firms reporting electricity as the most important obstacle for their day-to-day operations declined from 63% in 2006 to 23% in 2012. Since the World Bank's Enterprise Surveys focus on registered firms, more information is needed about whether informal firms' access to electricity has been improved as well.

Another compelling challenge of infrastructure gaps is transit transportation. As a landlocked country, Uganda faces very high trade cost. *Uganda Vision 2040* recognises the importance that 'Uganda must urgently attain an integrated transport infrastructure network to spur its own economic growth.' It sets the vision that 'by 2040, Uganda will have a multi-lane standard gauge railway system with high speed trains using the latest technology for both passenger transport and cargo freights' (The Government of Uganda, 70).

Access to finance is identified as another key constraint faced by many private firms. According to the World Bank's Enterprise Surveys, firms' access to credit through the financial intermediaries of banks remained low in Uganda in 2013. Only 10% of firms had a bank loan or line of credit, a proportion which was less than half the average for low income countries at 22% and lower than in 2006 in Uganda at 17%. Moreover, only 8% of firms used banks to finance investments compared to 15% in low income countries (World Bank, 2013a).

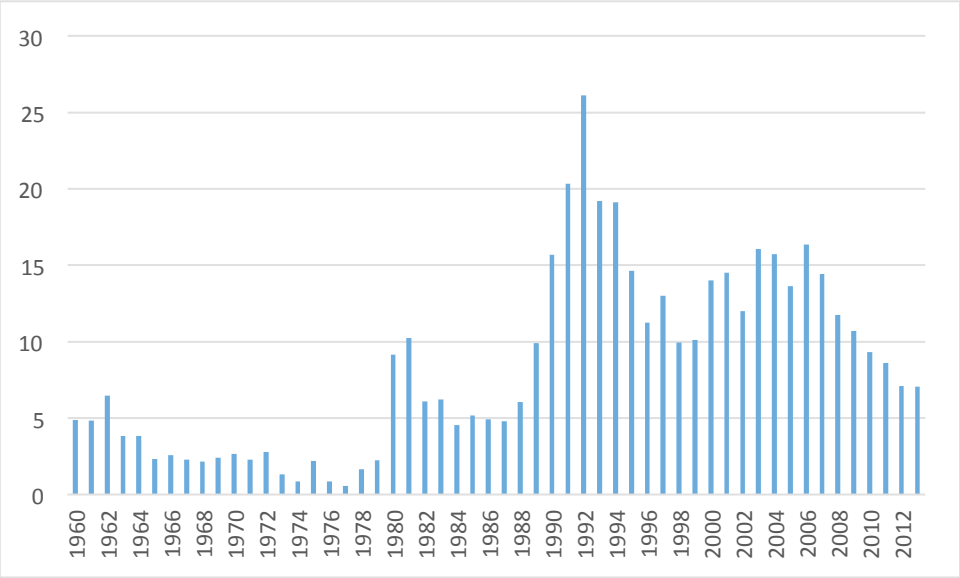
Finally, questions about sector-specific constraints can ultimately be answered only through detailed comparative value chain analysis. This is beyond the scope of the present paper. In the future, in-depth comparative value chain analysis can be done in order to make more specific policy recommendations.

B. How to use FDI to incubate new industries?

FDI is not only an important source of external finance, but also a channel for transferring knowledge and skills and opening up new international market opportunities.

Sustained FDI inflows can reduce Uganda's financial dependence upon donor countries. Accordingly to the WDI, net FDI inflows as a percentage of GDP has increased from almost null (0.03 percent) in 1991 to about 5 percent in 2013. The growth rate of net FDI inflows has been speeding up especially since 2006, which coincides with the declining aid dependence of Uganda as measured with net official development assistance received as a percentage of GNI (see Figure 9). Uganda still relies on donor funding especially big donors such as the US. In 2013, the US provided about US$451 million of aid to Uganda (see Table 23).

Figure 9 Net Official Development Assistance Received as a percentage of GNI



Source: World Development Indicators, **http://data.worldbank.org/indicator/DT.ODA.ODAT.GN.ZS.**

Table 23 Top 10 Bilateral Donors in Uganda in 2013

(Constant Prices,2013 USD millions)

Donors	Amounts
United States	451.97
United Kingdom	90.93
Norway	69.97
Japan	57.51
Denmark	55.24
Germany	42.07
Sweden	41.31
Netherlands	36.17
Ireland	31.67
Austria	17.43

Source: OECD Aid Statistics.

According to the Uganda Investment Authority, China was the largest FDI investor in 2013, followed by the UK, Canada and India (see Table 24). As for sectoral distributions, finance, insurance, real estate and business services attracted the greatest FDI flows, but it created the least employment per 1 million investment. As seen in Figure 10, manufacturing sectors created the highest level of employment.

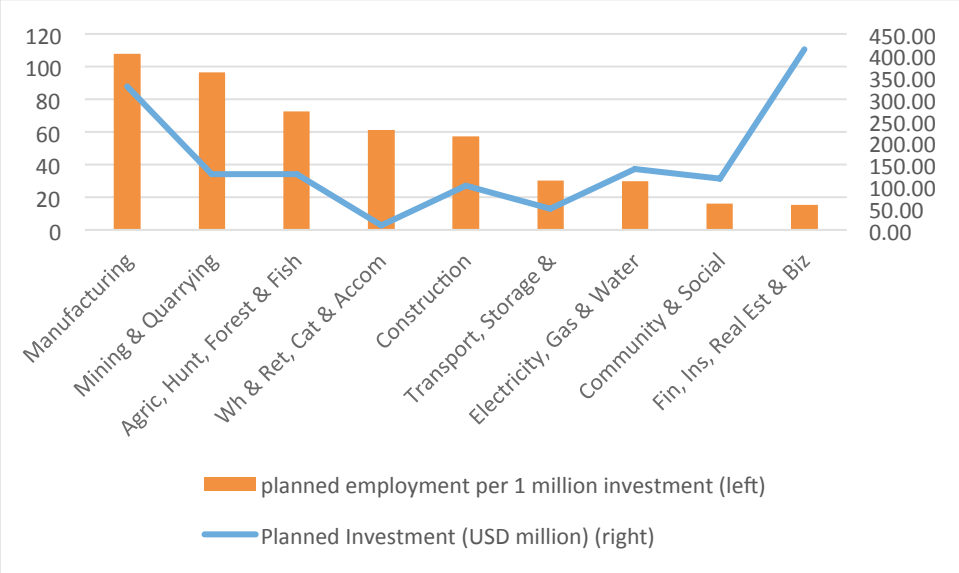
Table 24 Top 10 Home Countries of Planned FDI Investment in 2013

(USD millions)

	Planned Investment (USD millions)	Number of Projects
China	270.17	62
United Kingdom	146.33	18
Canada	143.09	4
India	101.06	111
Kenya	64.74	13
Netherlands	55.15	1
Iran	31.31	2
South Africa	21.58	9
Cayman Islands	18.12	1
Mauritius	14.90	4

Source: Uganda Investment Authority.

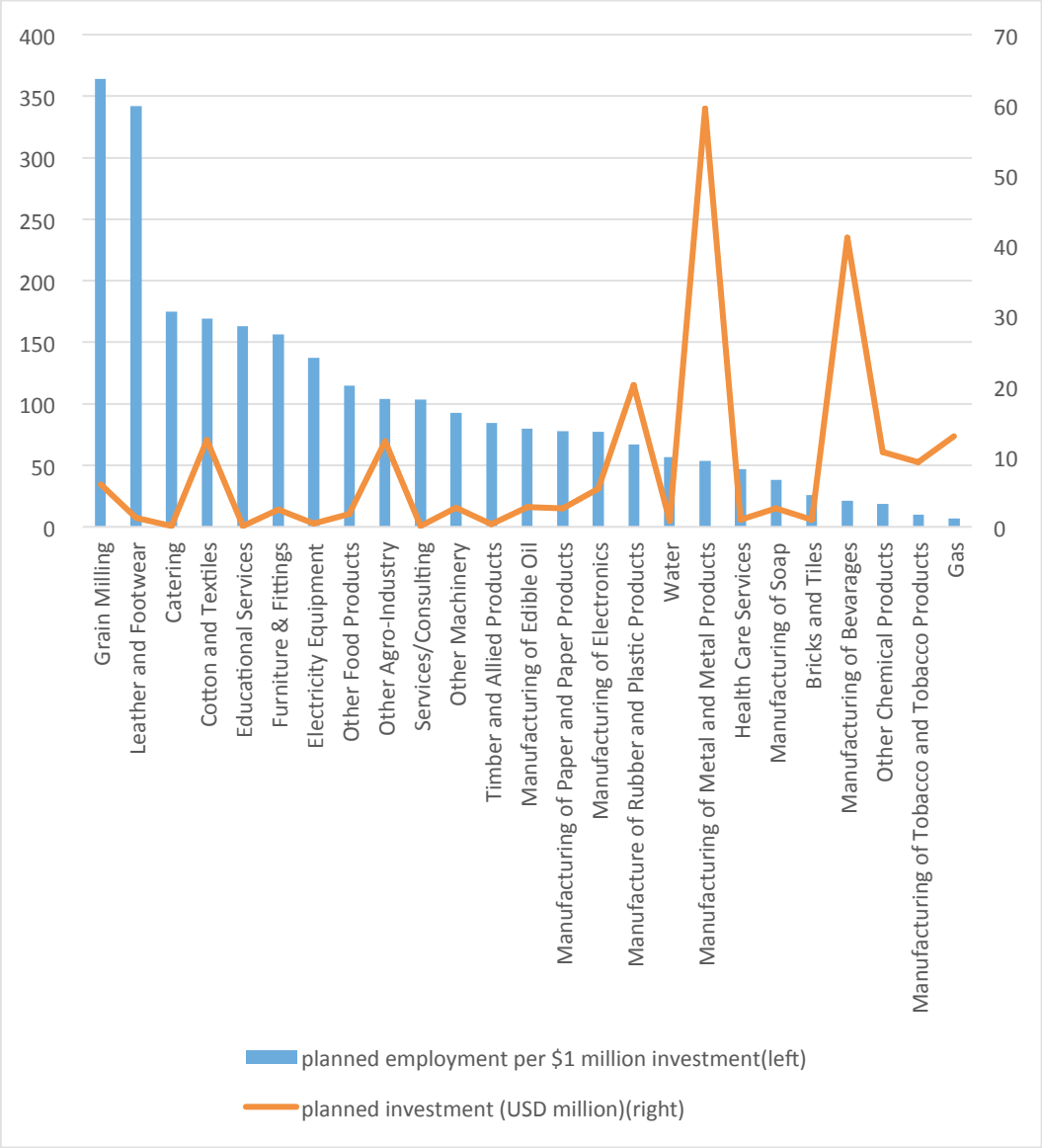
Figure 10 Volume of FDI by Sectors vs. Employment per unit



Source: Uganda Investment Authority.

Looking inside the manufacturing sectors, Figure 11 shows that the subsectors of 'grain milling' and 'leather and footwear' created relatively high levels of employment, but they attracted less than 10 million of the planned investment.

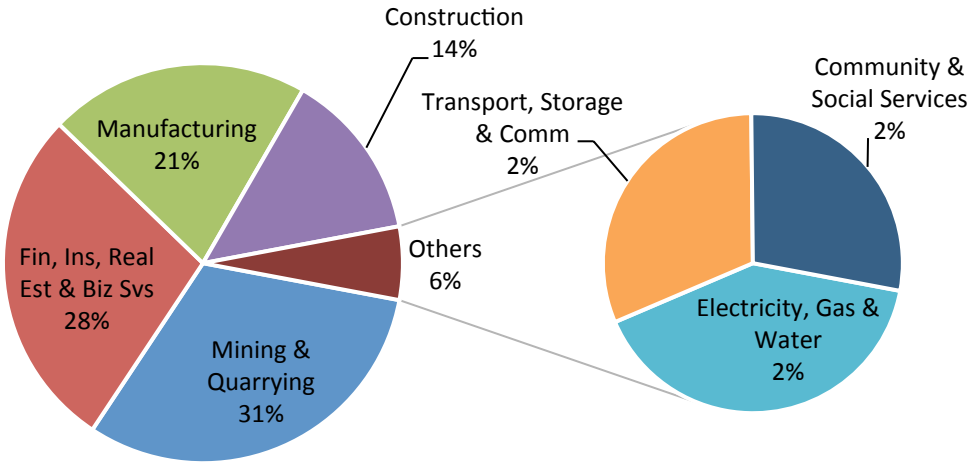
Figure 11 Volume of FDI by Manufacturing Subsectors vs. Employment per unit



Source: Uganda Investment Authority.

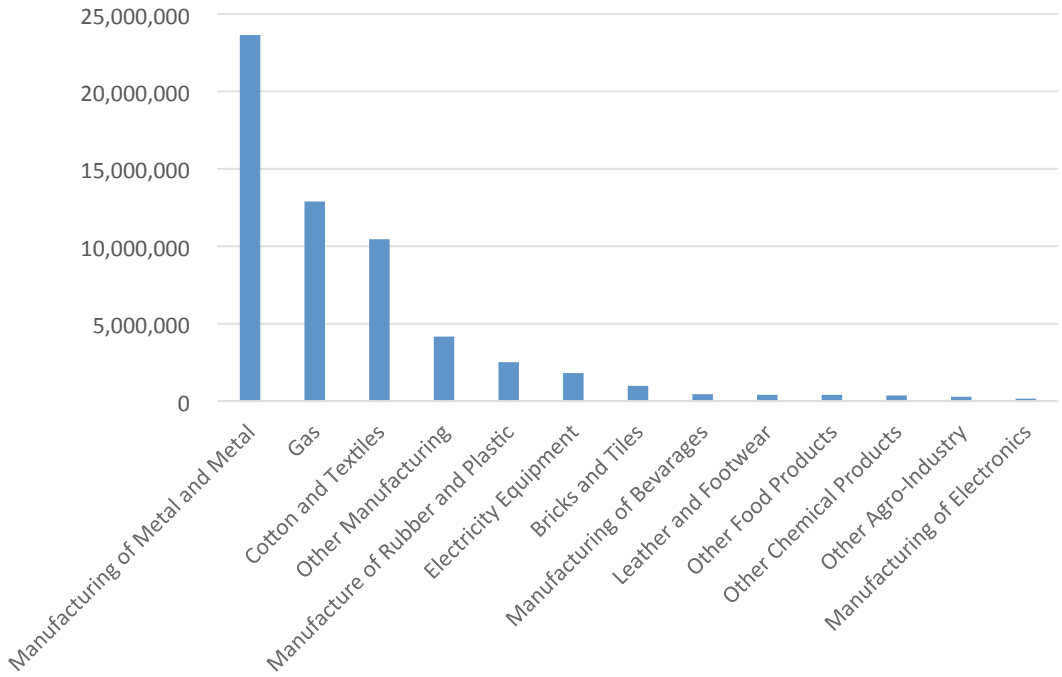
A closer look at the FDI flows from China reveals that services and mining sectors accounted for nearly 60 percent of total China's FDI in Uganda in 2013, whereas manufacturing sectors accounted for one fifth (see Figure 12). Among manufacturing sectors, 'manufacturing of metal and metal products', 'gas', 'cotton and textiles' were the top 3 subsectors, while 'leather and footwear' and 'manufacturing of electronics' only accounted for a meagre share of total China's FDI flows to Uganda. But gas and metal subsectors are capital-intensive, which creates relatively less employment (see Figure 13). The emphasis on the job-creating manufacturing FDI does not mean that resource-/service-intensive FDI is not important. As long as these foreign investments can be designed in a way that promotes inclusive and sustainable growth, they are beneficial to the whole economy.

Figure 12 The Distribution of China's FDI in Uganda by Sectors in 2013



Source: Uganda Investment Authority.

Figure 13 The Distribution of China's Manufacturing FDI by Subsector (USD)



Source: Uganda Investment Authority.

Based on the above empirical analysis, it is safe to conclude that the sectoral structure of FDI inflows into Uganda can be better improved by putting in place targeted government policy to attract more labour-intensive FDI. In particular, there is a huge potential for boosting China's FDI in manufacturing sectors such as footwear and electronics. From this perspective, the international support measures matter, since they can incentivise Chinese investors to invest in Africa. For example, the African Growth and Opportunity Act (AGOA) and Everything but Arms (EBA) initiative provide duty-free and quota-free access to the US and European markets respectively. This can help to improve cost competitiveness if Chinese investors produce the labour-intensive products in Africa.

C. How to enhance the role of industrial parks in industrial upgrading?

Like many other LDCs, Uganda is plagued with the problem of poor infrastructure and poor investment climate, which has undermined the effectiveness of development projects. The standard prescription is to improve the overall country policy and institutional framework in order to lay the foundation for development effectiveness, since it is generally held that there is no good projects in a bad policy environment. Hence, some development agencies have used the financial leverage of foreign aid to incentivise recipient countries to conduct desired policy and institutional reforms. The performance-based aid allocation system in the World Bank is a case in point. Yet one salient problem with the standard approach is that there is 'no one size fits all' prescriptions about the best policies and institutions. Ignoring the importance of different development stages in deciding the relative effectiveness of a given institution/policy may result in counterproductive outcomes. Another problem with this standard approach is that it takes a long time to improve overall institutional environment. This may miss many development opportunities of quick wins, which may gradually improve the institutional environment in the end. Moreover, the need for generating jobs for youth is urgent and cannot be postponed until the overall improvement of infrastructure and governance.

Industrial parks can promote structural transformation via a step-by-step approach. Investing in industrial parks can pragmatically 'provide a bundling of public services in a geographically concentrated area', 'improve the efficiency of limited government funding/budget for infrastructure', 'facilitate learning, knowledge spillover and cluster development, or agglomeration of certain industries', and 'propel urban development – providing a conducive living conditions for workers and for diaspora science and technical personnel; and facilitate agglomeration of services, including obtaining the economy of scale for environmental services such as water treatment plants and solid waste treatment plants' (Lin and Wang 2014: 36).

The Government of Uganda has recognised the power of industrial parks in speeding up structural transformation. So far it has established more than 20 industrial parks countrywide, including the Kampala Industrial and Business Park (KIBP). The

KIBP was designed as the country's biggest industrial park in order to enable Uganda's industry to leverage production for the local and export market within a short period of time. Yet investors complained inadequate power, lack of water and fibre optic cables, as well as inadequate drainage and solid water management facilities.[3]

Apart from providing adequate infrastructure, the Government of Uganda also needs to adopt targeted policies to proactively attract FDIs to sectors where Uganda has latent comparative advantages. For example, Uganda can identify major light-manufacturing imports from China and adopt policies to encourage/subsidize firms in China to relocate of their production to Uganda for meeting the domestic demands and for exporting to global market (Lin, 2012c). Moreover, the government also needs to provide limited incentives to solve the first-mover problem, that is, no private sectors want to venture into the new industry. If they succeed, other firms would quickly imitate their successes so that the gains have to be shared by many firms. Yet if they fail, the first movers provide useful information to the latecomers. Therefore, the government has to play a facilitating role to compensate for the externalities generated by the first movers and in mitigating the coordination problem of resolving the bottlenecks in poor infrastructure and business environment. To enter into and scaling up new industries, policymakers may consider compensating pioneer firms in the industries identified earlier with time-limited tax incentives, co-financing for investments, or providing access to foreign exchange.

VI. Conclusion

In summary, our paper applies the GIFF to LDCs for the first time with a special focus on Uganda – a landlocked African country. The central tenet of the GIFF of New Structural Economics is that to achieve sustained and dynamic growth, developing countries need to follow their comparative advantages in their industrial development and to tap into the potential of advantages of backwardness in industrial upgrading. We first analysed '*what Uganda has*', and the factor endowment analysis finds that Uganda is a labour-abundant, resource-rich and capital-poor country. Then we discussed '*what Uganda can potentially do well*' by selecting targeted sectors in benchmark countries. After applying the prescreening criteria of potential for growth and feasibility for production, we select the following subsectors: garments, footwear, trunks and cases, video and radio equipment, cotton yarn, vessels, agro-processing business, iron and steel, paper production, dyeing/colouring materials, printing industries, and glass and glassware. In the future study, more detailed comparative value chain analysis is needed to select subsectors where Uganda really has cost competitiveness. Finally, we identified key constraints to industrial upgrading and firm entry, such as infrastructure deficits and limited access to finance, and discussed

[3] Julius Barigaba, "Uganda to tarmac roads in business park," *The East African*, June 7, 2014, http://www.theeastafrican.co.ke/business/Ugandatotarmacroadsinbusinesspark//2560/2340180//dm89va//index.html.

how the Government of Uganda can adopt more targeted FDI policy to attract foreign investors in the subsectors identified above and develop industrial parks to allow new industries to take off the ground before the overall country policy and institutional environment is improved.

References

Byamugisha, Jimrex, Leyla Shamchiyeva and Takaaki Kizu. 2014. Labour market transitions of young women and men in Uganda, *International Labour Organisation Work4Youth Publication Series No. 24*.

Lin, J. Y. 2012a. *New Structural Economics: A Framework for Rethinking Development and Policy*, Washington, DC: World Bank.

———. 2012b. *The Quest for Prosperity: How Developing Economies Can Take Off*, Princeton, NJ: Princeton University Press.

_____. 2012c. "From Flying Geese to Leading Dragons: New Opportunities and Strategies for Structural Transformation in Developing Countries," Global Policy, Vol. 3, issue 4, November 2012: 397-409.

Lin, J. Y. and Hinh T. Dinh. 2014. "The New Structural Economics and Strategies for Sustained Economic Development in the Pacific Island Countries", from *Oxford Handbook of the Economics and the Pacific Rim*, edited by Inderjit Kaur and Nirvikar Singh, Oxford University Press, 2014, pp. 198-229.

Lin, J. Y. and Yan Wang, 2014. "Kazakhstan and Regional Integration: Joining Global Supply Chains via Growth Identification and Facilitation", Working Paper.

The Government of Uganda. *Uganda Vision 2040*.

World Bank. 2007. Uganda: Moving Beyond Recovery: Investment & Behavior Change, For Growth, Country Economic Memorandum.

_____. 2011. Light Manufacturing in Africa: Focused Policies to Enhance Private Investment and Create Millions of Productive Jobs, Volume II: The Value Chain and Feasibility Analysis Domestic Resource Cost Analysis, August.

_____. 2013a. *Uganda Diagnostic Trade Integration Study (DTIS) update: Prepared for the Enhanced Integrated Framework*, April.

_____. 2013b. Enterprise Survey: Country Highlights.

Annex I Identifying Sectors for Growth

Table I-1 Identifying Sectors for Growth: Key Exports of India

Year	Ranking			
1995				
	1	5205	Non-Retail Pure Cotton Yarn	3.54%
	2	6204	Non-Knit Women's Suits	3.45%
	3	1006	Rice	3.38%
	4	306	Crustaceans	2.88%
	5	6205	Non-Knit Men's Shirts	2.56%
	6	6206	Non-Knit Women's Shirts	2.34%
	7	4203	Leather Apparel	2.21%
	8	2601	Iron Ore	2.15%
	9	5208	Light Pure Woven Cotton	1.66%
	10	801	Coconuts, Brazil Nuts, and Cashews	1.57%
2000				
	1	5205	Non-Retail Pure Cotton Yarn	3.34%
	2	2710	Refined Petroleum	3.18%
	3	7113	Jewellery	2.63%
	4	306	Crustaceans	2.59%
	5	6204	Non-Knit Women's Suits	2.58%
	6	1006	Rice	1.67%
	7	6205	Non-Knit Men's Shirts	1.66%
	8	6206	Non-Knit Women's Shirts	1.63%
	9	2601	Iron Ore	1.59%
	10	4203	Leather Apparel	1.48%
	13	**5208**	**Light Pure Woven Cotton**	**1.24%**
	14	**801**	**Coconuts, Brazil Nuts, and Cashews**	**1.24%**
2005				
	1	2710	Refined Petroleum	7.18%
	2	2601	Iron Ore	4.97%
	3	7113	Jewellery	3.29%
	4	7102	Diamonds	2.81%
	5	3004	Packaged Medicaments	2.18%
	6	6204	Non-Knit Women's Suits	2.05%
	7	1006	Rice	1.61%
	8	7210	Coated Flat-Rolled Iron	1.53%
	9	5205	Non-Retail Pure Cotton Yarn	1.28%
	10	6109	Knit T-shirts	1.24%
	14	**306**	**Crustaceans**	**0.98%**
	20	**6205**	**Non-Knit Men's Shirts**	**0.84%**

	11	**6206**	**Non-Knit Women's Shirts**	**1.23%**
	29	**4203**	**Leather Apparel**	**0.59%**
	40	**5208**	**Light Pure Woven Cotton**	**0.45%**
	26	**801**	**Coconuts, Brazil Nuts, and Cashews**	**0.66%**
2010				
	1	2710	Refined Petroleum	17.94%
	2	2601	Iron Ore	4.42%
	3	7113	Jewellery	3.80%
	4	3004	Packaged Medicaments	3.18%
	5	8703	Cars	1.78%
	6	5205	Non-Retail Pure Cotton Yarn	1.50%
	7	5201	Raw Cotton	1.45%
	8	8525	Broadcasting Equipment	1.44%
	9	7403	Refined Copper	1.33%
	10	1006	Rice	1.30%
	26	**7102**	**Diamonds**	**0.57%**
	11	**6204**	**Non-Knit Women's Suits**	**1.14%**
	21	**7210**	**Coated Flat-Rolled Iron**	**0.76%**
	15	**6109**	**Knit T-shirts**	**0.99%**
	27	**306**	**Crustaceans**	**0.56%**
	30	**6205**	**Non-Knit Men's Shirts**	**0.47%**
	17	**6206**	**Non-Knit Women's Shirts**	**0.89%**
	41	**4203**	**Leather Apparel**	**0.39%**
	70	**5208**	**Light Pure Woven Cotton**	**0.27%**
	47	**801**	**Coconuts, Brazil Nuts, and Cashews**	**0.36%**
2012				
	1	2710	Refined Petroleum	19.21%
	2	7113	Jewellery	6.47%
	3	3004	Packaged Medicaments	3.95%
	4	1006	Rice	2.22%
	5	8703	Cars	1.75%
	6	1302	Vegetable Saps	1.61%
	7	5201	Raw Cotton	1.40%
	8	8525	Broadcasting Equipment	1.26%
	9	2601	Iron Ore	1.17%
	10	5205	Non-Retail Pure Cotton Yarn	1.17%
	17	**7403**	**Refined Copper**	**0.82%**
	15	**7102**	**Diamonds**	**0.88%**
	14	**6204**	**Non-Knit Women's Suits**	**0.90%**
	26	**7210**	**Coated Flat-Rolled Iron**	**0.63%**
	22	**6109**	**Knit T-shirts**	**0.66%**
	25	**306**	**Crustaceans**	**0.63%**

40	**6205**	**Non-Knit Men's Shirts**	**0.40%**
27	**6206**	**Non-Knit Women's Shirts**	**0.62%**
45	**4203**	**Leather Apparel**	**0.37%**
67	**5208**	**Light Pure Woven Cotton**	**0.26%**
50	**801**	**Coconuts, Brazil Nuts, and Cashews**	**0.34%**

Table I-2 Identifying Sectors for Growth: Key Exports of Nigeria

Year	Ranking			
2000				
	1	2709	Petroleum oils, oils from bituminous minerals, crude	99.36%
	2	2711	Petroleum gases and other gaseous hydrocarbons	0.28%
	3	1207	Oil seeds and oleaginous fruits nes	0.10%
	4	8905	Special purpose ships, vessels, nes	0.06%
	5	5516	Woven fabric <85% artificial staple fibre	0.02%
	6	8430	Earth or snow moving, boring or pile driving machines	0.02%
	7	6811	Articles of asbestos-cement & cellulose fibre cement	0.01%
	8	7308	Structures, parts of structures of iron or steel, nes	0.01%
	9	1801	Cocoa beans, whole or broken, raw or roasted	0.01%
	10	7323	Table, kitchen, household items of iron or steel nes	0.01%
2006				
	1	2709	Petroleum oils, crude	92.74%
	2	2710	Petroleum oils, other than crude	5.50%
	3	8905	Light-vessels, fire-floats, dredgers, floating cranes and other vessels	0.51%
	4	1301	Lac; natural gums, resins, gum-resins and oleoresins	0.32%
	5	8904	Tugs and pusher craft.	0.13%
	6	3306	Preparations for oral or dental hygiene	0.12%
	7	9001	Optical fibres and optical fibre bundles	0.09%
	8	4113	Leather further prepared after tanning or crusting	0.08%
	9	8901	Cruise ships, excursion boats, ferry-boats, cargo ships, barges and similar ...	0.06%
	10	4106	Tanned or crust hides and skins of other animals, without wool or hair on	0.05%
	29	**1207**	**Other oil seeds and oleaginous fruits**	**0.00%**
	97	**5516**	**Woven fabric <85% artificial staple fibre**	**0.00%**
	179	**8430**	**Earth or snow moving, boring or pile driving machines**	**0.00%**
	-	**6811**	**Articles of asbestos-cement & cellulose fibre cement**	**0.00%**
	-	**7308**	**Structures, parts of structures of iron or steel, nes**	**0.00%**
	23	**1801**	**Cocoa beans, whole or broken, raw or roasted**	**0.00%**
	47	**7323**	**Table, kitchen, household items of iron or steel nes**	**0.00%**

2010				
	1	2709	Petroleum oils and oils obtained from bituminous minerals, crude.	70.35%
	2	2710	Petroleum oils and oils obtained from bituminous minerals, other than crude; preparations not elsewhere specified or included, containing by weight 70 % or more of petroleum oils or of oils obtained from bituminous minerals, these oils being the basic con	11.33%
	3	2711	Petroleum gases and other gaseous hydrocarbons.	5.45%
	4	4113	Leather further prepared after tanning or crusting, including parchment-dressed leather, of other animals, without wool or hair on, whether or not split, other than leather of heading 41.14.	2.40%
	5	1801	Cocoa beans, whole or broken, raw or roasted.	1.21%
	6	4106	Tanned or crust hides and skins of other animals, without wool or hair on, whether or not split, but not further prepared.	1.10%
	7	1207	Other oil seeds and oleaginous fruits, whether or not broken.	0.74%
	8	4001	Natural rubber, balata, gutta-percha, guayule, chicle and similar natural gums, in primary forms or in plates, sheets or strip.	0.64%
	9	2714	Bitumen and asphalt, natural; bituminous or oil shale and tar sands; asphaltites and asphaltic rocks.	0.60%
	10	8431	Parts suitable for use solely or principally with the machinery of headings 84.25 to 84.30.	0.42%
	14	**8905**	**Light-vessels, fire-floats, dredgers, floating cranes and other vessels the navigability of which is subsidiary to their main function; floating docks; floating or submersible drilling or production platforms.**	0.36%
	18	**1301**	**Lac; natural gums, resins, gum-resins and oleoresins (for example, balsams).**	0.27%
	42	**8904**	**Tugs and pusher craft.**	0.03%
	83	**3306**	**Preparations for oral or dental hygiene, including denture fixative pastes and powders; yarn used to clean between the teeth (dental floss), in individual retail packages.**	0.01%
	113	**9001**	**Optical fibres and optical fibre bundles; optical fibre cables other than those of heading 85.44; sheets and plates of polarising material; lenses (including contact lenses), prisms, mirrors and other optical elements, of any material, unmounted, other th**	0.00%
	194	**5516**	**Woven fabric <85% artificial staple fibre**	**0.00%**
	225	**8430**	**Earth or snow moving, boring or pile driving machines**	**0.00%**
	193	**6811**	**Articles of asbestos-cement & cellulose fibre cement**	**0.00%**

104	**7308**	**Structures, parts of structures of iron or steel, nes**	**0.00%**
69	**7323**	**Table, kitchen, household items of iron or steel nes**	**0.00%**
2012			
1	2709	Petroleum oils and oils obtained from bituminous minerals, crude.	69.20%
2	2710	Petroleum oils and oils obtained from bituminous minerals, other than crude; preparations not elsewhere specified or included, containing by weight 70 % or more of petroleum oils or of oils obtained from bituminous minerals, these oils being the basic con	8.58%
3	4001	Natural rubber, balata, gutta-percha, guayule, chicle and similar natural gums, in primary forms or in plates, sheets or strip.	7.03%
4	2711	Petroleum gases and other gaseous hydrocarbons.	6.27%
5	1801	Cocoa beans, whole or broken, raw or roasted.	2.12%
6	401	Milk and cream, not concentrated nor containing added sugar or other sweetening matter.	0.75%
7	4113	Leather further prepared after tanning or crusting, including parchment-dressed leather, of other animals, without wool or hair on, whether or not split, other than leather of heading 41.14.	0.48%
8	2302	Bran, sharps and other residues, whether or not in the form of pellets, derived from the sifting, milling or other working of cereals or of leguminous plants.	0.47%
9	801	Coconuts, Brazil nuts and cashew nuts, fresh or dried, whether or not shelled or peeled.	0.44%
10	8905	Light-vessels, fire-floats, dredgers, floating cranes and other vessels the navigability of which is subsidiary to their main function; floating docks; floating or submersible drilling or production platforms.	0.42%
14	**4106**	**Tanned or crust hides and skins of other animals, without wool or hair on, whether or not split, but not further prepared.**	**0.41%**
13	1207	Other oil seeds and oleaginous fruits, whether or not broken.	0.35%
136	2714	Bitumen and asphalt, natural; bituminous or oil shale and tar sands; asphaltites and asphaltic rocks.	0.00%
50	**8431**	**Parts suitable for use solely or principally with the machinery of headings 84.25 to 84.30.**	0.00%
30	**1301**	**Lac; natural gums, resins, gum-resins and oleoresins (for example, balsams).**	0.00%
27	**8904**	**Tugs and pusher craft.**	0.00%
100	**3306**	**Preparations for oral or dental hygiene, including denture fixative pastes and powders; yarn used to clean**	0.00%

		between the teeth (dental floss), in individual retail packages.	
509	**9001**	**Optical fibres and optical fibre bundles; optical fibre cables other than those of heading 85.44; sheets and plates of polarising material; lenses (including contact lenses), prisms, mirrors and other optical elements, of any material, unmounted, other th**	0.00%
-	**5516**	**Woven fabric <85% artificial staple fibre**	0.00%
228	**8430**	**Earth or snow moving, boring or pile driving machines**	0.00%
159	**6811**	**Articles of asbestos-cement & cellulose fibre cement**	0.00%
175	**7308**	**Structures, parts of structures of iron or steel, nes**	0.00%
98	**7323**	**Table, kitchen, household items of iron or steel nes**	0.00%

Table I-3 Identifying Sectors for Growth: Key Exports of Vietnam

Year	Ranking			
1995				
	1	2709	Crude Petroleum	17.95%
	2	901	Coffee	13.59%
	3	306	Crustaceans	6.18%
	4	1006	Rice	5.70%
	5	6403	Leather Footwear	3.68%
	6	6201	Non-Knit Men's Coats	3.40%
	7	6402	Rubber Footwear	3.26%
	8	6404	Textile Footwear	3.17%
	9	4202	Trunks and Cases	2.79%
	10	307	Molluscs	2.66%
2000				
	1	2709	Crude Petroleum	21.49%
	2	6403	Leather Footwear	6.15%
	3	306	Crustaceans	4.77%
	4	6404	Textile Footwear	4.29%
	5	1006	Rice	4.24%
	6	6402	Rubber Footwear	3.87%
	7	901	Coffee	3.55%
	8	6201	Non-Knit Men's Coats	2.17%
	9	307	Molluscs	2.03%
	10	6203	Non-Knit Men's Suits	1.82%
	12	**4202**	**Trunks and Cases**	**1.66%**
2005				
	1	2709	Crude Petroleum	19.33%
	2	6403	Leather Footwear	7.50%

	3	9403	Other Furniture	3.85%
	4	1006	Rice	3.84%
	5	306	Crustaceans	3.47%
	6	6402	Rubber Footwear	2.98%
	7	6404	Textile Footwear	2.46%
	8	901	Coffee	2.45%
	9	6204	Non-Knit Women's Suits	2.33%
	10	2701	Coal Briquettes	2.02%
	19	**6201**	**Non-Knit Men's Coats**	**1.08%**
	21	**307**	**Molluscs**	**1.07%**
	11	**6203**	**Non-Knit Men's Suits**	**1.69%**
	14	**4202**	**Trunks and Cases**	**1.46%**
2010				
	1	2709	Crude Petroleum	6.50%
	2	6403	Leather Footwear	4.89%
	3	1006	Rice	4.04%
	4	9403	Other Furniture	3.87%
	5	8525	Broadcasting Equipment	2.92%
	6	6402	Rubber Footwear	2.79%
	7	8443	Industrial Printers	2.65%
	8	901	Coffee	2.51%
	9	6404	Textile Footwear	2.23%
	10	304	Fish Fillets	2.22%
	14	**306**	**Crustaceans**	**1.96%**
	13	**6204**	**Non-Knit Women's Suits**	**2.08%**
	12	**2701**	**Coal Briquettes**	**2.18%**
	28	**6201**	**Non-Knit Men's Coats**	**0.85%**
	40	**307**	**Molluscs**	**0.52%**
	17	**6203**	**Non-Knit Men's Suits**	**1.55%**
	19	**4202**	**Trunks and Cases**	**1.36%**
2012				
	1	8525	Broadcasting Equipment	10.30%
	2	2709	Crude Petroleum	7.41%
	3	6403	Leather Footwear	4.01%
	4	8471	Computers	3.40%
	5	901	Coffee	3.12%
	6	1006	Rice	2.91%
	7	6402	Rubber Footwear	2.35%
	8	6404	Textile Footwear	2.30%
	9	8542	Integrated Circuits	2.18%
	10	9403	Other Furniture	2.17%
	43	**8443**	**Industrial Printers**	**0.42%**

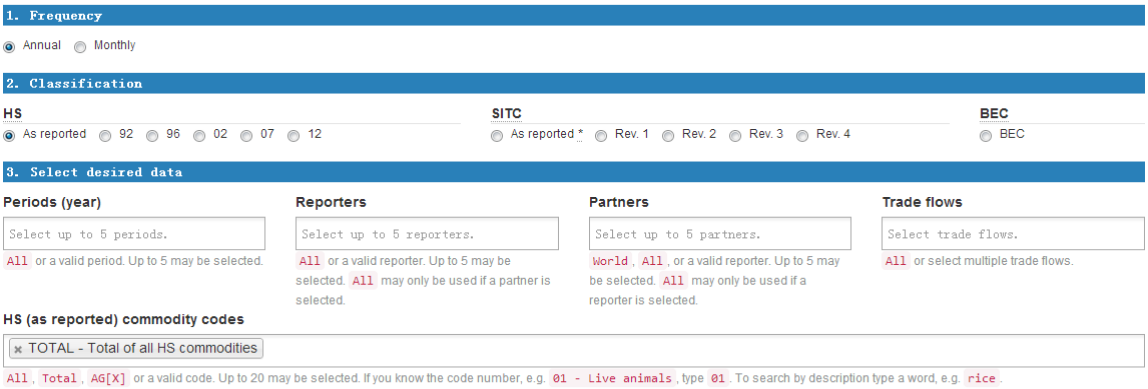
135	6304	Bedspreads	0.09%
20	306	Crustaceans	1.28%
12	6204	Non-Knit Women's Suits	1.81%
18	2701	Coal Briquettes	1.34%
28	6201	Non-Knit Men's Coats	0.88%
42	307	Molluscs	0.43%
17	6203	Non-Knit Men's Suits	1.46%
22	4202	Trunks and Cases	1.19%

Annex II How to use related databases?

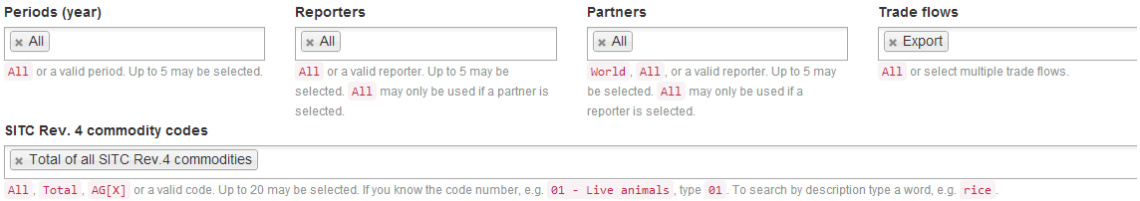
A. How to calculate revealed comparative advantages (RCAs) using UNcomtrade data?

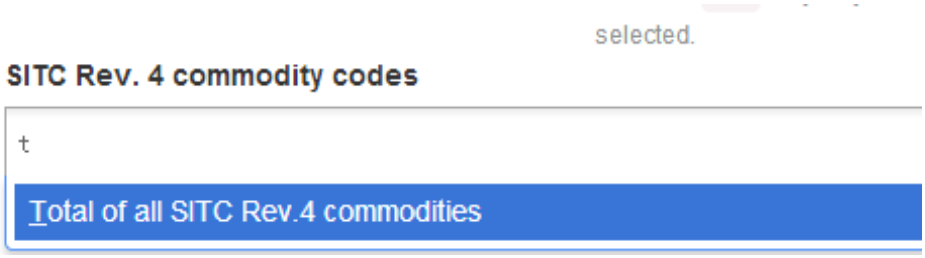
First, log on the UN Comtrade | International Trade Statistics Database, the website is http://comtrade.un.org/. And click on the button get trade data.

Then we will enter an interface shown below. Choose the period, the reporters, the partners and the trade flows. Take Uganda as an example, we entry “all” in the box of periods, “Uganda” in the box of reporters, “world” in the box of partners and “export” in the box of trade flows.

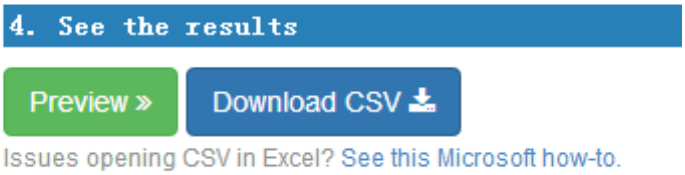


Because we want to calculate the comparative advantages in 4-digit level, we choose “Total of all SITC REV.4 commodities” in the box of SITC REV.4 commodity codes.





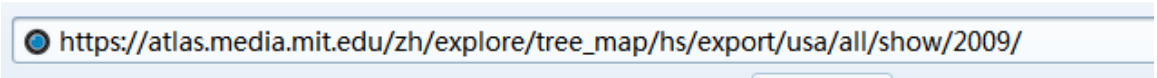
And by clicking on the button "Download CSV", we could download the dataset, and employ the methodology of calculating RCAs as explained in page 30.



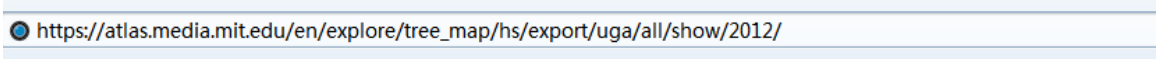
B. How to use MIT's observatory of economic complexity to calculate export or make the graph?

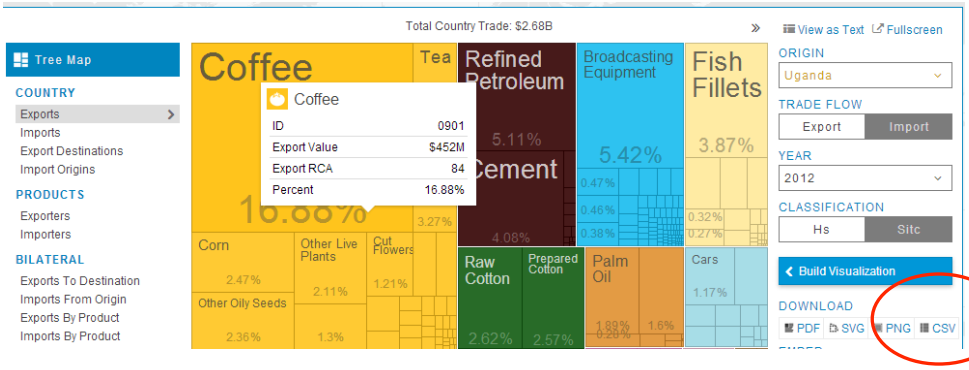
First, log in the following website:
https://atlas.media.mit.edu/en/explore/tree_map/hs/export/usa/all/show/2009/

This interface present the export of the US in 2009, we can change it into another country by



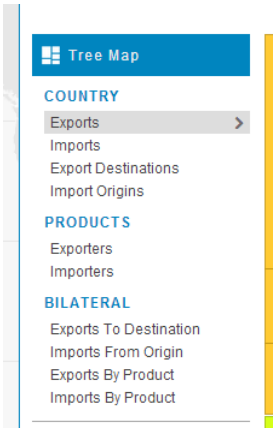
Change the item "usa" into "uga", which is the abbreviate of Uganda, and we can change the year by replacing the item "2009" into any other period, change the export/import by replacing "export" into "export" . And the tree map would be created automatically.





Second, if we want to download the dataset, click on the button on the bottom right of the interface as shown above.

We can also use this dataset to collect the information and dataset below, by clicking on any items.

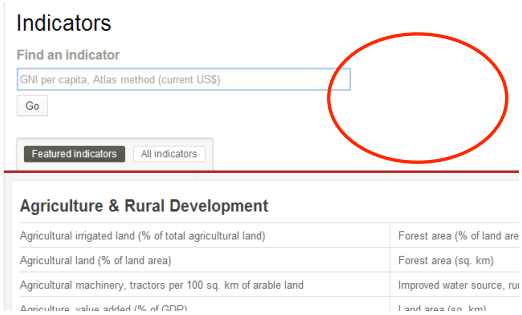


What's more, we can collect the information of "The Top 5 export destinations of China" and "Top 5 imports origins of China" and its Rank of Economic Complexity Index (ECI) through this website.

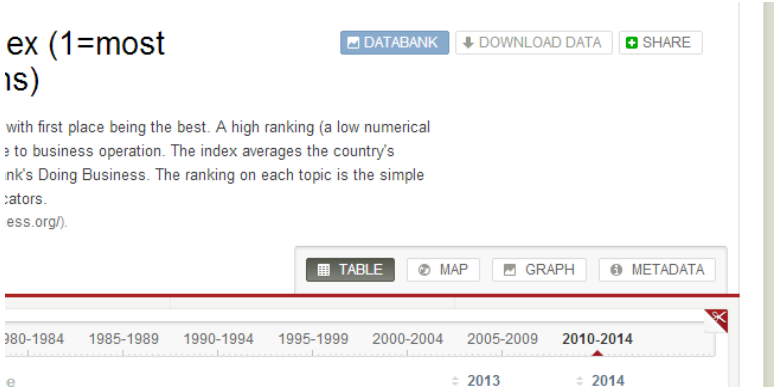
C. How to use World Bank database?

First, we log in the following website: **http://data.worldbank.org/**

Second, choose Indicators and Countries.



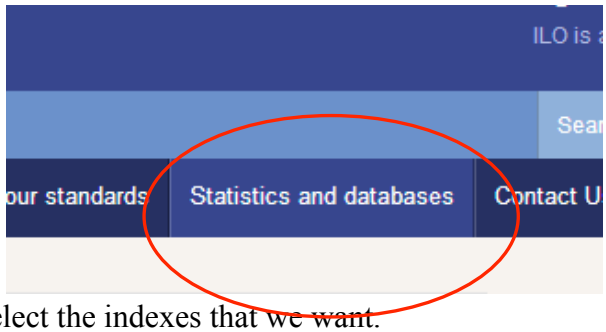
And then, download the dataset what we want by click on the following "DOWNLOAD DATA" button.



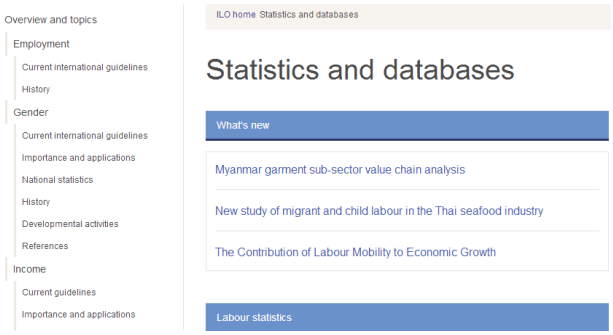
D. We can use the labor situation dataset and information?

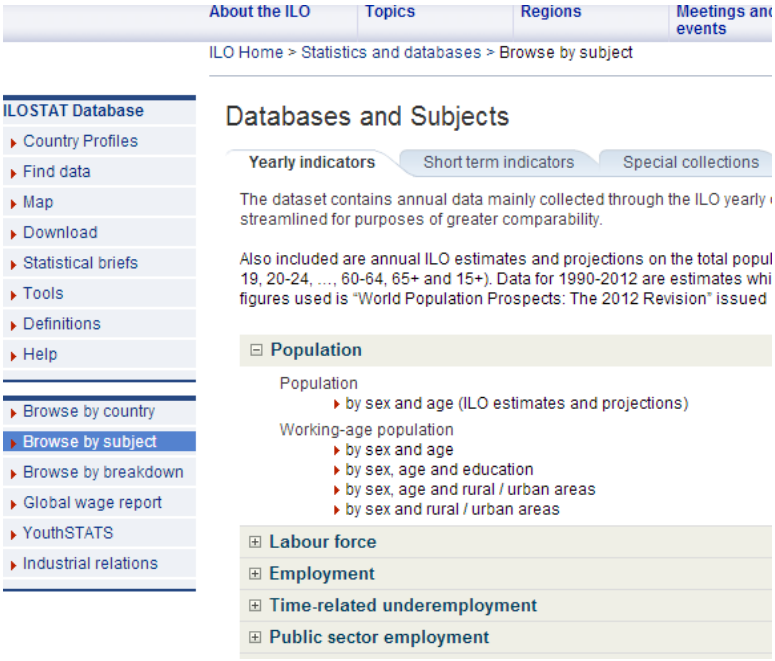
First, log in International labour Organization (ILO) website: http://www.ilo.org/global/lang--en/index.htm.

Entre the database.



Skip and select the indexes that we want.





Annex III Data needed for comparative value chain analysis

In this annex, we have intensively drawn on the study made by the World Bank and the Global Development Solutions in 2011 to illustrate how the comparative value chain analysis is conducted.

A. Objectives

To achieve the objectives of the comparative value chain analysis, a typical light-manufacturing product is analyzed in the following manner (World Bank, 2011: 66):

- Examine important issues and trends in the world products market of a given subsector;
- Review the structure of markets of the given subsector in both catching-up and target countries;
- Assess the key features, strengths and weaknesses of the existing supply chain for this given subsector in both catching-up and target countries;
- Assess the overall economic efficiency of domestic production of the given subsector in relation to world prices (based primarily on Chinese prices) using alternative cost projection scenarios to establish current and medium term competitiveness;
- Taking the economic efficiency result as a starting point, analyze the value chain of a given product to identify key strengths, weaknesses and opportunities or needs for investment, expansion or contraction to move towards international competitiveness at the business strategy and business process level; and
- Provide possible policy options and recommendations to help stimulate growth and improve competitiveness in the sector.

B. Product Selection Method

After identifying products of a given subsector for detailed comparative value chain analysis, a detailed technical profile of each product with an accompanying diagram or photograph needs to be complied and sent to the field teams to help ensure that product data collection in the field focused on products with similar – if not identical – technical specifications (World Bank, 2011: 71).

In order to screen the potential products, a product screening survey needs to be developed. The following questions will be posed to respective sector associations and operators in the benchmark countries.

For sector associations, the following six questions will be investigated (World Bank, 2011: 67):

1. Whether these products are currently produced by companies with less

than 50 employees;

2. If companies identified in #1 above can be set up with less than US$100,000 in investment capital;

3. The minimum level of skills and know-how required to produce the products;

4. Whether the products produced by the companies in #1 are being exported;

5. Whether products produced by companies in #1 are consolidated by brokers or other intermediaries for exports; and

6. Whether companies identified in #1 can readily access raw material inputs in the market to produce the products.

Apart from interviews with sector associations, additional interviews needs to be conducted at the firm level to identify specifically the level of investments and minimum level of technical skills required for an entrepreneur or existing SMEs to set up a production operation.[4]

For operators, the following questions will be examined (World Bank, 2011: 68):

1. Barriers to market entry, particularly from a financial and skills requirement, were sufficiently low to allow entrepreneurs and SMEs in the catching-up countries to easily establish operations; and

2. These products are currently being produced by SMEs in the benchmark countries, and are effectively being sold in local and export markets.

In short, the product screening survey will help to identify products as viable candidates to be targeted for the value chain and feasibility analysis.

C. Global Market of a Given Subsector

First, regarding market trends, we need to collect trade data from the UNComtrade or International Trade Centre (ITC) to have a better idea about the total value of the given sub-sector in the global market including both the past performance and the forecast one. The top 15 exporters and importers need to be identified. Annual percentage change of exports/imports shares can be calculated to grasp their trends.

Second, industry and consumer trends need to be analysed in order to help supplying countries/firms to be best able to adjust to these trends. Regarding the industry trends, the following questions can be explored: whether consolidation amongst retailers occurs; whether private brands are proliferating; whether there is entrenchment of outsourcing and its integration in firm supply chains. Regarding the consumer trends, apart from calculating shares of expenditures of the given subsector in major importing countries, other consumer trends also needs to be identified such as consumer preferences about the brand and consumer awareness of corporate social responsibility.

[4] To make the comparative analysis, it is necessary to find out respective government definitions of small, medium and large enterprises in the benchmark and catching-up countries.

Third, policy and regulatory environment matters in deciding cost competitiveness. Data needs to be collected on whether benchmark countries maintain various input and/or output subsidies to encourage industrial production and exports. For example, questions need to be explored on whether electricity prices are controlled and generally subsidized by governments and whether a rebate is given on the exported price of the given product.

D. Comparative Sector Profiles

Sector profile for the given product needs to be analysed in both benchmark and catching-up countries. Data needs to be collected on domestic production, domestic demand, total imports, total exports, employment, company size, and number of companies. More importantly, we need to have an in-depth investigation into supply chain and institution support structure. Take Ethiopia's apparel industry for example, Figure III-1 shows the relevant ministries and agencies that involve in the promotion and development of the given subsector. Interviews will be conducted with all relevant stakeholders to discover constraints along the whole value chain (see Figure III-2 for an illustration). Take financial constraints for example, it is useful to collect data on licensed investment projects in this subsector by investment type and status.

Figure III-1 Ethiopia's cotton-to-garment market and institutional support structure

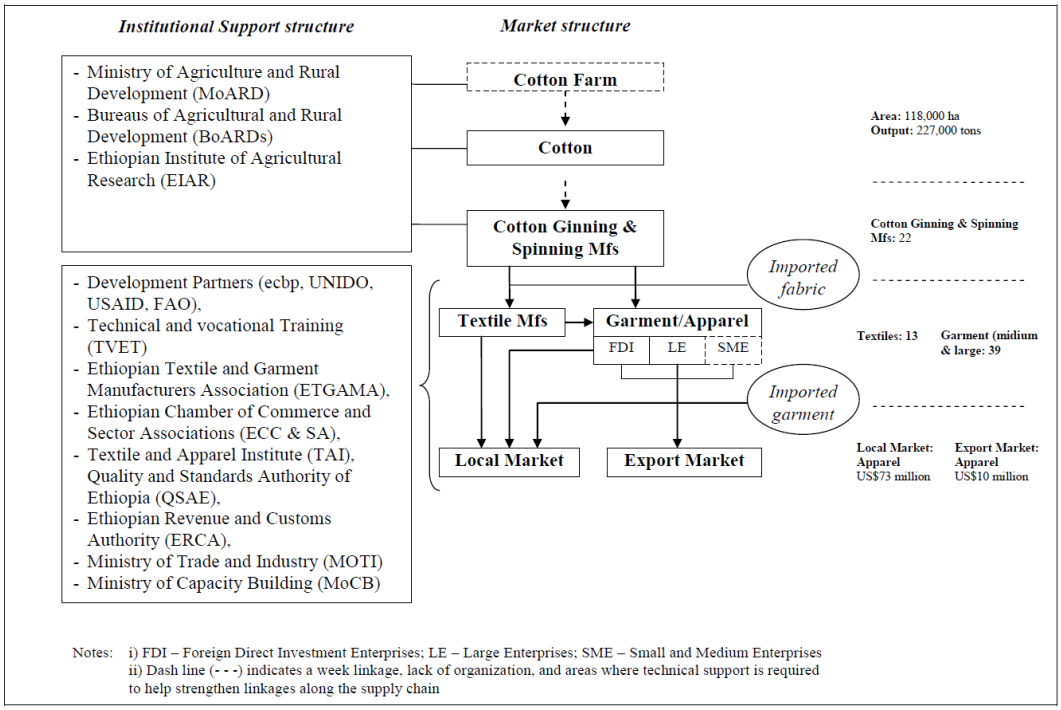
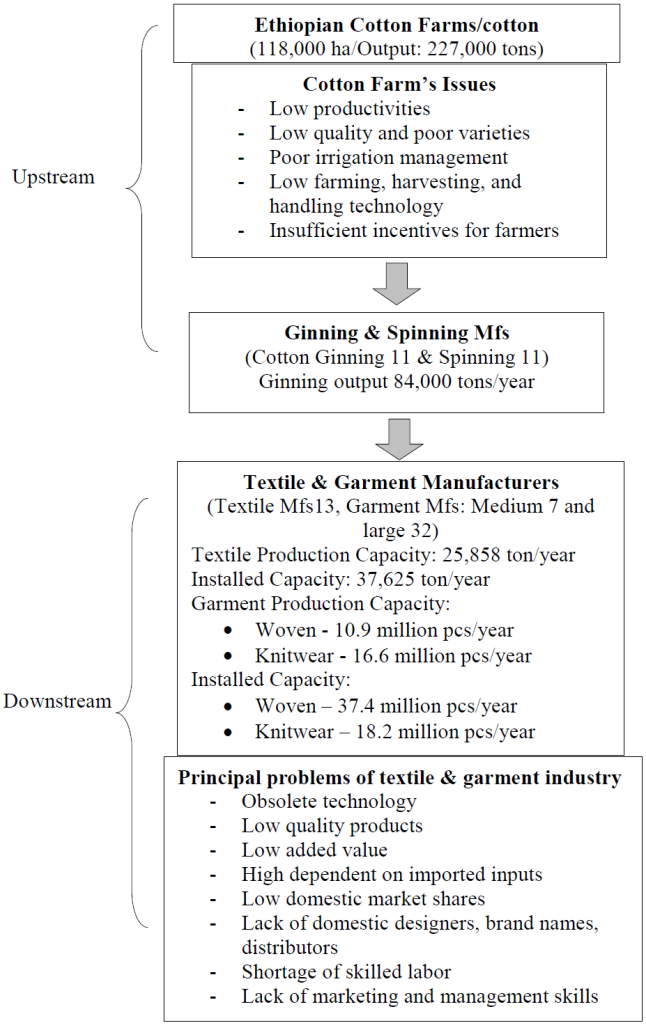


Figure III-2 Ethiopia's cotton-to-garment processing road map



Source: World Bank, 2011, p. 80 and p. 82.

E. Economic Efficiency and Competitiveness of the Given Products

After learning the basic features of sector profiles, we move to establish the basic competitiveness of the given industry and its likely future trend in competitiveness, with a focus on a selected product as a representative product. This is a complement to looking more closely through the value chain analysis at the strategic and process opportunities for upgrading and expansion at each production stage over the next five years (World Bank, 2011: 93). To do so, we will first select representative firms in the catching-up countries. For the analysis, a composite firm was created by taking a weighted average of the economic production cost of the selected firms. This cost is compared with the cost of competing imports.

Economic production costs are derived according to the following procedures:

- An annual capital charge is obtained by multiplying the estimated replacement cost of assets by a capital recovery factor (ten-year asset life, 12 percent interest rate).
- All import tariffs on imported inputs and indirect taxes (VAT) are deducted where these can be identified.
- Costs (capital cost, electricity, water/fuel, administration) that do not apply specifically to the production of the primary output are allocated on the basis of the reported share of the given product in total output.
- Utility costs of electricity, water and fuel are small components of total cost and have been adjusted only on the basis of their indirect foreign exchange effect.

To project economic product costs of the catching-up countries, we need to make assumptions about the productivity growth and exchange rate fluctuations.

Two important qualifications about the above analysis on economic production costs are as follows: first, product quality needs to be taken into account in further analysis; second, transportation costs play an indispensable role in deciding the cost competitiveness, especially for landlocked developing countries.

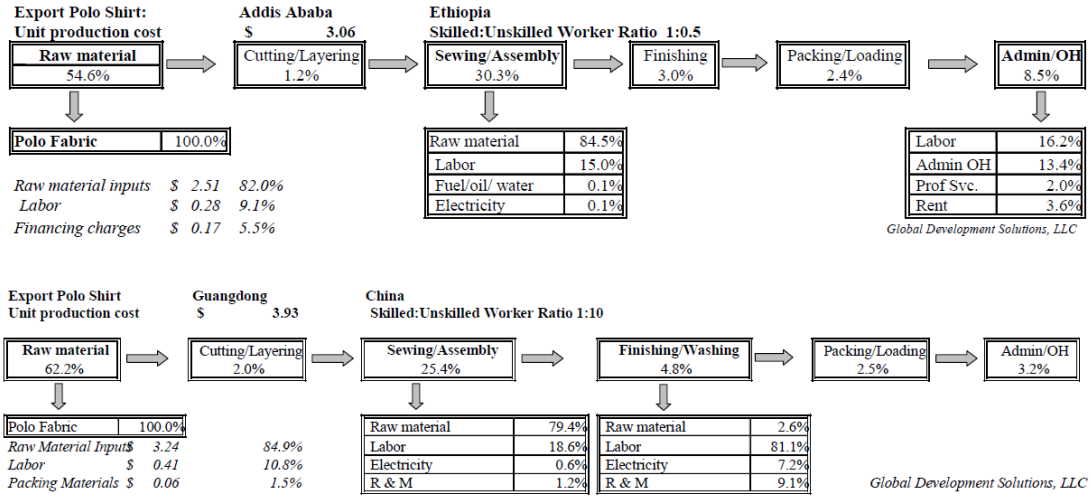
F. Value Chain Analysis

The value chain analysis can identify a number of factors at the factory level that contribute to differences in competitiveness between manufacturers in the select countries.

For an illustrative example, Figure III-3 shows the composition of costs of polo shirt production in Ethiopia and China. To put the analysis into a comparative perspective, Figure III-4 shows the performance of key variables in determining the cost competitiveness in benchmark countries (China and Vietnam) and the

catching-up countries (Ethiopia and Tanzania), which helps countries to learn their relative strengths and weaknesses.

Figure III-3 Polo Shirt Value Chain Diagram, Ethiopia and China



Source: World Bank, 2011, p. 102, 103.

Figure III-4 Benchmarking Key Variables for the Production of Polo Shirts

Benchmarking Data Sheet: Polo Shirts		China	Vietnam	Ethiopia	Tanzania
1.0	**Avg Spoilage & Reject rate: List different types (3)**				
1.1	In-factory product rejection	2% - 3%	1% - 3%	2% - 5%	1% - 3%
1.2	Product rejection by client	0%	0% - 1%	1% - 3%	0%
2.0	**Avg Waste & losses: List different types (% of total)**				
2.1	Production waste - scrap (fabric-to-polo, weight)	5% - 10%	1% - 7%	10% - 11%	3% - 10%
2.2	Losses (theft)		0%	0%	0%
3.0	**Electricity**				
3.1	On grid (Cost/kWh)	$ 0.13	$ 0.07	$0.05 - $0.06	$0.14
3.2	Off grid (Cost/kWh) - self generated	$ -	$0.10	$0.07	$0.22
3.3	% of time off grid/month	0% - 10%	7% - 10%	10% - 16.7%	20% - 30%
4.0	**Water ($/m³)**	$0.59 - $0.61	$0.31 - $0.45	$ 0.06	$ 0.06
5.0	**Fuel & Oil ($/liter)**	$0.87 - $0.96	$0.36 - $0.87	$0.89 - $0.93	$0.89 - $0.93
6.0	**PRODUCTIVITY & EFFICIENCY**				
6.1	Range - Labor productivity (polos) : Pieces/employee/day	18 - 35	8-14	7-19	5 - 20
6.2	Average - Labor productivity (polos) : Pieces/employee/day	25	12	11	12
6.3	Electricity usage: On-grid (kWh/1,000 pieces)	49 - 196	132 - 344	40 - 98	120 - 140
6.4	Electricity usage ($/1,000 pieces)	$6 - $24	$8 - $25	$2 - $6	$15 - $25
6.5	Water usage (m³/1,000 pieces)	3 - 14	3 - 15	16 - 37	18 - 20
6.6	Water usage ($/1,000 pieces)	$2 - $8	$1 - $7	$1 - $2	$1 - $2
6.7	Fuel & oil usage (liters/1,000 pieces)	0.5 - 5	1-13	1-13	10 - 12
6.8	Fuel & oil usage ($/1,000 pieces)	$1 - $5	$1 - $13	$0.73 - $12.28	$10 - $12
6.9	Transport ($/km-ton)	$0.27 - $0.30	$0.12 - $0.25	$0.03 - $0.19	$0.04 - $0.06

High reject rate
High scrap rate
High electricity price
Poor quality of electricity
Lowest labor productivity

** Cost reflects assembly costs only*

Source: World Bank, 2011, p. 105.

A closer analysis of the supply chain structure for the sector may reveal major structural differences in the way the sector is organized that substantially impact labor productivity and production efficiency. Take the apparel sector in Ethiopia for example, supply chain structure has two features: (a) predominately SMEs producing for the local market with a few large, fully integrated (fabric purchase-to-finished product export) manufacturers; (b) limited number of local producers capable of supplying export-quality fabric. Consequently, the garment production structure in Ethiopia is characterized by (a) long order-to-delivery time; (b) high overhead costs to manage input material sourcing, in-house production, finished product exports and sourcing packing/packaging material; (c) high inland transport

cost (World Bank, 2011: 108-109).

Finally, based on the above analysis on constraints along the value chain and the structural differences in the supply chain, specific policy recommendations will be made to enable catching-up countries to compete in the international market.