



Employment creation potential, labour skills requirements, and skill gaps for young people: A Rwanda case study

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- Outside of agriculture and manufacturing, “Industries without smokestacks” (IWOSS) sectors have emerged as the strongest drives of employment particularly for women, youth and the unskilled.
- Similar to manufacturing, IWOSS sectors employ unskilled and semi-skilled workers, require less physical capital per unit of output, are tradable, and exhibit high returns from the application of new technology.
- Over the years, IWOSS sectors have had higher labour productivity and employment potential compared with agriculture and manufacturing. Looking forward, these sectors will continue to be key sources of jobs growth.
- In order to support IWOSS-led employment growth, key constraints to infrastructure, business environment and skills development need to be addressed to improve competitiveness.
- Skills development also needs to be prioritised through coordinated policy around basic education for all, while providing accessible technical, vocational and tertiary education that provides the right mix of hard and soft skills needed by employees.
- Sufficient investment in skills development will reduce the risk of higher inequality inherent in the higher skill bias of IWOSS sectors.

Background

As Rwanda strives to achieve middle-income status by 2032, job creation remains one of the biggest hurdles to robust and inclusive economic growth. In the last two decades, Rwanda has grown at an impressive rate of close to 8 percent per year, outpacing economic growth in comparator economies. In order to achieve the ambitious growth targets over the next 15 years, Rwanda plans to create around 200,000 jobs annually, according to the Government's National Strategy for Transformation (NST1), an economic plan with job creation at its centre. Employment in Rwanda has remained characterized by agriculture, informality and low earnings in part due to the unskilled nature of the labour force. Additionally, formal and informal firms, potentially powerful generators of jobs, constitute only a small share of overall jobs and mostly employ the urban labour force.

Rwanda's economy, similar to other African economies, has been increasingly driven by structural transformation; workers have progressively moved out of agriculture but not into manufacturing. This economic evolution is unlike the manufacturing-led growth of East Asian countries. In fact, only a small share of Rwanda's jobs have come from manufacturing in recent years. So if job creation is taking place outside of agriculture and manufacturing, where are Rwandan jobs coming from?

A notable development over the years has been the emergence of higher employment in a subset of commodity-based, agro-processing and services oriented sectors, similar to traditional manufacturing. These sectors, coined "industries without smokestacks" (IWOSS) are similar to manufacturing in that they are: (i) tradable with outputs that can be produce locally and sold internationally; (ii) productive with high value added per worker—relative to average economy-wide productivity; (iii) capable of technological change and productivity growth; and (iv) scalable with the potential for agglomeration economies.¹

Since 2000, Rwanda's IWOSS sectors (agro-processing, horticulture and export agriculture, business and financial services, tourism, and construction) have grown more rapidly than the rest of the economy- 9 percent per year compared to 3 percent economy wide growth. In contrast, the share of labour in subsistence agriculture has progressively declined since 2000—from 87 to 67 percent- and employment in manufacturing has remained low. These sectors, which employed only 5 percent of the population in 2000, increased by three-fold to 16 percent by 2017.

¹ Newfarmer, R., J. Page, and F. Tarp, eds. 2018. *Industries without Smokestacks: African Industrialization Revisited*. Oxford, U.K.: Oxford University Press.

This services-oriented pattern of industrial transformation has the potential to generate off-farm higher-wage jobs, but it is not immediately clear if Rwanda can generate sufficient productivity growth without relying on a surge in manufacturing to drive overall economic growth. Will IWOSS sectors create enough jobs to raise incomes, especially those of young, women, and unskilled workers?

Going forward, Rwanda will be faced with a substantial jobs challenge similar to many other African countries. With a current population of nearly 13 million people and population growth rate of 2.1 percent annually, Rwanda has to create jobs at a rapid rate to absorb new workers coming into the labour force. By 2032, about two thirds of total population will be of working age and the urban work force will increase by more than 80 percent. This policy brief presents joint work by the International Growth Centre and the Brookings Institution examining the employment dynamics in Rwanda.² The study looks at whether and how IWOSS sectors can lead the structural transformation process in tandem with manufacturing growth and concludes with reviews of the Rwandan Government's employment and skills development strategy and policy ideas to build on ongoing initiatives.

Key insights

IWOSS sectors have been important drivers of Rwanda's structural transformation.

A look at Rwanda's employment dynamics between 2000 and 2017 shows that employment in IWOSS sectors has grown more rapidly than the rest of the economy at around 9 percent per year, three times the rate of employment across all sectors (Table 1). The manufacturing sector has also grown at impressive pace albeit starting from a lower base. The share of labour in subsistence agriculture, the sector with the largest share of employed labour, has progressively declined since 2000 – from 87 to 67%- a trend indicative of economic structural transformation within and out of agriculture into high value-added activities. The IWOSS sectors with the highest employment growth sectors were agro-processing, horticulture and export agriculture, business and financial services, tourism, and construction. These sectors, which employed only 5% of the population in 2000, nearly more than tripled in size to 16% by 2017.

² This policy brief is based on a longer study: Newfarmer, R., and Twum A., 2020, "Employment creation potential, labour skills requirements, and skill gaps for young people: A Rwanda case study", Brookings Institution, Washington D.C.

Table 1: IWOSS have grown more rapidly than manufacturing and other activities

	Employment			Employment share		Annual % growth
	2000/ 2001 (*000)	2016/ 2017	Change	2000/ 2001	2016/ 2017	2000-2017
Total employment ^{1,2,3}	3,796	5,825	2,030	100%	100%	3%
Total IWOSS	201	922	721	5%	16%	9%
Export crops and horticulture	92	140	48	2%	2%	3%
Agro-processing	5	35	30	0%	1%	12%
Construction	26	255	229	1%	4%	14%
Tourism	17	157	141	0%	3%	14%
ICT	-	12	12	-	0%	-
Transport	25	151	126	1%	3%	11%
Maintenance and repairs	11	35	24	0%	1%	7%
Financial and business services	15	49	34	0%	1%	7%
Trade (excl. tourism): formal	10	86	76	0%	1%	13%
Manufacturing (excl. agro-processing)	25	85	60	1%	1%	7%
Other non-IWOSS ^{4,5}	3,569	4,818	1,249	94%	83%	2%
Agriculture	3,296	3,926	630	87%	67%	1%
Mining	6	51	45	0%	1%	13%
Utilities	4	11	6	0%	0%	5%
Trade (excl. tourism) informal	82	296	215	2%	5%	8%
Domestic services	82	239	157	2%	4%	7%
Government	71	202	130	2%	3%	6%
Other	28	94	66	1%	2%	7%

Source: Authors' calculations using Rwanda National Institute of Statistics Integrated Household Survey: EICV1, EICV3, EICV4. Notes: 1. Numbers might not match published reports. Details of adjustments are not available for replication. 2. Working-age population is defined as 16 years and over by the NISR. 3. Employment for "export crops and horticulture" and "tourism" are estimated using IFPRI (2017). Employment for ICT is not reported in 2000. 4. Agriculture includes subsistence agriculture. 5. Employment in trade (formal and informal) is estimated using ratios of employment from the Rwanda Establishment Census.

Labour has steadily moved into IWOSS sectors and is more productive than labour in non-IWOSS and manufacturing sectors.

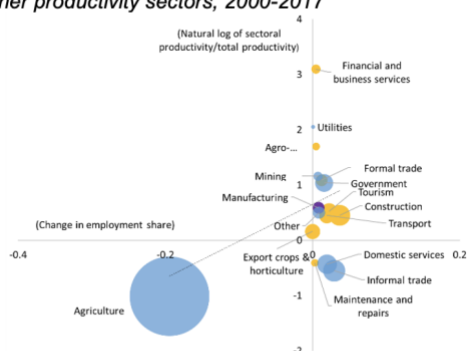
Since 2000, IWOSS sectors have increased as a share of overall employment. This has primarily been driven by a shift in labour out of agriculture into IWOSS sectors and other low value-added non-IWOSS sectors like informal trade and domestic services (Figure 1). Labour productivity for the IWOSS sectors, expressed as output per worker, is the highest in IWOSS sectors (Figure 2). Notably, over the period, labour productivity declined in IWOSS sectors but increased for the overall economy, manufacturing and other non-IWOSS sectors. Agricultural output has increased because of improvements in technology and agricultural practices. At the same time, workers have moved out of subsistence agriculture into other activities resulting in an increase in labour productivity in agriculture. Correspondingly, labour productivity rates have fallen for IWOSS sectors (agro-processing, tourism, transport, and formal trade) because additional workers are flowing in at rates faster than the growth of sectoral output. Policy to boost the productivity of IWOSS sectors would be crucial to leveraging the employment and growth gains from the economic shift towards these sectors.

IWOSS sectors offer significant opportunities to employ women and youth.

Not only have IWOSS sectors been strong drivers of overall employment growth, they have also intensely created jobs for women and young people in particular. Between 2000 and 2017, growth in value-added of the IWOSS sectors resulted in more jobs than value-added growth in non-IWOSS sectors including manufacturing. Compared to non-IWOSS and manufacturing, IWOSS sectors have an employment elasticity of 1.26 for women, significantly higher than the elasticity for the overall economy of 0.04, and around double that of manufacturing which is around 0.56. We observe a similar trend for youth employment. Once again, IWOSS emerges as a strong generator of jobs for the youth, followed by non-IWOSS sectors and the manufacturing sector. These findings position IWOSS sectors as important sectors for boosting employment for women and the youth.

Figure 1: Labor is moving into higher productivity activities, led by IWOSS

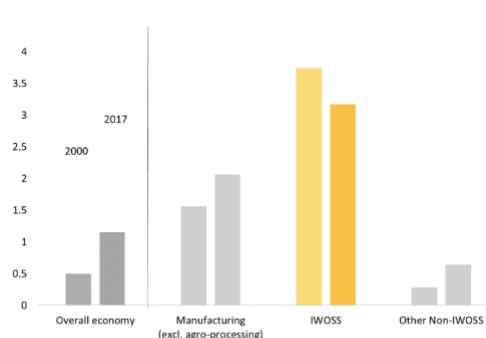
Changes in share of employment and movement into higher productivity sectors, 2000-2017



Source: Authors' calculations using EICV3, EICV5 and Rwanda National Accounts. Size of bubbles equal employment share in 2017. The yellow bubbles indicate the IWOSS sectors, purple is manufacturing, and light blue are the other non-IWOSS activities.

Figure 2: Labor productivity for IWOSS, like manufacturing, is higher than vs non-IWOSS

Millions of RWF per worker



Source: Authors' calculations using EICV1, EICV3, EICV5 and Rwanda National Accounts.

Table 2: Growth and jobs: A sectoral perspective 3

Sector	2000-2017			2010-2017	
	Change in GDP	Change in employment	Employment elasticity	Women employment elasticity	Youth employment elasticity
Overall economy	256%	53%	0.21	0.04	0.08
Total IWOSS	278%	358%	1.10	1.26	0.28
Manufacturing (excl. agro-processing)	350%	240%	0.69	0.56	-0.13
Other Non-IWOSS	206%	35%	0.18	0.01	0.07

Source: Authors' calculations using EICV1, EICV3, EICV5 and Rwanda National Accounts. Notes: 1.

Employment elasticity is defined measures the growth of employment relative to the growth of the

economy. 2. Value added is approximated for sectors not directly reported in the national accounts. See

Annex A. 3. For export crops and horticulture, value added is estimated using IFPRI (2017). See Annex A.

³ Sectoral breakdown can be found in Table 3 in Newfarmer, R., and Twum A., 2020, "Employment creation potential, labour skills requirements, and skill gaps for young people: A Rwanda case study", Brookings Institution, Washington D.C

4. Employment numbers for ICT are not reported in 2000. Employment elasticity for 2010-2017 is 0.93. 5. Youth employment elasticities are calculated for 2010-2017 because of issues verifying the youth employment number for 2000.

Although IWOSS sectors are relatively more skill-intensive than non-IWOSS sectors, they also emerge as significant employers of low-skilled labour.

IWOSS sectors employ nearly 13 percent of the 4.8 million low skilled workers in 2017 (Table 4) compared to the 1.3 percent employed by the manufacturing sector. About 26 percent of workers in IWOSS are either high skilled (5 percent) or medium skilled workers (21 percent) with the financial, business services and ICT sectors emerging as the most skill intensive of the IWOSS sectors. IWOSS sectors with the highest share of low skilled workers are formal trade, export crops, horticulture, maintenance, and repairs. The skill breakdown of IWOSS sectors more or less parallels the skill distribution in the manufacturing sectors. On the other hand, non-IWOSS sectors are less skill intensive with only 16 percent of workers falling in the high skilled and skilled categories; the government and utilities sectors are exceptions with most workers considered skilled and high skilled- around 80 and 65 percent respectively.

Table 3: Jobs in IWOSS, like manufacturing, tend to require higher skills 4

Breakdown of sectoral employment by skill level, 2017

	Absolute			Share		
	High skilled (^{'000})	Skilled	Low skilled	High skilled	Skilled	Low skilled
Total employment	157	760	4,827	3%	13%	84%
Total IWOSS	37	177	628	4%	21%	75%
Manufacturing (excl. agro-processing)	2	19	63	3%	23%	74%
Other Non-IWOSS	117	563	4,137	2%	12%	86%

Source: Authors' calculations using EICV1, EICV3, EICV5. Notes: 1. Totals of sectors by skill level do not match totals presented in table 1 because of missing information on education. 2. High skilled=post-secondary education; skilled= secondary education; low skilled=lower than secondary education.

These growth dynamics carry over to employment projections between 2017 and 2035: 8 percent annual growth for IWOSS, 10 percent for manufacturing and 1 percent for non-IWOSS (Table 6). These parameters imply that IWOSS would move from 16 percent of employment to around 35 percent by 2035 while the share of manufacturing would increase by 4 percentage points to around 5 percent of total employment. Non-IWOSS sectors in this scenario make up 60 percent of total employment; 45 percent coming from subsistence agriculture

⁴ Sectoral breakdown can be found in Table 5 in Newfarmer, R., and Twum A., 2020, "Employment creation potential, labour skills requirements, and skill gaps for young people: A Rwanda case study", Brookings Institution, Washington D.C

and more than half of the remaining share coming from domestic services and government.

Scenarios for the future: Emerging demand for skilled workers

Given the strong performance of IWOSS sectors over the past two decades, can we expect continued growth and job creation? Can IWOSS sectors generate sufficient productivity growth to drive overall economic growth? Finally, can it produce a sufficient number of high-productivity jobs to raise incomes, especially of young, women and unskilled workers? To explore these questions, we use an illustrative scenario based on historical GDP growth and the Rwandan Government's growth targets over the next 15 years. We assume an overall annual GDP growth of 8 percent and use the Government's employment growth estimate of 3 percent per year. The IWOSS sectors are projected to grow at a rate slightly higher than that of the economy (10 percent), and non-IWOSS sectors other than manufacturing would grow at a slower pace (6 percent), primarily because of the much lower growth rate needed in subsistence agriculture due to structural transformation. Based on projections, agro-processing, tourism, ICT, transport, all priority sectors under the government's development agenda, will lead growth in IWOSS value added in 2035.⁵

Table 4: A growth scenario to 2035: Projected GDP at 8 percent and labour demand in 2035

	Employment				Share of total employment	
	2017	2035 (proj)	Add. jobs	Annual growth	2017	2035 (proj)
	('000)	('000)	('000)			
Overall economy	5,825	9,825	3,999	3%	100%	100%
Total IWOSS	922	3,463	2,541	8%	16%	35%
Manufacturing (excl. agro-processing)	85	442	358	10%	1%	5%
Other non-IWOSS	4,818	5,919	1,100	1%	83%	60%

Source: Authors' calculations using EICV1, EICV3, EICV5 and Rwanda National accounts. Notes: 1. Methodology for GDP projections for 2035 are detailed in Annex A. 2. Employment projections are based on projected employment elasticities and GDP in 2035.

Can Rwanda satisfy this demand for high skilled and moderately skilled workers? Based on the *Future Drivers of Growth* report by the Government and World Bank, we put together a business-as-usual scenario for labour supply in 2035: 6 percent of supply will consist of high skilled workers, 34 percent skilled workers and 60 percent low skilled workers. Juxtaposing the anticipated supply

⁵ Detailed table available in Newfarmer, R., and Twum A., 2020, "Employment creation potential, labour skills requirements, and skill gaps for young people: A Rwanda case study", Brookings Institution, Washington D.C

with the anticipated demand in table 7 reveals a looming gap in skills that might well develop over the next decade and one half. The shortage could well exceed 3 percent of the demand if the government does not make a jump shift in its workers' skill development (Table 8).

Table 5: Projected skills deficit, 2035

	Employment		
	High skilled	Skilled (‘000)	Low skilled
Projected labor supply (World Bank)	491	3,340	5,993
High growth scenario: 8% annual growth rate	507	3,709	5,609
Projected labor demand			
Skill gap	16	368	-384

Source: Authors' calculations using EICV1, EICV3, EICV5 and Rwanda National accounts. 2035 estimates are projected. Notes: 1. Skill breakdown for 2035 is based on skill distribution in 2017 from EICV5. Adjusted estimates for tourism and trade are distributed using skill distribution in EICV5. 2. Labour supply by skill in 2035 is projected using WBG (2018). Figure O.19: 5% tertiary, 35% some secondary, 60% less than secondary.

Policy discussion

Well-designed policy based on both contextual needs and on evidence of what works well, would be essential to building on Rwanda's employment gains in IWOSS sectors. This section discusses policy in three main areas: investment climate, firm productivity, and education policy.

Improving the investment climate with a focus on growing exports will boost competitiveness in IWOSS sectors.

At a basic level, infrastructure development is key to encouraging sectoral growth for IWOSS sectors. For agro-processing, reliable roads and power access with allow factories to produce at their assigned capacity. Roads are also essential for export crops and horticulture, which require timely delivery from produce to consumer. Transport infrastructure- logistics, warehousing, and trucking services- are basic requirements for exporting across all non-service IWOSS sectors. Delays in delivery time and high shipping costs are the two main logistics challenges facing Rwandan exporters according to the World Bank Enterprise Survey (2020). Despite the urgency of addressing these challenges, the Government must be prudent in its infrastructure financing strategy- a diversified infrastructure-financing portfolio of loans combined with grants and financing from donors and development banks would be less risky.

Policy should also be designed to encourage productivity gains at the firm level. The Government should prioritize pro-competition policy that encourages firms to innovative. Facilitating the inflows of FDI and internationalization of firms will expose Rwandan business to regional and

global competition. To achieve this, Rwanda's program of special economic zones and its ongoing efforts around supplier and firm development, for example, NIRDA's programs supporting technical and management upgrading for domestic firms, need additional attention and support. Additionally, the government must effectively manage State-owned enterprises, which have historically been important and successful pillars of industry. As the private sector grows and value chains get increasingly complex, SOEs would need to balance their growth ambitions and market power (stemming from their privileged position) with the government's agenda around encouraging a larger and more vibrant private sector.

Basic education is fundamental, vocational education is no less important, and tertiary education will be crucial to increasing the supply of high skilled workers.

Filling the jobs of tomorrow in Rwanda will require significant investments in children, youth, and adult workers, including notably women. Business surveys already point to the lack of skilled labour as a major constraint on business growth—and this trend is only likely to intensify. Increasing the human capital of young Rwandan workers has three components—boosting basic, technical and advanced conceptual skills. With a current average educational attainment of 4.1 years of schooling, the country has to focus on providing the basic skills essential for the post-2020 economy in Rwanda. Even as it increases time in school, the country has to improve educational outcomes if the country is to achieve its high growth aspirations. Second, it has to upgrade its secondary schools and vocational and educational training systems. Finally, the country will benefit from further reforms to its tertiary school system and universities.

Vocational education grapples with insufficient private sector involvement in curriculum design and implementation, and nascent performance tracking especially for TVET institutions and labour market outcomes. Collecting and disseminating information on the quality of skills providers and the returns to different skills would improve quality and encourage participation in high-return programs.

Finally, even though university enrolment has doubled in the last decade, only 8 percent of tertiary-age youth are enrolled in tertiary education, well below the level in middle-income countries. Increasing access to financing (including private) would expand enrolment. Enrolment in high-return fields could be increased through financing incentives and higher-quality science and engineering instruction in earlier grades. Creating incentives for researchers to develop and adapt innovations to benefit industries and getting industries to pay for the research are essential for reaping the maximum returns to innovation

Conclusions

Rwanda has made great strides in using structural transformation to drive its growth and job creation. Its policies have generated a diverse and increasingly complex economy in which jobs have been created at a rapid pace in higher productivity activities. This process has pulled workers out of subsistence agriculture into industries without smokestacks—including high productivity agriculture and services—as well as incipiently manufacturing. These sectors have led the growth process. Manufacturing, though still small, is becoming a dynamic complement to this process.

The growth process creates a demand for ever higher skilled labour. While producers complain even today that the lack of availability of skilled workers inhibits their growth, the aggregate numbers in the government aspirational scenario and value chain analysis show that this gap is likely to be case in the decades ahead.

Thus, the government must rapidly invest in its workers and innovation to sustain its growth momentum, lest the lack of skilled workers and professionals become a brake on growth. Moreover, the skill-bias inherent in the growth process—driven by industries without smokestacks and manufacturing—will drive an undesirable increase in inequality. Thus, there are two reasons to invest heavily in workers' skills: 1) to avoid letting skill shortages weigh down growth rates and 2) to ensure that the rising incomes are more equitably shared.

The review of policies and programs offers a source of optimism. The government has developed a sophisticated set of policies to use skill development, business creation, and job matching to alleviate any skills deficit and constraint on growth. The challenge ahead will be to realize the potential of these programs.