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Industries without smokestacks in Africa

A Kenya case study

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Abstract

This study assesses the scope for industries without smokestacks (IWOSS) to generate large-scale wage employment opportunities in Kenya especially for the youth. IWOSS are non-manufacturing industries that demonstrate high productivity and employment potential similar to manufacturing. While Kenya has, since independence, prioritized industrialization anchored on manufacturing as an avenue for employment creation and economic growth, the country is facing early deindustrialization characterized by a declining share of manufacturing in employment and gross domestic product (GDP). Recognizing this enormous challenge, recent policy discourse in addressing persistent youth unemployment has widened its focus to include emerging sectors of IWOSS. This study examined the job creation potential for youth across diverse IWOSS sectors, focusing on horticulture, ICT and tourism, and identified constraints that inhibit growth and job creation. The methods include a review of sectoral performance with respect to growth and wage employment; assessments of current and projected levels of employment and productivity; and application of value-chain approach to examine job creation potential and the key constraints. The main data sources included the Kenya's Social Accounting Matrix (SAM), the World Bank Jobs Group Database, Occupational Network Data (O-NET), and various survey data sets including the Kenya Integrated Household Budget Survey (KIHBS) 2015/16 and the World Bank Enterprise Survey for Kenya 2018. These approaches were complemented by a survey of key informants in the three sectors, conducted in 2020. The three IWOSS sectors (horticulture, ICT, and tourism) reveal above-average output growth and are projected to continue being significant sources of wage employment for youth up to the year 2030. In contrast, except for construction, the industrial sectors performed below-average with respect to output growth over the two decades up to 2018. The study identified both cross-cutting and sector-specific constraints affecting competitiveness, investments, output, and employment growth of the three select IWOSS sectors. The cross-cutting constraints relate to the investment climate, which encompasses infrastructure, the regulatory environment, and skills. Horticulture faces constraints related to inaccessibility to cold chain facilities, non-tariff trade barriers, limited coordination among exporters, capacity gaps, and insufficient systems for handling food safety compliance. ICT faces additional challenges of weak competition environment and weak supportive framework to identify, fund, and nurture ICT innovations. Tourism faces additional challenges related to multiple taxation and levies. Recommendations are suggested to address both cross-cutting and IWOSS sector-specific constraints including: Government and other stakeholders should support continuous skills transfer and support to local producers, promote investments in cold chain infrastructure, ensure policy framework that enhances competitive markets to improve affordability, put in place an all-encompassing policy for e-commerce, support private sector investments in education for high-level ICT skills and soft skills, adoption of emerging technologies, enhance development of access roads and promote competitive air transport and promote new product innovations.

Abbreviations and acronyms

AFA	Agriculture and Food Authority
AfDB	African Development Bank
BPO	Business Process Outsourcing
CPS	Community and Personal Services
ERSWEC	Economic Recovery Strategy for Wealth and Employment Creation
EuroGAP	European Good Agricultural Practice
FTE	Full Time Equivalent
GDP	Gross Domestic Product
ICT	Information and Communications Technology
IFC	International Financial Corporation
ILO	International Labour Organization
ISIC	International Standard Industrial Classification
IWOSS	Industries Without Smokestacks
KIHBS	Kenya Integrated Household Budget Survey
KIPPRA	Kenya Institute for Public Policy Research and Analysis
KNBS	Kenya National Bureau of Statistics
KWh	Kilowatt Hour
MSME	Micro, Small, and Medium Enterprises
NTTBs	Non-tariff trade barriers
O*NET	Occupational Network database
PGD	Post Graduate Diploma
SAM	Social Accounting Matrix
SDG	Sustainable Development Goal
SSA	Sub-Saharan Africa
STEM	Science, Technology, Engineering, and Mathematics
TSA	Tourism Satellite Account
USAID	United States Agency for International Development
USD	United States Dollar
VC	Value Chain
WBG	World Bank Group
WTO	World Trade Organization

1. Introduction

The Kenyan government has, since independence, sought to promote development of the industrial sector, particularly manufacturing, as a strategy for generating mass productive employment. Indeed, this inclination towards industrialization has been espoused in several policy strategies over the decades, including the import substitution strategies of 1960s through 1970s; market liberalization of the early to mid-1990s; and the export-led policy orientation since early 2000. In the post-2000 period, the job creation agenda through industrialization has been pursued by the Economic Recovery Strategy for Wealth and Employment Creation (ERSWEC) 2003-2007 and, more recently, the Kenya Vision 2030, which targets annual manufacturing sector growth of 10 percent (Government of Kenya, 2018).

The growth of the manufacturing sector, which accounts for over 50 percent of industrial sector gross domestic product (GDP), has, however, remained below annual national targets, and its GDP contribution has remained stagnant for the last two decades at about 10 percent (KNBS, various). In the recent years, the manufacturing sector contribution to GDP has declined from 11.3 percent in 2010 to 7.5 percent in 2019 (KNBS, 2020). The formal sector wage employment contribution of manufacturing has also remained stagnant, averaging 13.0 percent over the last two decades.

This apparent stagnation in wage employment for manufacturing contrasts with more vibrant service sectors, particularly ICT-enabled services, tourism, and horticulture, thus calling for an assessment of the country's development strategies. Indeed, recent research and policy discourse in developing economies cite growth and employment opportunities in emerging sectors that have similar characteristics to manufacturing in terms of productivity and the potential for creating decent jobs. Such sectors/subsectors include agro-processing, financial services, horticulture, information and communications technology (ICT), tourism, transit trade, and wholesale trade—and are collectively referred to as “industries without smokestacks” (IWOSS) to differentiate them from traditional manufacturing (Newfarmer, Page and Tarp, 2018).

It is in this context that this country case study aims to assess the scope for IWOSS to generate large-scale wage employment opportunities for subsets of the Kenyan population, particularly the youth. The specific sectors/subsectors this study focuses on include horticulture, ICT, and tourism, as these three IWOSS sectors have demonstrated impressive performance based on sectoral growth, contribution to GDP, and export levels. The data illustrating the performance of these sectors is discussed in subsequent sections of this study and examined comparatively with non-IWOSS sectors including mining, construction, utilities, and manufacturing.

The key question is whether these IWOSS sectors can play a comparable role in creating adequate jobs that manufacturing played in other economies, especially the newly industrialized economies in Asia. This country case study also aims to identify constraints that inhibit growth and job creation potential across the identified IWOSS sectors. In assessing the constraints, a key focus is on the skills of the youth labor force, particularly soft and digital skills requirements in IWOSS.

A mixed methods approach was applied to realize the diverse objectives of the study. The main data sources include the annual Statistical Abstract and the Economic Survey published by the national statistical agency, the Kenya National Bureau of Statistics (KNBS). Other sources include the Kenya Integrated Household Budget Survey (KIHBS) 2015/16, the Kenya Population and Housing Census undertaken by KNBS in 2009 and 2019, the 2018 World Bank Enterprise Survey for Kenya (World Bank, 2018), the World Development Indicators/World Bank Jobs Group Database, the occupational

network (O*NET) database, the Kenya's Social Accounting Matrix (SAM), the Tourism Satellite Account (TSA), and selected key informants in the selected IWOSS sectors.

The rest of this country case study is structured as follows: Section 2 briefly examines the country's macroeconomic context and background, while Section 3 assesses, in a comparative manner, patterns of economic and employment growth for IWOSS and non-IWOSS sectors. The analyses are performed for both aggregated and disaggregated sectors. Section 4 analyzes employment creation potential and constraints to its output and employment growth. Section 5 looks at trends of employment growth into the future. Section 6 assesses labor skills requirements and skills gaps. Section 7 highlights implications for policy and concludes.

2. Country context and background

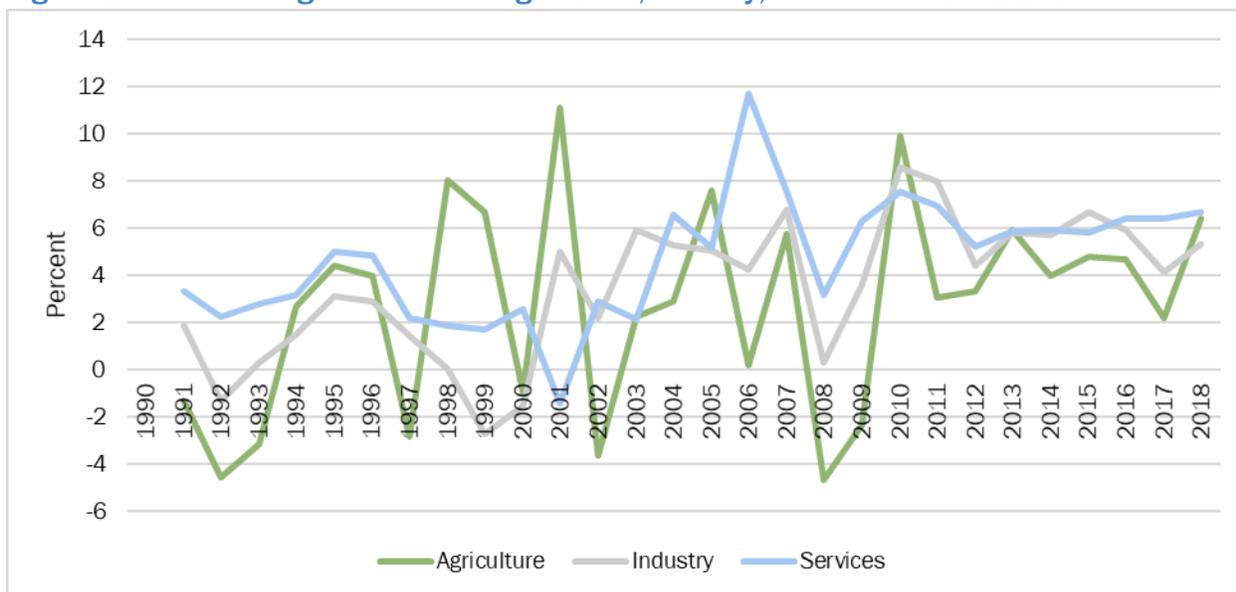
2.1 Economic growth performance

After strong economic growth performance in the 1960s through the 1980s, Kenya's economy experienced slow growth in the 1990s and early 2000s. Economic growth picked up and has remained mostly positive since 2003. In the first half of 1990s, real gross domestic product (GDP) per capita growth averaged a negative 1.7 percent followed by a slight increase to just over zero percent in the second half of the 1990s. Some of the factors linked to this poor growth performance include drought, oil price increases, aid embargos, and ethnic clashes. Real GDP growth then accelerated to an average of 2.7 percent in 2003-2018, and is linked to the economic and structural reforms under the Economic Recovery Strategy for Wealth and Employment Creation (ERSWEC) 2003-2007 (Ministry of State for Planning, 2003) and the implementation of the Kenya Vision 2030. From 2012 to 2018, real GDP per capita has remained on an upward trend, and its growth has been relatively stable.

With respect to value-added growth across the broad economic sectors, the annual growth rate of value-added for services has been largely positive and stable in the 28-year period beginning in 1991 to 2018. Services value-added growth was 0.65 percent between 2008 and 2018, and this relatively stable positive trend may explain services' increasing share relative to the industrial and agriculture sectors. Agriculture's value-added growth has been the most unstable, with huge swings from one year to another and an overall growth of negative 1.39 percent in 1991-2018 and 4.2 percent between 2009 and 2018. This volatile growth can be linked to the high correlation between the sector's performance and weather patterns (as the country's agriculture is mainly rain-fed). Value-added growth for the industrial sector has been more stable than that of agriculture, averaging negative 0.29 percent between 1991 and 2008 and 0.17 percent between 2009 and 2018 (Figure 1).

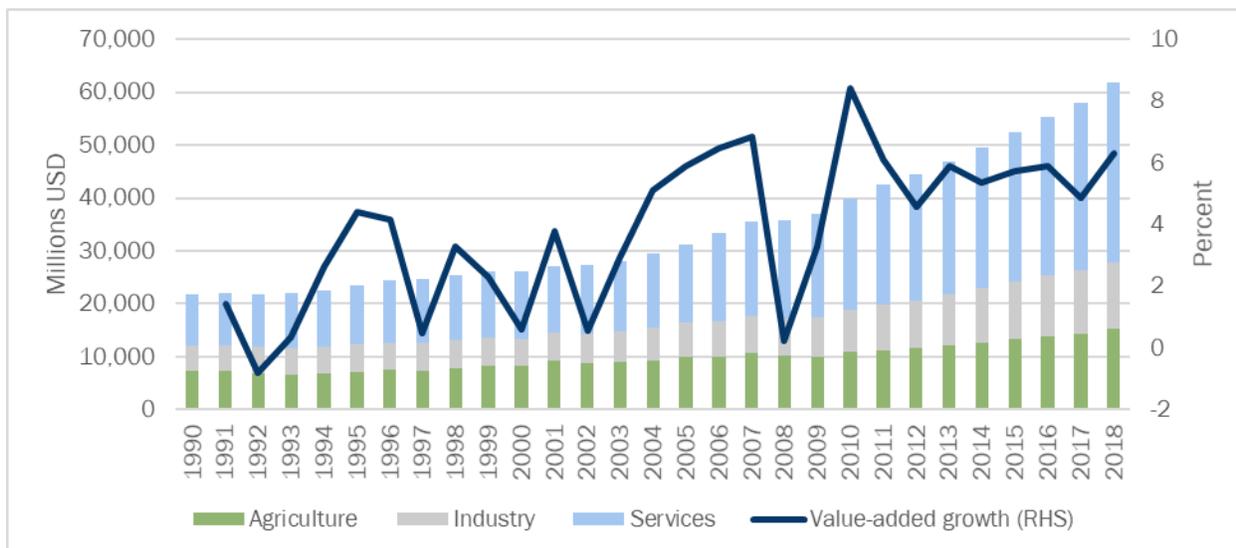
The services sector is currently the most important sector in Kenya's economy in terms of its share of value addition. Its value-added share was about 55 percent in 2018, larger than its previous shares of 44 percent in 1990 and 53 percent in 2010 (Figure 2). The share of agriculture value addition was larger than that of the industrial sector, but agriculture's share fell from about one-third of the total value addition in 1990 to one-quarter in 2018. The industrial sector's share of value addition has been about one-fifth over the last three decades. Thus, like other countries in sub-Saharan Africa (SSA), Kenya is experiencing a shift towards services sectors with limited manufacturing activity, or what has been referred to as deindustrialization (AfDB, 2015).

Figure 1: Value-added growth rates of agriculture, industry, and services 1991-2018



Source: World Bank, 2019a. World Development Indicators (JobStructure Tool).

Figure 2: Value-added share of agriculture, industry and services, and aggregate value-added growth rates 1990-2018 (%)



Source: World Bank, 2019a. World Development Indicators (JobStructure Tool).

2.2 Employment levels, patterns, and trends

Kenya faces significant labor market challenges in the forms of unemployment, time-related underemployment and inactivity.¹ These challenges are more severe for the youth and women, and

¹ Underemployment encompasses individuals whose total work hours are less than 29 hours (KNBS, 2018b).

vary widely across regions. The Kenya Integrated Household Budget Survey (KIHBS) 2015/16 reveals that, whereas the overall unemployment of the working-age group (15 to 64 years) was estimated at 7.4 percent, that of women was 9.6 percent while that of the youth (15 to 24 years) was 17.7 percent. Time-related underemployment was estimated at 20.4 percent for the overall population and 26.0 percent and 35.9 percent for women and youth, respectively.² These statistics reveal that economic growth is yet to be fruitfully translated into employment opportunities and/or is not large enough to offer adequate jobs.

These population and labor force growth patterns suggest not only a changing age structure but also a greater need for productive employment generation. While the country's population grew from 37.7 million people in 2009 to 47.6 million people in 2019, thus recording an average annual growth rate of 2.2 percent, the labor force grew by a higher rate of 3.1 percent per annum over the same period, rising from 15.8 million people to 20.7 million people.

Table 1 shows access to various types of employment based on years for which survey data is available.³ The share of self-employed (own account workers) has risen significantly to become the leading type of employment in Kenya. This shift saw the share of the self-employed rise from 23.9 percent in 1998/99 to 47.7 percent in 2015/16. Despite the increase in the share of formal wage employment, the economy is experiencing difficulties to generate wage employment.

Table 1: Access to employment in Kenya (1998/99-2015/16)

Sector	1998/99			2005/06			2015/16		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Family agriculture (%)	39.8	61.9	50.78	38.1	53.1	45.0	21.6	18.4	20.5
Formal wage (%)	32.0	10.6	21.4	18.1	9.3	14.2	31.1	17.7	24.5
Self-employed (%)	25.2	22.7	23.9	41.8	34.4	38.4	41.2	54.4	47.7
Unpaid worker (%)	1.4	3.5	2.5	1.4	2.7	2	5.4	8.9	7.1
Apprentice (%)	0.2	0.0	0.1	0.2	0.2	0.2	0.2	0.1	0.2
Other (%)	0.6	0.1	0.4	0.2	0.3	0.2	0.5	0.5	0.5
Total (%)	100	100	100	100	100	100	100	100	100
Total ('000)	8,782	8,673	17,455	9,905	8,251	18,156	16,559	15,878	32,437

Source: Estimates based on Labor Force Survey 1998/99 and KIHBS 2005/06 and 2015/16 data.

Family agriculture was the major source of employment, particularly for women in 1998 and 2005. A larger proportion of men (31 percent) than women (25 percent) are in formal wage employment, a trend likely due to inequality in terms of employability (i.e., education and skills levels), among other

² This country case study mainly adopts the ILO (2016) definition of the youth 15 to 24 years. In some cases, the study uses the broader category of the 15 to 34 years to accommodate the Kenyan definition.

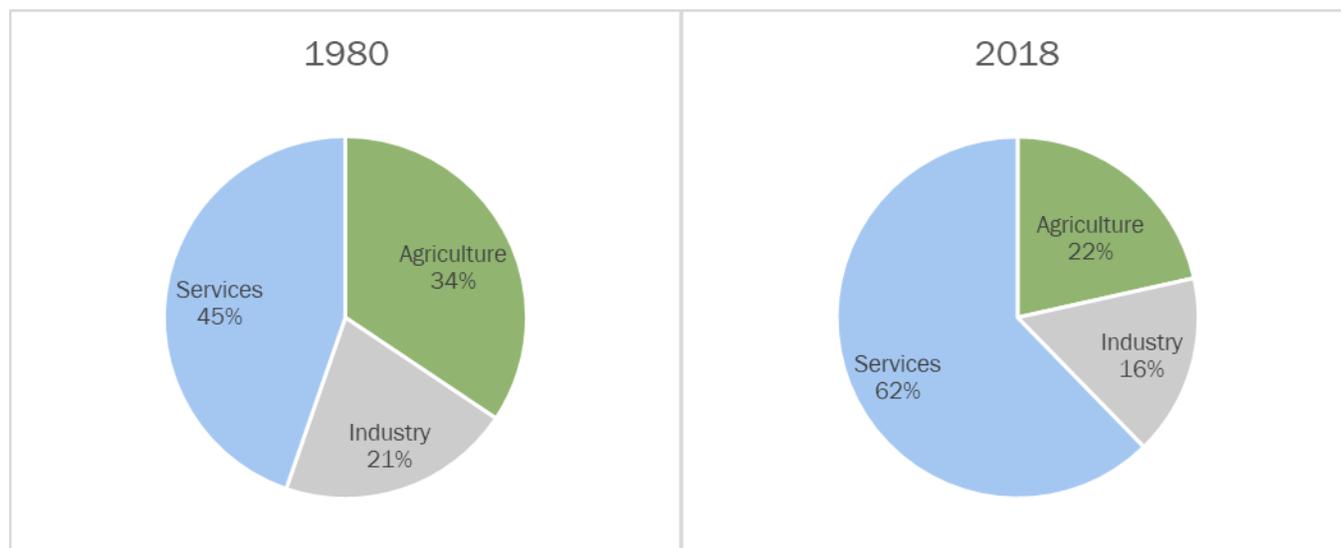
³ Note that the survey data is not strictly comparable to that in the annual Economic Survey, which excludes small-scale farming and pastoralist activities.

factors. As an example, although the gap is narrowing, a larger proportion of males (47.7 percent) than females (43.6 percent) had secondary education or higher in 2015/16 (KIHBS 2015/16). Furthermore, fewer females enroll in science, technology, engineering, and mathematics (STEM) courses within tertiary institutions; hence, they are disadvantaged in securing job opportunities within the industrial and the emerging technology sectors.

2.3 Patterns of growth in output

This subsection focuses on the main trends in output, employment, and productivity for both broad and disaggregated sectors using snapshots of 2018 relative to 1980. Focusing on the broad economic sectors, the share of agriculture in GDP contracted by 12.9 percentage points between 1980 and 2018, reducing its contribution from one-third to about one-quarter of output. At the same time, though, structural transformation towards industry did not emerge, as the share of industry declined by 4.7 percentage points, reducing its contribution from one-fifth to about one-sixth of GDP. In contrast, the services sector expanded by 17.6 percentage points in 2018 relative to its size in 1980, contributing over three-fifths of GDP in 2018 (Figure 3).

Figure 3: Contribution to GDP, main economic sectors 1980 and 2018 (%)



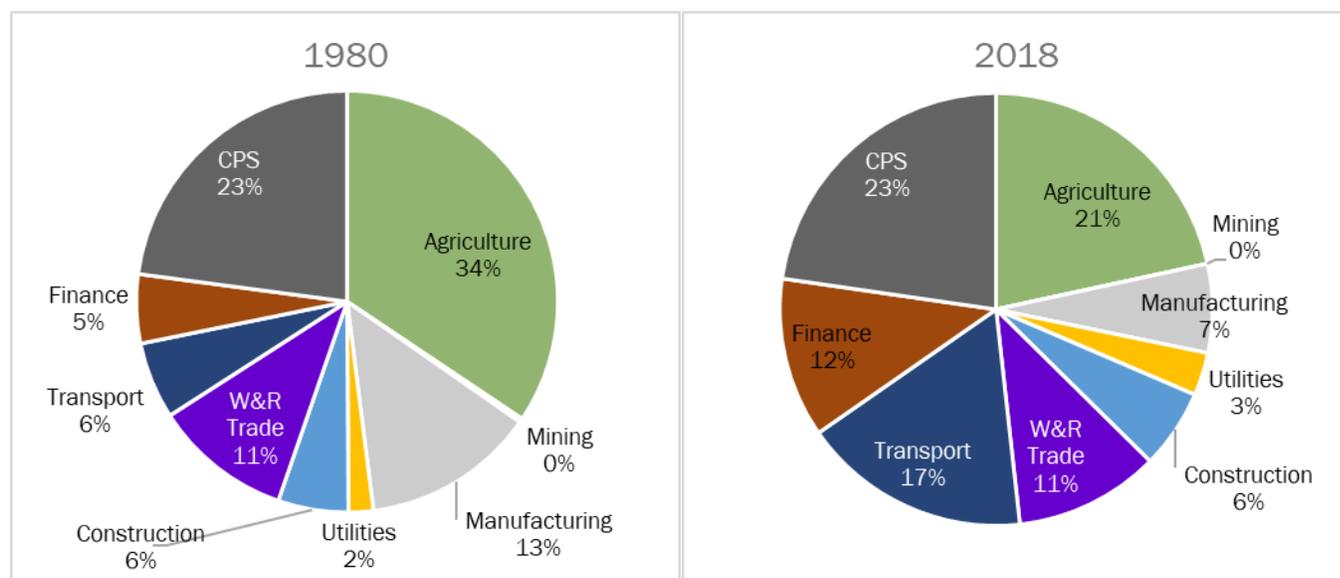
Source: Construction based on data from KNBS (various), Economic Survey.

More specifically, during this time, the share of IWOSS sectors (including financial services, transport, and wholesale trade) expanded (Figure 2). Within the industrial subsectors, the most drastic change was the reduction in the contribution of manufacturing (even when agro-processing is included) by 6.7 percentage points. On the other hand, the contribution of the other industrial subsectors—that is, utilities, construction, and mining—expanded by 1.3, 0.5, and 0.2 percentage points, respectively, implying that manufacturing has been the driver of the decline in industrial activity. Among the services subsectors, the most vibrant was transport whose contribution increased by 11.1 percentage points in 2018 relative to 1980.⁴ The increase in the share of transport reflects the rapid rise in ICT services (which are included as part of transport in this case). The financial subsector increased by 6.6 percentage points over the same period while the remaining two service subsectors, “trade” and

⁴ Note that, in this instance, “transport” includes storage and ICT.

“community and personal services” (CPS) did not experience significant changes in their relative contribution to GDP.

Figure 4: Contribution to GDP by broad economic sectors, 1980 and 2018 (%)



Note: CPS represents community and personal services and includes real estate; professional, scientific and technical activities; education; human health and social work activities; and arts, entertainment and recreation.

Source: Authors' calculations based on data from KNBS (various), Economic Survey.

2.4 Patterns of growth in total employment and productivity

More broadly, the share of agriculture in total employment (formal and informal) generally increased from the 1991 levels of 47 percent to 60 percent in 2010 and then fell to 57 percent in 2018 (Table 2). Relative to 2001, industry's share declined by 2 percentage points while the share of services employment decreased from 38 percent to 35 percent. The patterns in output growth and employment growth imply that productivity declined in agriculture and increased in services and industry.

Table 2: Share of total employment: agriculture, industry, and services (%)

	Share of employment			
	1991	2001	2010	2018
Agriculture (including horticulture)	47	51	60	57
Industry (including agro-processing)	13	10	7	8
Services	40	38	33	35
Total employment ('000)	8,001	10,980	13,794	18,033

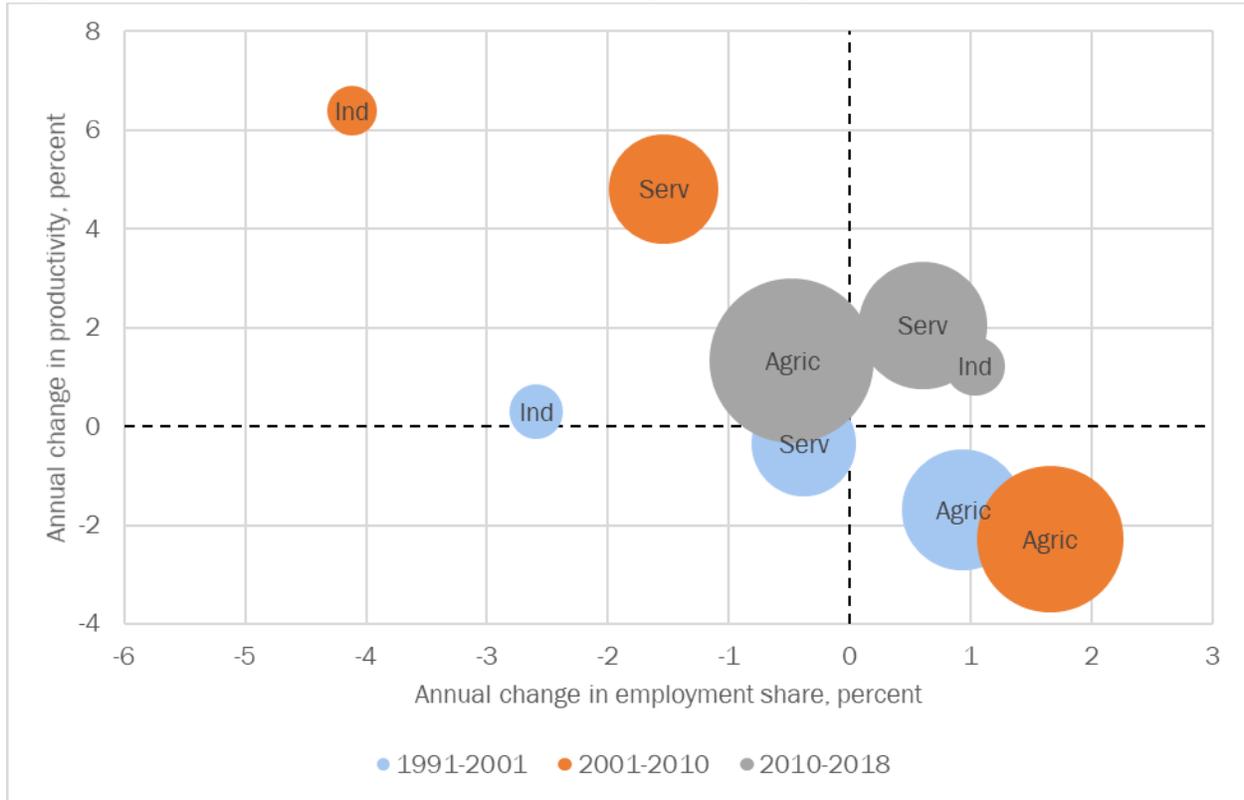
Source: World Bank (2019a). World Development Indicators (JobsStructure Tool).

These sectoral employment growth patterns demonstrate that Kenya has not transitioned to industrial economic activities despite policy efforts to support industrialization and/or expand manufacturing activities. It could be averred that employment in agriculture has remained large due to low entry barriers and few opportunities for the labor force to be absorbed in industrial activity.

As indicated in Figure 5, industry and services have grown in productivity faster than agriculture especially in the period 2001-2010 relative to 1991-2001. In agriculture, value added per worker was

lower in 2018 than it was in 2001 but slightly higher than its level in 2010. On the other hand, in industry, the value added per worker for 2018 nearly doubled relative to 2001 levels. For services, there was a 79.5 percent increase in value added in 2018 relative to 2001 levels. The correlation between productivity growth and employment growth is negative for agriculture but no similar pattern is evident for industry and services.

Figure 5: Correlation between sectoral productivity and employment shares



Note: The bubble size is representative of the employment share in each of the three sectors.
 Source: World Bank, 2019a. World Development Indicators (JobsStructure Tool).

Table 3 provides indicative labor productivity based on the sectoral classification of IWOSS and non-IWOSS. The IWOSS sectors include tourism, ICT, transit trade, financial and business services, wholesale trade, agro-processing, and horticulture. Labor productivity increased consistently for IWOSS, manufacturing and non-IWOSS sectors in 2018 relative to 2001 and 2010. Among the IWOSS sectors, agro-processing, horticulture, and financial and business services had the highest productivity in 2018. These sectors also experienced the largest growth rates in productivity, suggesting these sectors hold the potential for increased productive employment, which is crucial for addressing Kenya’s high poverty and inequality levels.

Table 3: Labor productivity by sector

	Labor productivity (value-added per worker)		
	2001	2009	2018
Total IWOSS	0.95	1.08	1.42
Agro-processing	2.07	2.58	4.47
Export crops and horticulture	1.12	1.09	2.08

Tourism	0.24	0.29	0.42
ICT	0.86	1.04	0.86
Transport	1.21	1.38	1.96
Financial and business services	0.50	1.29	2.01
Trade and repairs	0.87	0.93	0.73
Manufacturing	0.52	0.53	0.68
Other non-IWOSS	0.63	0.65	0.84
Mining	0.93	0.74	1.67
Utilities	0.92	1.57	1.91
Construction	0.41	0.53	0.82
Domestic services	0.32	0.34	0.45
Government	0.29	0.32	0.37

Source: KNBS (Various), Statistical Abstract.

3. Sectoral decomposition: IWOSS in comparison with non-IWOSS

This section focuses on output, wage employment, and productivity in disaggregated IWOSS and non-IWOSS sectors or subsectors.

3.1 Industries without smokestacks (IWOSS) in Kenya: horticulture, ICT, and tourism

As noted earlier, this study focuses on the growth and employment creation potential of horticulture, ICT, and tourism in Kenya. In Kenya, horticulture is dominated by the production of flowers (largely roses, cuttings, mixed flowers, and carnations), fruits (mainly avocados and mangos) and vegetables (largely fine beans and processed beans). We justify our focus on horticulture based on the sectors' production quantities and the commodities' significant share in Kenya's export basket. The selection of ICT is based on its crucial role as an enabler to other sectors, i.e., supporting growth and productiveness of other sectors. Indeed, ICT has been identified as an important enabler in Kenya's Vision 2030 Medium Term Plans, and the sector supports business processes and enhances efficiency in the development agenda. Tourism, which is a set of integrated services, such as travel and tours, accommodation, food and beverages, souvenirs and entertainment, transportation, and excursions—is an important part of Kenya's economy with respect to its output share and employment creation potential.

3.2 Sectoral output and its growth patterns of IWOSS versus non-IWOSS

While total output expanded at an annualized rate of 5.1 percent between 2001 and 2018, the respective annualized rates for IWOSS, manufacturing, and other non-IWOSS were 5.1 percent, 4.3 percent, and 5.1 percent (Table 4). The sectors with the highest annualized growth in output were mining, ICTs, and construction, with respective rates of 10.2 percent, 9.5 percent and 9.1 percent. Notably, these sectors began from a relatively low GDP base in 2001, which partly explains their relatively higher growth rates. The IWOSS sectors with the largest absolute changes in GDP in 2018 relative to 2001 were export crops and horticulture, financial and business services, and transport.

Table 4: GDP by activity, share, absolute change, and growth, 2001- 2018

	GDP 2001 (KSh millions)	GDP 2018 (KSh millions)	GDP share 2001 (%)	GDP share 2018 (%)	Absolute change in GDP (KSh millions)	Share of change (%)	Annualized growth of GDP %
Activity	1,178	2,730	100	100	1,552	100	5.1
Total IWOSS	547	1,282	46.4	46.9	735	47.3	5.1
Agroprocessing	56	140	4.7	5.1	85	5.4	5.6
Export crops and horticulture	250	478	21.2	17.5	228	14.7	3.9
Tourism	12	37	1.0	1.4	25	1.6	7.0
ICT	23	106	1.9	3.9	83	5.4	9.5
Transport	70	178	5.9	6.5	108	7.0	5.6
Financial and business	42	152	3.6	5.6	110	7.1	7.8
Trade and repairs	94	189	7.9	6.9	96	6.2	4.2
Manufacturing	71	146	6.0	5.3	74	4.8	4.3
Other non-IWOSS	560	1,303	47.6	47.7	743	47.9	5.1
Agriculture	278	523	23.6	19.2	246	15.8	3.8
Mining	5	26	0.4	0.9	21	1.3	10.2
Utilities	20	65	1.7	2.4	46	2.9	7.3
Construction	32	140	2.7	5.1	108	7.0	9.1
Domestic services	181	439	15.4	16.1	258	16.6	5.4
Government	45	110	3.8	4.0	65	4.2	5.4

Note: GDP is measured in 2009 prices.

Source: Authors' calculations based on data from KNBS (various), Statistical Abstract.

The relatively large increase in mining output can be linked to recent discoveries and production of a wider variety of minerals, including titanium ore minerals. Kenya began exporting titanium in 2014 and has begun commercial exploitation of other minerals, including niobium and rare earth metals. Currently, Kenya also exports crude oil, but only began to do so after 2018. The growth in construction has been driven by large investments in road and railway infrastructure especially since 2013. A recent example is the construction of the Standard Gauge Railway, Kenya's largest-ever infrastructure project at a cost of \$3.6 billion.

3.3 Sectoral wage employment and growth of IWOSS versus non-IWOSS

On aggregate, wage employment increased by over 1 million in 2018 relative to 2001 and most of this increase was in non-IWOSS and more specifically in domestic services and government (Table 5a).⁵ Non-IWOSS sectors (excluding manufacturing) contributed 62.5 percent of this change while the rest was contributed by IWOSS (30.2 percent) and manufacturing (7.2 percent). For non-IWOSS sectors, the main drivers of wage employment growth were domestic services rather than a vibrant industrial

⁵ The domestic services sector includes the following categories. (i) professional, scientific and technical services; (ii) administrative and support services; (iii) education; (iv) human, health, and social work activities; (v) other service activities; and (v) activities of households as employers. Government includes public administration and defence activities.

sector. Indeed, most of the employment within non-IWOSS was in *domestic services*, which accounted for 64.2 percent and 62.1 percent of total non-IWOSS employment in 2001 and 2018, respectively. The largest absolute increase resulted from expansions in domestic services (mainly education) and government (administrative services). The increase in government's wage employment was largely driven by the 2013 transition to a devolved governance structure that created 47 new sub-national governments, which resulted in the emergence of thousands of public sector jobs in between 2013 and 2018.

Table 5a: Changes in formal employment and its share in IWOSS and non-IWOSS, 2001-2018

	Wage employment 2001 (millions)	Wage employment 2018 (millions)	Wage employment share 2001 (%)	Wage employment share 2018 (%)	Absolute change (millions)	Share of change (%)	Annualized growth (%)
Total wage employment	1,599	2,670	100.0	100.0	1,071	100.0	3.1
Total IWOSS	576	900	36.0	33.7	324	30.2	2.7
Agro-processing	27	31	1.7	1.2	4	0.4	0.9
Export crops and horticulture	224	230	14.0	8.6	6	0.5	0.1
Tourism	49	89	3.1	3.3	39	3.7	3.5
ICT	27	123	1.7	4.6	97	9.0	9.5
Transport	58	91	3.6	3.4	33	3.1	2.7
Financial and business services	84	76	5.2	2.8	-8	-0.8	-0.6
Trade and repairs	107	260	6.7	9.8	153	14.3	5.3
Manufacturing	136	213	8.5	8.0	77	7.2	2.7
Other non-IWOSS	886	1,556	55.4	58.3	670	62.5	3.4
Agriculture	60	74	3.8	2.8	14	1.3	1.2
Mining	5	15	0.3	0.6	10	0.9	6.5
Utilities	21	34	1.3	1.3	13	1.2	2.8
Construction	77	172	4.8	6.4	95	8.9	4.8
Domestic services	569	966	35.6	36.2	397	37.0	3.2
Government	154	295	9.6	11.0	141	13.2	3.9

Note: Manufacturing excludes agro-processing.

Source: Authors' calculations based on data from KNBS (Various), Statistical Abstract

Absolute changes in employment over this time period were positive in all sectors except financial and business services. The IWOSS sectors with the largest absolute change in wage employment in 2018 relative to 2001 were trade and repairs, ICT, and tourism with 14.3 percent, 9.0 percent and 3.7 percent of the total absolute change in wage employment, respectively. Outside of IWOSS and domestic services, the construction sector and manufacturing had relatively strong performances with respect to absolute changes in wage employment accounting for 8.9 percent and 7.2 percent of the total absolute change, respectively.

With respect to annual employment growth across the sectors, total wage employment growth between 2001 and 2018 was 3.1 percent. Notably, employment growth of IWOSS (at 2.7 percent) was equal to that of manufacturing but lower than other non-IWOSS (3.4 percent). The wage employment growth of IWOSS was lower than the growth of the national labor force (of about 3.1 percent). While we expected that agro-processing and horticulture would be vibrant with respect to wage employment growth, their respective wage employment shares declined in 2018 relative to 2001. On the other

hand, the wage employment shares of ICT and tourism increased despite a decline in the share of employment for the total IWOSS sectors.

Among the selected IWOSS sectors, ICT stands out both in terms of high output and wage employment growth. Export crops and horticulture have high output growth but low wage employment growth. On the other hand, tourism—despite a relatively lower base—fairs better than manufacturing in output and wage employment growth in 2018 relative to 2001. As an example, the annualized growth in wage employment in tourism (at 3.5 percent) was larger than the total employment growth (of 3.1 percent). Importantly, in relative terms, wage employment in manufacturing was 2.8 times larger than tourism in 2001, but tourism has since closed the gap: In 2018, wage employment in manufacturing had fallen slightly to 2.4 times larger than tourism in 2018.

Although wage employment in manufacturing expanded by 2.7 percent, its employment share declined (from 8.5 percent to 8.0 percent) suggesting that, on average, wage employment in the other sectors of the economy grew faster than that of manufacturing. All other non-IWOSS sectors recorded an increase in wage employment except utilities and agriculture.

Notably, some sectors, particularly “export crops and horticulture” and “financial and business services,” experienced both high output growth *and* apparent poor performance in their wage employment. Indeed, the financial and business services sector has negative employment elasticity, implying its growth is associated with reduced demand for labor (Table 5b). The slow or declining growth in wage employment in these IWOSS sectors could be attributed to structural changes within the sectors. Both sectors are characterized by use of digitization/automation in their production processes, which, in financial services, include: automatic teller machines (ATMs), mobile banking, internet banking, telephone banking, video banking, agency banking, and electronic funds transfer (EFT). The automation process has lowered the demand for wage employment at the firm level in the short run, as suggested by several studies, including Spiezia (2016). It is also established that automation amid innovation usually spurs sector-wide development and growth in wage and non-wage employment in the long run (Ibid).

Table 5b: Change in GDP, wage employment and employment elasticity 2001-2018

	Change in GDP	Change in wage employment	Wage employment elasticity
	2001-2018	2001-2018	2018
Total	131.8	67.0	0.51
Total IWOSS	134.5	56.2	0.42
Agro-processing	151.3	16.2	0.11
Export crops and horticulture	91.0	2.5	0.03
Tourism	213.5	79.7	0.37
ICT	365.0	364.3	1.00
Transport	154.0	57.0	0.37
Financial and business services	261.2	-9.7	-0.04
Trade and repairs	102.6	142.3	1.39
Manufacturing	104.4	56.8	0.54
Other non-IWOSS	132.6	75.6	0.57
Agriculture	88.5	23.3	0.26

Mining	421.6	192.1	0.46
Utilities	231.8	59.5	0.26
Construction	340.0	123.6	0.36
Domestic services	142.8	69.7	0.49
Government	142.8	92.1	0.64

Source: Authors' calculations based on data from KNBS (Various), Statistical Abstract.

In Kenya's horticulture and financial sectors, there is growth of non-wage jobs and/or growth of wage jobs in "auxiliary" subsectors. In horticulture, small-scale producers (mainly self-employed and contributing family workers) have increased over time. Small-scale producers accounted for less than 50 percent of production in 2001 and over 80 percent of the total production in 2018 (Kleih, Basset-Mens, Allen, & Edewa, 2018), a trend that may explain the increased output and exports in horticulture and apparent slack in wage employment.

In the financial sector, key policy changes—notably the government's policy on consolidation and the Basel norms—has resulted in mergers and acquisitions. This trend, together with the sectors' relatively high and increasing levels of automation and transition into digital platforms, has slowed demand for wage employment within mainstream financial institutions. A more recent regulation on lending interest rates (cap) and minimum interest payments on deposits is associated with worker layoffs in financial institutions between September 2016 and November 2019 (KNBS, 2020). The sectors' high intensity of automation and layoffs are consistent with its negative employment elasticity value. Even so, structural changes may have opened more non-wage employment opportunities in related services—such as banking agents and mobile money transfer agents. For example, the banking sector's wage employment grew 1.5 times in 2018 relative to 2007 (from 21,657 to 31,889 employees) while the number of mobile money transfer agents grew 130 times over the same period (from 1,582 in 2007 to 205,745 agents in December 2018) (Central Bank of Kenya, various).

The growth in the number of the banking and mobile money transfer agents can serve as a good proxy for persons working outside the mainstream financial institutions. In fact, many of these activities can be classified as self-employed or contributing family workers, which dampens wage employment growth numbers within the financial sector. We do note that some of these agents will be captured under retail trade or ICT sectors (since their activities tend to be domiciled within trade or ICT establishments), which would also partly explain the rapid employment growth (both wage and non-wage) in the trade and ICT sectors.

Thus, in horticulture and financial services, we see a process of "informalization" of new jobs and workspaces. We envisage that this process will persist with further mechanization and/or automation. As a result of these changes, it's very possible that a large share of new jobs in Kenya will be of lower quality (i.e., informal non-wage jobs characterized by precarious or vulnerable employment, low pay and low coverage of social protection). Importantly, this process may undermine the decent work agenda and compromise achievement of the Goal 8 of the sustainable development goals (SDGs), "decent work and economic growth."

A comparison of the trend in the wage employment share of youth (15 to 24) in IWOSS and non-IWOSS by sex reveals contrasting trends for males and females in 2018 relative to 2001 (Table 6). While a larger share of male youth transitioned to IWOSS (from 33.8 percent to 43.6 percent) a smaller share of female youth (29.3 percent) were in IWOSS wage jobs in 2018 (from 44.2 percent in 2001). The main drivers of the increase in the share of IWOSS for males were trade and repairs, ICT, financial and

business services, and tourism. Females had increases in ICT, transport, and agro-processing. The share of employment in manufacturing changed marginally with an increase for males and a decline for females. Domestic services expanded for females and declined for males.

Table 6: Share of youth (15 to 24) in waged jobs by sex, 2001 and 2018

	Male wage employment share, 2001 (%)	Female wage employment share, 2001 (%)	Male wage employment share, 2018 (%)	Female wage employment share, 2018 (%)
Total wage employment (%)	100	100	100	100
Total IWOSS	33.8	44.2	43.6	29.3
Agro-processing	2.2	0.8	1.6	1.4
Export crops & horticulture	15.5	21.0	10.2	8.6
Tourism	4.0	4.3	4.2	2.6
ICT	1.2	3.0	5.0	4.0
Transport	5.4	0.8	3.8	1.8
Financial & business services	1.3	4.4	3.1	2.9
Trade & repairs	4.2	9.9	15.6	7.9
Manufacturing	9.0	7.0	10.3	6.1
Other non-IWOSS	57.2	48.8	46.1	64.7
Agriculture	9.0	1.4	6.5	5.5
Mining	0.5	0.3	0.7	0.1
Utilities	1.2	0.3	0.5	0.3
Construction	5.2	0.2	4.8	7.5
Domestic services	40.5	44.9	32.2	50.0
Government	0.7	1.6	1.4	1.2

Source: Authors' calculations based on Statistical Abstract (various).

Importantly, the share of employment in manufacturing changed marginally with an increase for males and a decline for females. with respect to jobs by sex, some of the sectors with strong growth in wage employment, such as ICT and construction, are less accessible to women. Indeed, according to the KIHBS 2015/16, in construction and ICT, the share of women of working age in wage jobs was only 5.4 percent and 31.9 percent, respectively (Table 7). Women tend to dominate wage jobs in services and agriculture, horticulture, tourism, and domestic services. These skewed shares suggest that efforts to enhance employment should pay keen attention to the sex distribution, especially in IWOSS sectors like ICT and agro-processing.

Table 7: Share of males and females in waged jobs for the working age group in 2015/16

	Wage employment share	
	Male	Female

Agro-processing	61.4	38.6
Export crops and horticulture	37.0	63.0
Tourism	45.5	54.5
ICT	68.1	31.9
Transport	95.9	4.1
Financial and business services	50.6	49.4
Trade and repairs	57.3	42.7
Manufacturing	71.4	28.6
Agriculture	47.0	53.0
Mining	85.7	14.3
Utilities	73.2	26.8
Construction	94.6	5.4
Domestic services	46.8	53.2
Government	75.1	24.9
Total	57.5	42.5

Source: Authors' calculations based on KIHBS 2015/16.

3.4 Relative skill composition across sectors

Table 8 represents the breakdown of sectoral wage employment by relative skill composition of the IWOSS and non IWOSS sectors as measured by education. High-skilled jobs are defined as those performed by workers with complete tertiary education. Skilled jobs refer to employees with secondary education, while low-skilled are those with only primary education or lower. Because these classifications are not directly observable in the data sources used, we use KIHBS 2015/16 data to generate the relative shares of sectoral wage employment by skill level and relevant ISIC codes. We then apply computed shares to aggregate data from the Statistical Abstract to estimate distribution of wage employment across the IWOSS and non-IWOSS sectors.

Thus, for the total wage employment, most wage employees (53 percent) are low skilled. Only 17 percent have high skills, and about 30 percent are skilled. The highest proportion of low-skilled workers (55.7 percent) are employed in non-IWOSS/non-manufacturing, followed by IWOSS (48.0 percent) and manufacturing (39.5 percent).

Among IWOSS, ICT is the high-growth sector that requires a relatively large proportion of high-skilled workers. Other sectors requiring relatively higher skills are financial and business services (57 percent) and utilities (52.4 percent). On the other hand, tourism and horticulture can absorb relatively high proportion of workers with moderate to low level skills. Indeed, agro-processing and horticulture are the IWOSS sectors with the largest share of low-skilled waged employment at 76 percent and 66 percent, respectively. As for the non-IWOSS sectors, mining and agriculture have the largest share of low-skilled labor while utilities and government have the largest concentration of high-skilled and skilled employment.

Table 8: Breakdown of sectoral employment by skill level, 2018

	Absolute ('000)			Share (%)		
	High skilled	Skilled	Low skilled	High skilled	Skilled	Low skilled
Total employment	453,063	798,800	1,418,191	17.0	29.9	53.1
Total IWOSS	152,639	314,999	432,358	17.0	35.0	48.0
Agro-processing	1,472	6,185	23,722	4.7	19.7	75.6
Export crops and horticulture	6,550	71,687	151,602	2.9	31.2	66.0
Tourism	16,951	38,724	33,121	19.1	43.6	37.3
ICT	93,368	22,846	7,089	75.7	18.5	5.8
Transport	12,573	37,374	40,701	13.9	41.2	44.9
Financial and business services	43,263	18,202	14,164	57.2	24.1	18.7
Trade and repairs	54,169	113,416	92,816	20.8	43.6	35.6
Manufacturing	44,662	84,499	84,307	20.9	39.6	39.5
Other non-IWOSS	264,104	425,181	867,015	17.0	27.3	55.7
Agriculture	1,846	17,240	55,027	2.5	23.3	74.2
Mining	572	1,951	12,841	3.7	12.7	83.6
Utilities	17,899	10,926	5,308	52.4	32.0	15.6
Construction	19,215	63,651	88,699	11.2	37.1	51.7
Domestic services	385,381	284,809	295,919	39.9	29.5	30.6
Government	118,859	138,005	38,145	40.3	46.8	12.9

Source: Authors' calculations based on Statistical Abstract (2019) and KIHBS 2015/16.

3.5 Employment-output elasticities, ratios, and multipliers

Table 9 presents employment-output elasticities that reveal that, on aggregate, IWOSS in Kenya more broadly has a lower elasticity relative to manufacturing and non-IWOSS. In other words, even if IWOSS's growth outpaces that of manufacturing and non-IWOSS in the coming decade, it may not generate more jobs than these sectors.

Despite this general trend, many IWOSS *subsectors* demonstrate the highest elasticities overall, for example, trade and repairs (1.4) and ICT (1.0). However, for tourism and horticulture, a 1 percent increase in their respective output results in a 0.37 percent and 0.03 percent change in wage employment, respectively—though an important caveat in these comparisons is that horticulture has relatively larger proportions of non-wage jobs in form of own-account and family workers.

Table 9: Change in GDP and wage employment and employment elasticity 2001-2018

	Change in GDP	Change in wage employment	Wage employment elasticity
	2001-2018	2001-2018	2018
Total	131.8	67.0	0.51
Total IWOSS	134.5	56.2	0.42

Agro-processing	151.3	16.2	0.11
Export crops and horticulture	91.0	2.5	0.03
Tourism	213.5	79.7	0.37
ICT	365.0	364.3	1.00
Transport	154.0	57.0	0.37
Financial and business services	261.2	-9.7	-0.04
Trade and repairs	102.6	142.3	1.39
Manufacturing	104.4	56.8	0.54
Other non-IWOSS	132.6	75.6	0.57
Agriculture	88.5	23.3	0.26
Mining	421.6	192.1	0.46
Utilities	231.8	59.5	0.26
Construction	340.0	123.6	0.36
Domestic services	142.8	69.7	0.49
Government	142.8	92.1	0.64

Source: Authors' construction based on data from KNBS (Various), Statistical Abstract.

The elasticities presented above are sensitive to output-to-value-added growth and are supplemented with other labor intensity measures including labor-to-value-added ratios computed using the social accounting matrix (SAM). The labor-output ratios (or labor-to-value-added ratios) represent the number of individual workers required per sector to increase GDP in each sector by KSh 1 million (Figure 6). Sectors with higher ratios require more labor per unit of output. The relatively more labor-intensive IWOSS sectors include tourism, trade, and ICT, which largely corroborates the results using the wage employment elasticity detailed in Table 9. Some of the lowest labor-to-output ratios were recorded for financial services and utilities—a finding consistent with their relatively high levels of automation. Relative to IWOSS and other non-IWOSS, manufacturing had a relatively high ratio.

Figure 6: Labor-output ratios for Kenya, 2018 (wage employment)



Source: Authors' calculations based on data from KNBS (2019) Statistical Abstract.

4. Employment creation potential and constraints facing IWOSS sectors

The objective of this section is to discuss not only the employment creation potential of each of the three selected IWOSS sectors but also the key constraints to their output and employment growth through a value-chain approach. The constraints are discussed within specific themes including investment climate, skills and exports following Page (2019). The section begins by assessing the employment potential and constraints for horticulture, ICT, and tourism. A brief section on cross-cutting constraints concludes this section.

4.1 Horticulture value chain, employment potential, and constraints

Horticulture is quite diverse in its product range, and the subsector encompasses flowers, fruits, and vegetables, which have unique value chains and varying performance in output and wage employment growth. Some of the more important commodities with respect to output and export quantities are roses, cuttings, mixed flowers, carnation, avocados, mangos, green beans, and processed beans.

Using the three pillars rapid screening criteria, we identify the green beans value chain as the most promising subsector within horticulture in Kenya to illustrate employment potential and constraints within the sector (World Bank, 2018), largely because it is labor intensive and most of its chain activities are in Kenya, which could offer important lessons to the flower value chain for which some of the key value addition activities are not within the country.

4.1.1 Green beans value chain

Within the green beans subsector, mixed vegetables, green beans, and processed green beans are the leading products. In 2018, each accounted for 45.8, 22.9 and 11.8 percent of total value of vegetable exports, respectively. Table 10 provides a highlight of area under production and output by volume and value of green beans between 2015 and 2018.

Table 10: Green bean production, 2015 - 2018

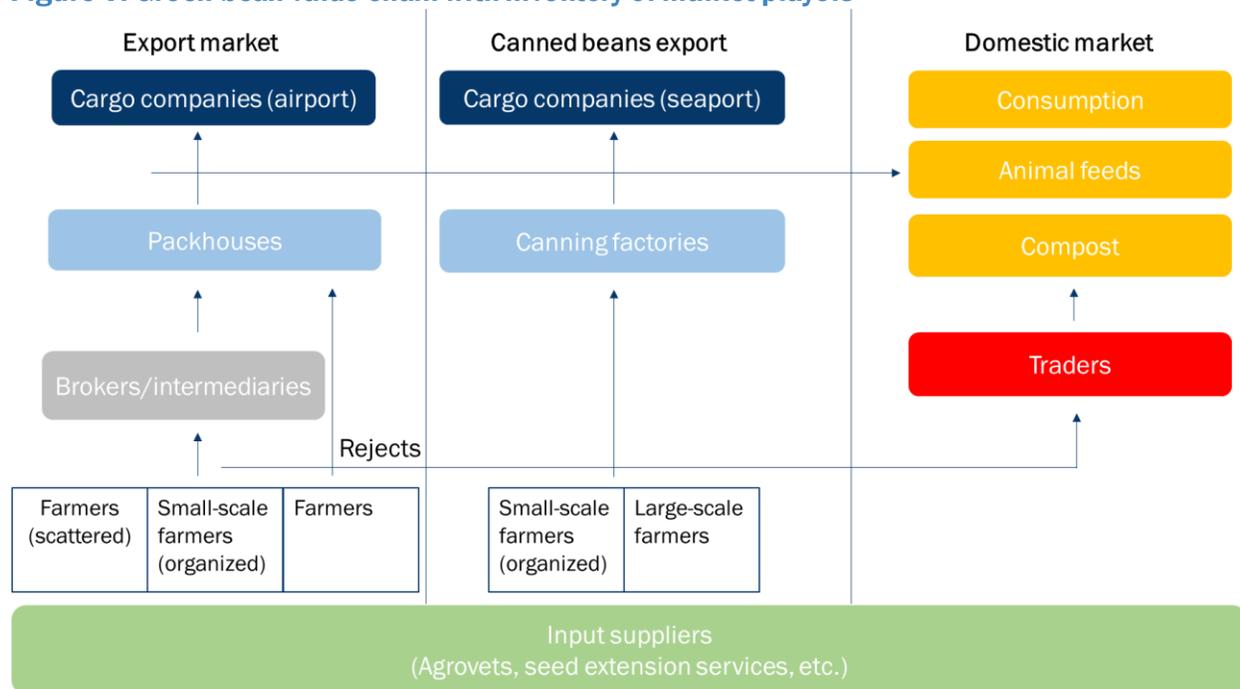
Year	Area (Ha)	Volume (MT)	Value (Ksh)	Yield (MT/Ha)	Growth in volume (%)
2015	5,671	34,779	1,382,209,471	6.1	
2016	5,948	46,222	1,968,975,817	7.8	14
2017	6,220	42,596	2,052,370,850	6.8	(4)
2018	7,942	66,765	3,309,256,570	8.4	22

Source: AFA-Horticultural Crops Directorate, 2018 and 2019.

The green bean value chain, like the other value chains in horticulture, consists of wide range of actors including farmers (small- and large-scale), traders, packhouses, canning factories, and logistics and freight establishments (Figure 7). Among farmers/producers, small-scale farmers are the majority and account for over 80 percent of total production. Most producers are organized into groups, and production is regulated through contractual arrangements with exporters. Sales of produce by small-scale producers are usually made through intermediaries, including brokers. And, in some cases, exporters who are usually large-scale farmers with large contracts with exporters (Kleih et al., 2017). Smallholder and large-scale farmers sell their produce in three distinct markets for green beans: the fresh bean export market, the canned beans export market, and the domestic market. The production

process for green beans is highly manual, particularly for small farms who commonly use family labor for most of the operations. Medium and large farms have mechanized a significant share of their operations, but harvesting is mainly carried out by casual labor and requires an estimated 60 persons per hectare of crop. The majority of these laborers are women (Kleih et al., 2018).

Figure 7: Green bean value chain with inventory of market players



Source: Adapted from Kleih et al., 2017.

There are two main types of post-harvest handling operations in which value addition takes place, namely the packing of fresh beans and processing of canned beans. These activities are implemented in packhouses and canning factories, respectively. In the packhouses, the value-addition activities that take place include the cleaning, sorting, grading, trimming, weighing, packaging, and cooling of produce. Packhouses may have between 50 (in the case of a medium-sized operator) and 300 (in the case of a large-scale operator) workers. More often than not, these workers are usually casual. Packhouses are designed to accommodate a wide range of export produce including fruit (e.g., mangoes or avocados) and vegetables (e.g., green beans, sugar snaps, mango touts, or baby corn). Trade relies on three main channels that include contractual engagements, brokers/intermediaries, and domestic wholesalers and retailers.

4.1.2 Employment potential for green beans

Tables 11a and 11b show the full-time equivalent jobs in the green beans value chain. These estimates assume the sector faces existing constraints such as inadequate cold chain facilities. Wage workers are estimated to work for 170 days annually.⁶

⁶ it is estimated that workers are engaged for 70-80 days for farm operations and 3-5 days for handling/processing to market-shelf per season. Each year has two seasons which translates to 170 days in a year.

With respect to employment, the small-scale farms are the most important source of wage jobs in the green beans value chain. We estimate that out of the 58,915 full-time equivalent (FTE) wage jobs generated by the value chain, 49,400 (84 percent) were in small-scale farms. Our estimates indicate that the green beans value chain account for at least a quarter of all jobs within the export crops and horticulture sector. About 95 percent of all the wage jobs are for the unskilled labor force (Tables 11a and 11b). It is further estimated that 21 percent of those employed are the youth and that women take up an estimated 50 percent of all the wage jobs.

Table 11a: Distribution of jobs by type across value chain nodes, 2018

Node	Node share of total value chain jobs (%)	Share of total jobs (%)		Share of FTEs (%)	
		Permanent	Casual labor	High skill	Low skill
Smallholder farms	76.9	50	50	5	95
Medium and large farms	8.3	12	88	20	80
Traders	2.4				
Packhouses	9.1	10	90	25	75
Processors	3.3	10	90	25	75
Logistics and freight	0.0	10		100	

Note: 1 FTE is a full-time job of 40 hour per week.

Source: Authors' calculations.

Table 11b: Value chain jobs estimation analysis, 2018

Node	Number of actors	Jobs in current value chain	Share of total jobs		Share of FTEs	
		Total	Permanent	Seasonal	High skill	Low skill
Smallholder farms	104,000	49,400	24,700	12,350	1,235	48,165
Medium and large farms	11,200	5,320	638	4,682	128	5,192
Traders	3,204					
Packhouse	8,200	3,895	390	3,506	97	3,798
Processors	600	285	29	257	7	257
Logistics and freight	32	15	15		15	
Total		58,915	25,772	20,795	1,482	57,412

Note: 1 FTE is a full-time job of 40 hour per week. Because of the part-time nature of the horticultural sector, we assumed each horticultural job equates to 0.475 FTE jobs.

Source: Authors' calculations.

4.1.3 Constraints to growth of horticulture including the green beans value chain

Thus, the sector has both room to grow and create jobs, but remains constrained due to several factors. A major constraint facing the actors in the subsector, especially smallholders, is the quality of road infrastructure—specifically the feeder roads from farms to the packhouses and/or canning factories. Farmers also lack cold chain facilities. Together, these two challenges are major causes of large post-harvest losses in the horticultural value chain. Indeed, it is estimated that up to about 42 percent of output of green beans is lost due to poor road infrastructure and lack of cold chain infrastructure (Kleih, Basset-Mens, Allen, & Edewa, 2018; RSA, 2015; Kok, Osen, & Snel, 2019).

A related constraint is the relatively high transport costs and inadequate options for transport. Kenya's inland transport costs are among the highest for comparator countries in the region. Although there is great potential in using maritime transport, this option is yet to be properly utilized due to a number of reasons identified by our key informants, including long transportation days to the market attributed to lack of dedicated investment in maritime lines to the main target markets. Competition restrictions in input markets also hamper the sector: Both the fertilizer and seeds markets are dominated by large state agencies, a structure that perpetuates anti-competitive practices, resulting in high input costs (World Bank, 2014). In addition, there are a host of binding constraints facing horticultural exports including green beans. These constraints include:

- (i) **Difficulty in performing cross-border trade.** Firm representatives, during a stakeholder consultative/dissemination forum in 2020 in Nairobi, attributed this constraint to skills deficits among customs officials in the application of tariffs - and reflected in the poor ranking of Kenya on a couple of Doing Business metrics (World Bank 2020) including on ease of performing cross-border trade of 117 out of 189 countries in the 2020 rankings. The Doing Business report estimates that the cost associated with documentary compliance was quite high in Kenya at \$191 and is higher than the SSA average of \$172.5 (World Bank, 2020).
- (ii) **Dynamic non-tariff trade barriers.** Trade barriers in Kenya are aggravated by limited access to technical information by producers. Thus, producers usually find themselves playing catch up with evolving standards. A specific example is the consumer-driven standards such as the European Good Agricultural Practice (EuroGAP) and the Kenya Good Agricultural Practice (KenyaGAP).
- (iii) **Weaknesses in marketing especially for niche products.** One of the problematic aspects is the limited branding of export products yet there are opportunities to leverage Kenyan outputs on the basis of the role of small farmers and particularly women in the production process.
- (iv) **Inadequate coordination among exporters.** Key informants pointed out that, although there is opportunity to gain from consolidation of different shipments of exports, exporting firms do not do so due to lack of coordination. Consolidation of various shipments would offer excellent opportunities for lowering costs, boosting profits, and enhancing competitiveness of Kenya's exports (USAID, 2012).

Skills constraints

In addition to the above, the skills supply (or skill pool) and its quality also hampers the growth of this value chain. Indeed, there has been a general decline in the number of students registered in agricultural-related courses by an estimated 7 percentage points from 9 percent in 2010 to 2.2 percent in 2019 (KNBS, 2010, 2019). We project that, unless there are specific interventions, the number of qualified experts in farm technology, marketing, and soil and plant science, among other areas, will decline.

In addition, available graduates have inadequate skill levels due to a lack of experiential learning (and lack of impacting practical skills) in learning institutions, among other problems (Mungai and Ombati, 2015). Key informants who were mainly industry players identified sector-specific skills constraints to include limited knowledge of non-tariff trade barriers (NTTBs), limited knowledge of branding of products especially among small producers, and lack of technical knowledge in the application of pesticides. These constraints suggest the need to adopt accessible continuous skills transfer and learning approaches to enhance skills levels.

We subsequently projected the job creation potential when the green beans constraints were addressed. KIPPRA estimated this by simulating scenarios where there is a reduction of post-harvest losses by 50 percent and 75 percent respectively. In these scenarios, jobs would increase by 6 percent and 10 percent respectively. In the first scenario, 308 additional skilled jobs and 1,391 low-skilled jobs will be generated, while in the second scenario 378 skilled jobs and 4,258 unskilled jobs shall be generated. Besides addressing post-harvest losses, the sector can create more jobs with innovations in marketing, expansion of solid infrastructure beyond the greater Nairobi region, and exploring ways of reducing the cost of doing business in transport and related operations.

4.2 ICT value chain, employment potential, and constraints

Of sub-Saharan African countries, Kenya has been on the forefront of ICT innovation and adoption, and the ICT sector encompasses many opportunities. In principle, ICT economic activities encompass industries that produce goods and services “intended to fulfil or enable the function of information processing and communication by electronic means.”⁷ The industries in the ICT sector can be grouped into ICT manufacturing industries, ICT trade industries, and ICT services industries (see Box 3).

Although ICT accounted for only 1.6 percent of GDP between 2014 and 2019, it contributed about 4.4 to 4.7 percent of wage employment—indicating the sector’s importance for job creation. The sector is an important source of economic growth contributing 6.9 percent of GDP growth in 2019. Furthermore, the sector is experiencing high growth globally, and, as traditional economies transform into digital economies, it will only grow in importance. Moreover, ICT has significant backward and forward linkages with nearly all the other sectors and is an important “enabler.”

The sector also creates important synergies with other growth sectors, such as agriculture and financial services. For instance, in Kenya the ICT sector promotes agricultural productivity through access to extension services, access to farm inputs and markets for produce and data analytics and intelligence (World Bank, 2019c). Moreover, the country has made significant strides in the overall financial inclusion agenda by leveraging ICT services: The 2019 FinAccess Survey for Kenya reveals that the use of mobile money among the adult population increased from 27.9 percent in 2009 to 61.6 percent in 2013, 71.4 percent in 2016 and 79.4 percent in 2019 (FinAccess, 2019). The use of digital loans increased from 0.6 percent in 2016 to 8.3 percent in 2019 (Ibid.)

The ICT sector enjoys strong policy and legal support from the government, and the Kenya Vision 2030 states that the country aspires to “quickly become the top BPO [Business Process Outsourcing] destination in Africa.” In support of this goal, the Kenyan government developed the Digital Economy Blueprint 2019 as a roadmap to spur Kenya’s digital economy. The blueprint seeks to create opportunities on three fronts: entrepreneurship and innovation, digital skills research, and development. Thus, current policies already aim to position the Kenyan economy as a hub for ICT, e-commerce, and digital services by mitigating existing challenges.

⁷ United Nations (2008). International Standard Industrial Classification of all Economic Activities (ISIC), Rev. United Nations. New York.

Box 3: Information and Communications Technologies (ICT):

The ISIC, Rev.4 provides a relatively standardized definition which states that in principle, ICT economic activities (industries) encompass “the production of goods services intended to fulfil or enable the function of information processing and communication by electronic means, including transmission and display.” The activities (industries) in the ICT sector can be grouped into ICT manufacturing industries, ICT trade industries, and ICT services industries. The ISIC, Rev.4 industries that comply with the above definition (as contained in ISIC) are provided below:

*ICT sector***ICT manufacturing industries**

2610 *Manufacture of electronic components and boards*
 2620 *Manufacture of computers and peripheral equipment*
 2630 *Manufacture of communication equipment*
 2640 *Manufacture of consumer electronics*
 2680 *Manufacture of magnetic and optical media*

ICT trade industries

4651 *Wholesale of computers, computer peripheral equipment and software*
 4652 *Wholesale of electronic and telecommunications equipment and parts*

ICT services industries

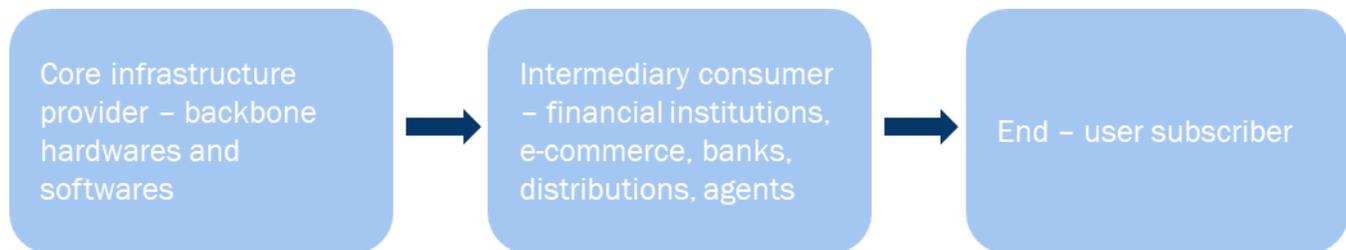
5820 *Software publishing*
 61 *Telecommunications*
 6110 *Wired telecommunications activities*
 6120 *Wireless telecommunications activities*
 6130 *Satellite telecommunications activities*
 6190 *Other telecommunications activities*
 62 *Computer programming, consultancy, and related activities*
 6201 *Computer programming activities*
 6202 *Computer consultancy and computer facilities management activities*
 6209 *Other information technology and computer service activities*
 631 *Data processing, hosting and related activities; web portals*
 6311 *Data processing, hosting and related activities*
 6312 *Web portals*
 951 *Repair of computers and communication equipment*
 9511 *Repair of computers and peripheral equipment*
 9512 *Repair of communication equipment*

4.2.1 ICT value chain and employment potential

We focus on ICT as an enabler that supports growth of various sectors. The role of ICT in job creation may be assessed using a simplified value chain that involves core infrastructure providers who are charged with provision of backbone hardware and software services such as telecommunication service providers as shown in Figure 8. Some of the core infrastructure providers include: Telecommunication firms, Internet service providers, Computer manufacturers/assemblers; Content providers; Software producers; Hardware manufacturers; Technology Research labs; and Technology Innovation hubs. The Intermediary consumers/providers include finance firms, E-commerce firms,

Banks, Distributors and Agents that rely on backbone services offered by core infrastructure service providers. Finally, the end users are the final consumers of services offered by the intermediary consumers/providers in a value chain and are usually the subscribers or end users of services.

Figure 8: ICT value chain and employment potential



Source: Authors' construction.

Throughout the ICT value chain, there are several jobs that are created. While there are gaps in employment data, the available data indicates that between 2014 and 2019, Internet service providers and telecommunication firms generated between 12,200 and 19,000 jobs at the core infrastructure provider level while the number of mobile money transfer agents increased from 143,946 in 2015 to 224,108 in 2019 for the Intermediary Service level. Even so, Kenya has not significantly translated high mobile and Internet penetration at the last mile user level to massive economic and employment opportunities. There is a huge potential to generate jobs at the last mile level when more ICT services are integrated with commercial activities.

4.2.2 Constraints to growth of the ICT sector

This discussion of constraints focuses on obstacles that would produce the largest gains in output and employment growth if removed. An overriding message from firms sampled in the Kenya Enterprise Survey 2018-2019 seems to be that the political environment, regulatory constraints, tax rates, and corruption are major or very severe obstacles. At the same time, electricity supply remains a major constraint, as 89 percent of ICT firms report electricity outages, with the average number of outages experienced in a typical month being about 3.5 episodes (World Bank, 2018). The overriding message seems to be that the political environment, tax rates, and corruption are more likely to be reported as major or very severe obstacles.

Table 12: Constraints reported by ICT enterprises

	No obstacle	Minor obstacle	Moderate obstacle	Major obstacle	Very severe obstacle
Tax rates	30.2	12.2	15.8	41.9	-
Tax administration	42.2	10.9	27.7	19.3	-
Business licensing and permits	12.5	26.0	16.1	34.7	10.7
Political instability	12.0	19.7	8.6	42.7	17.0
Corruption	21.4	0.2	28.9	41.3	8.2
Courts – Fairness and impartiality	66.8	18.2	8.6	0	6.3
Crime, theft, and disorder	13.1	51.5	24.6	10.7	-

Customs and trade regulations	41.7	36.5	12.2	9.6	-
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Source: World Bank (2018).

Another set of constraints that have introduced inefficiencies are broad competition restrictions facing ICT firms. These gaps are carefully summarized as:

- (i) Lack of transparent regulatory framework for pro-competitive spectrum allocation, which affects entry and the level playing field for all potential providers of broadband services. As a result, there has been reduced investment opportunities and creation of a market that is dominated by a few telecommunication players—thus resulting in high user fees.
- (ii) Lack of comprehensive policy and legal framework covering the e-commerce ecosystem, which creates consumer vulnerability to digital products and services.
- (iii) Lack of a clear regulatory framework to promote infrastructure sharing among market players, which inhibits entry to markets as well as growth of a more competitive sector.
- (iv) Lack of a clear regulatory framework to guide the growth and development of new industries such as Mobile Network Virtual Operators (MNVOs) that largely depend on the existing infrastructure. The slow growth of MNVOs that offer the Over the Top Services (OTTs) have not performed well in the market due to dominance by a few large players.
- (v) Limited interoperability between operators has led to costly and poor quality of services between operators, affecting the ability of smaller players to grow and leading to limited interoperability for call services.

Exports and skills constraints

We discuss the exports and skills constraint in recognition of their close association. The share of ICT services exported in total service exports demonstrate relatively sustained growth between 2003 and 2014 (save for some decline during the global financial crisis 2009-2011). Since 2015 the share of ICT in service exports generally declined but nevertheless is indicative of the potential for growth and job creation. Some of the major challenges related to exports of ICT are summarized in a table 13 and include lack of a supportive framework for innovations.

Table 13: Constraints facing exports of ICT

Major challenge	Description
Lack of supportive framework for ICT innovations	<ul style="list-style-type: none"> • Limited number of successful innovations that are mature and can be scaled to wider market. This is attributed to lack of supportive framework to identify, fund and nurture ICT innovations • Lack of implementation of anti-dumping laws
Skills gap and skills constraints	<ul style="list-style-type: none"> • Limited skilled human resource to design and develop cutting edge solutions based on emerging technologies such as Artificial Intelligence, Internet of Things, and 5G technologies • Limited skilled human resource to support BPO services
Limited capacity to design and implement huge system/equipment	<ul style="list-style-type: none"> • Inadequate capacity to manufacture ICT equipment for large markets • Inadequate capacity to offer superior ICT products and technical support • Difficulties in establishing a local presence in external markets, including failure/inability to comply with foreign certification processes

4.3 Tourism value chain, employment potential, and constraints

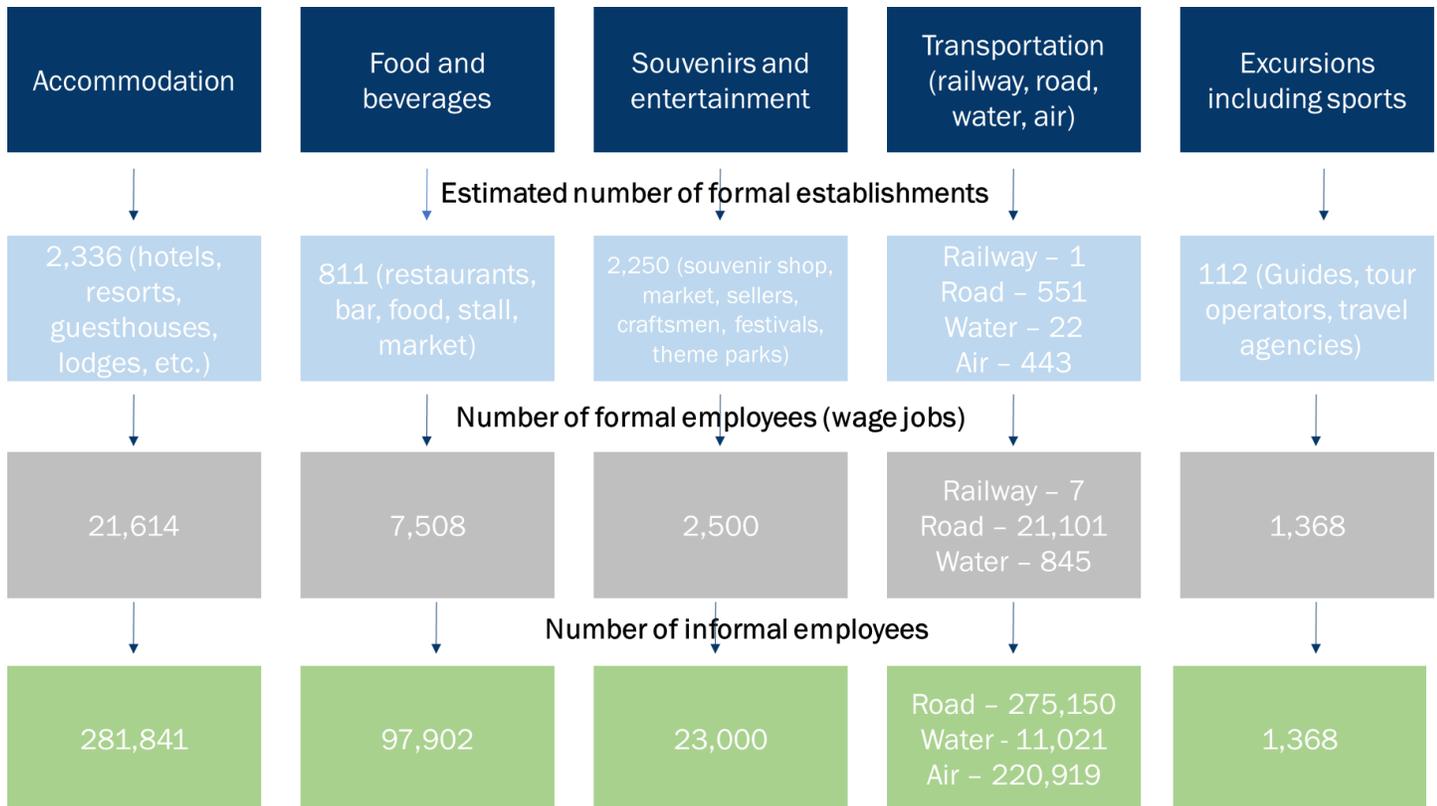
Given Kenya’s natural features—including its attractive physical features and particularly its coastal location, its unique cultural variety and diverse wildlife—and the tourism sector’s high employment-output elasticity, tourism has the potential to generate many of Kenya’s much-needed jobs. The sector is among the priority sectors for growth and employment creation under the economic pillar of the Kenya Vision 2030. Indeed, Kenya has strengths that can be harnessed to further promote and develop this sector. However, in order to be competitive, a number of bottlenecks must be addressed.

4.3.1 Tourism value chain and employment potential

Kenya’s tourism sector has three major product lines: safari, coastal, and business and conference travel. The three product lines are interrelated, and many visitors usually combine at least two of the products in each visit.

Figure 9 shows the core value chain and specific market players. The firms are distinguished by formality, size, and ownership. For each of these broad activities, the chain shows our estimates of the number of formal (and informal) establishments and employment. These estimates are based on information from the Tourism Satellite Account (TSA).

Figure 9: Tourism value chain with inventory of market players and employment



Sources: Adapted from WTO (2015) and TSA Kenya.

Based on information from the Tourism Satellite Account (forthcoming), the contribution of tourism to employment was about 1 million individuals in 2016 (if informal jobs are included) (Figure 9). This estimate is comparable to the numbers compiled by the World Tourism and Travel Council in which the total employment was estimated at 1.06 million in 2016 accounting for 9.2 percent of total

employment in Kenya. Kenya's tourism sector has over 4,000 formal establishments that offer over 70,000 direct wage jobs. In addition, over 900,000 individuals are self-employed in direct tourism-related sectors. Besides job creation, tourism contributes to foreign exchange earnings, enterprise development, and investment across other sectors. The sector also provides an economic incentive to preserve natural and cultural sites and improve local environmental management and sustainable development.

4.3.2 Constraints to the growth of the tourism sector

Investment climate

Based on the Kenya 2018-2019 Enterprise Survey data (World Bank, 2018), access to reliable electricity and transport infrastructure pose some challenges to the firms in the sector. About 91 percent of sampled hotels and restaurants experienced electricity outages. The average number of outages in a month was 6.3. These interruptions are substantial and likely to translate into higher operational costs, for example, when hotels have to invest in and use generators. Moreover, these obstacles have implications for firm-level competitiveness and the level of investment in the country.

Another challenge relates to the issue of taxation of establishments. Key informants within the tourism sector identified multiple taxation (taxation of same income streams by separate government agencies/levels) and an unclear tax regime as a major hurdle. These reports are consistent with firm-level data in which tax administration was described as a major obstacle by 31 percent of the establishments and a very severe obstacle by another 6 percent (World Bank, 2018). In addition, over 53 percent of surveyed establishments noted tax rates as a major or very severe obstacle (World Bank, 2018). Other conspicuous challenges are relative instability in the region linked with heightened terrorism activities, especially in the first half of the last 10 years.

Skills constraints

The tourism sector in Kenya and the region faces inadequate or lack of specialized training institutions for crucial high-level and diverse skills. Examples of these skills are film production; decision making and problem-solving; food technology; information technology; and leadership. It is estimated that the sector needs at least 5,000 new graduates annually compared to a little over 3,000 produced (World Bank, 2018). The situation is made more complex by out-migration of hospitality personnel, especially the specialized workforce, to other countries within the region.

Furthermore, the Kenya - Enterprise Survey 2018 (World Bank, 2018) shows skills (particularly related to technological upgrading) remains an obstacle to hotels and restaurants. About 20 percent of the hotels and restaurants indicated that skilled manpower is a major or very severe obstacle to technological upgrading. A further 21 percent identified it as a moderate obstacle. On the brighter side, most firms did not name an inadequately educated workforce as a major obstacle. Based on our skills gaps analyses using KIHBS (2015/16), skills gaps in the tourism sector, were observed in external communication to guests; product/service quality; value packaging; and independent quality management.

4.4 IWOSS cross-cutting constraints limiting growth and job creation

Besides the sector-specific constraints, cross-cutting constraints inhibit the growth of IWOSS as well as other sectors of the economy. These hurdles include the investment climate, which encompasses infrastructure, the regulatory environment, and skills. We examine infrastructure, which, in this case, encompasses not only utilities (energy and water supply) but also transport and ICT. Some of the

constraints were provided by firm representatives during our consultations while others were from recent surveys such as the Kenya – Enterprise Survey 2018 (World Bank, 2018).

Infrastructure

Firm representatives identified limited access to reliable electricity as a challenge in all the three sectors i.e., ICT, horticulture, and tourism. This challenge is also evident in the Kenya - Enterprise Survey 2018 (World Bank, 2018). Besides the unreliable supply, high cost of electricity was also identified by industry representatives as a key constraint during our consultations. Indeed, electricity costs are comparatively higher in Kenya than in comparable countries in Africa including Ethiopia, Nigeria, South Africa, Tanzania, and Uganda. Firms in Kenya pay \$0.21 per kilowatt hour (kWh) relative to costs of \$0.18 in Nigeria and \$0.10 in South Africa. These high costs have implications for firm-level competitiveness and the level of investment in the country (African Development Bank, 2018; World Bank, 2019b).

With respect to ICT infrastructure, while Kenya outperforms the rest of sub-Saharan Africa in mobile connectivity, ICT-related constraints continue to stifle growth. A key challenge is the relatively high cost of mobile broadband services and a large digital divide between urban and rural areas in Kenya. This challenge arises due to weak competition in Kenya’s ICT sector, which is associated with the quality of regulations (World Bank, 2019b). These and additional constraints are summarized in Table 14.

Table 14: Cross-cutting infrastructure bottlenecks

Sector	Sub-sector (and issue)	Regulatory and enforcement bottlenecks
Energy	Electricity generation (high cost of electricity)	The identified drivers of the high costs are a lack of policies and regulations on <i>net-metering</i> and <i>wheeling</i> system regulation (to address access and affordability from off grid solutions). ⁸ This has stifled growth of the energy sector especially in the rural areas—and contributes to the high costs of power.
ICT infrastructure	Telecommunications (costs are still comparatively higher)	(i) Entry barriers due to lack of transparent regulatory framework for pro-competitive spectrum allocation which affects entry and the level playing field for all potential providers of broadband services. (ii) Absence of clear regulatory framework to promote best practices including infrastructure sharing among market players—which limits entry in markets and results in inefficiency—and high cost of services.
	Mobile payment systems (there is room to enhance efficiency)	There is limited (but increasing) interoperability between mobile payment operators which affects the ability of

⁸ “Net-metering” indicates a system that operates in parallel with the distribution system of a licensee and that measures, by means of one or more meters, the amount of electrical energy that is supplied. “Wheeling” indicates the operation whereby the transmission system, distribution system, and associated facilities of a transmission licensee or distribution licensee are used by another person for the conveyance of electricity upon payment of specified charges

		smaller players to grow thus potentially creating inefficient markets with one or a few large firms.
Transport	Transport costs for road and railway still higher on average and poor feeder roads	Overlapping regulations and institutions – examples are provided within the specific discussions of the sectors.

With respect to transport, although good progress has been made in improving the main trunk roads in Kenya, we found road and railway transport costs remain a key constraint. The cost of transport is generally higher than comparator set of countries. The challenge has been a disincentive to further investments in some IWOSS sectors, such as agro-processing and horticulture.

Regulatory environment

Although a discussion of the regulatory framework can be wider, we focus on identifying key issues facing the enabling business environment.

Kenya's business regulatory environment fares better than most African countries in terms of ease of doing business and, in fact, was ranked third in Africa in the 2020 World Bank Doing Business Report. However, in spite of this good performance resulting from progressive reforms, the regulatory business environment remains complex and constraints remain.

The country's average performance in the 2020 World Bank's Doing Business rankings faltered on account of three areas of business regulation including: starting a business in Kenya (ranked 129 out of 190 countries), cross-border trade (117) and getting a construction permit (105). These cross-cutting constraints hamper the country's ability to improve its competitiveness, attract investments, and create more jobs.

Based on stakeholder consultations, a key issue that needs to be addressed in Kenya is the weak regulatory quality especially with respect to incorporation of competition principles in the design of regulations by the government. In addition, Kenya trails behind other middle-income countries in terms of rules that enable a market-based economy and was ranked 72 out of 129 countries in market economy status according to the Bertelsmann-Stiftung Transformation Index, as cited in World Bank (2019b). Respondents identified monopoly behavior and relatively strong participation of the government in utilities and agricultural input markets as key challenges. This challenge was exacerbated by the governments' role as a regulator. The respondents indicated that this dual role contributes to delayed implementation of a more open market for large consumers of electricity. A specific constraint that was observed by respondents was lack of regulations on net metering and wheeling systems to address the issue of access and affordability from off grid systems.

Importantly, in the advent of the transition to a devolved system of government in 2013, there is evidence of a surge in levies, overlapping regulations, and institutions that have resulted in disparate policies and regulations at the regional, national, and sub-national levels leading to higher operational costs (Kenya Association of Manufacturers, 2017).

Skills-related constraints

The first broad constraint is that educational achievement in Kenya is low relative to a typical middle-income country and is likely to be a key constraint facing firm growth and access to gainful employment by the youth. This can be associated with unsatisfactory education and training outcomes among the

populace. A key observation is that a relatively large proportion of the working age population (46.5 percent) have primary education or less as their highest education level as shown in Table 15. Yet the IWOSS sectors and the high growth sectors of the economy (such as ICT and construction) rely heavily on post-primary level skills.

Table 15: Distribution of the labor force (15-64) by highest education level reached by age group (2015/16) (%)

Age group	15-24 (%)	25-64 (%)	15-64 ('000)	15-64 (%)
Preprimary	25.1	74.8	54	0.3
Primary	22.4	77.8	8,924	46.2
Post-primary, vocational	26.0	74.1	258	1.3
Secondary	30.6	69.5	5,716	29.6
College (middle level)	14.0	86.1	1,812	9.4
University	31.1	68.9	866	4.5
None	13.3	86.8	1571	8.1
Other	39.5	60.6	40	0.2
Not stated	10.1	90.0	69	0.4
Total	23.3	76.8	19,311.4	100.0

Source: Authors' calculations based on KIHBS 2015/16.

The second broad hurdle is that the country faces skills mismatch between skills demanded and skills available in the labor market. This has been attributed (in part) to the weak linkages between education and industry. In addition to these broad highlights, the study implemented skills gap analyses across occupations in horticulture, ICT and tourism. These sectoral skills gap issues are presented in Section 6.

5. Trends into the future: Potential growth and labor demand

This section outlines the projections of the selected IWOSS sectors to generate wage jobs on a comparative basis with manufacturing and other sectors of the economy. Job creation is estimated into the future (to the year 2030). To assess the current and projected employment creation potential of the respective sectors, the JobsStructure Tools (World Bank, 2018) were used to examine sectoral contributions to aggregate employment growth and productivity.

The main assumption for the projections is that the prevailing sector growth trends in 2009 to 2018 continue to the year 2030. There are a few adjustments to these prevailing growth rates to provide a more realistic scenario of the projections. These adjustments include: Agro-processing is assumed to grow at 1.0 percent per annum (which is just about equal to its growth rate between 2014 and 2018) rather than the growth of negative 0.4 percent per annum that prevailed between 2009 and 2018. The government sector is projected to grow at 2.7 percent per annum (the growth in 2019 relative to 2018) rather than 60 percent annualized growth in the 2009 to 2018 period. The high growth rate in government employment in the 2009 to 2018 period was a result of transition to devolved government system, and Kenya is unlikely to have a similar expansion in the next decade. We assume that the tourism sector is unlikely to grow at the same pace as the pre-COVID-19 era, and its growth is revised

to about two-thirds of its rate between 2009 and 2018. The projections also assume that the structure of the economy will not change radically and that no major shocks will occur.

The resulting projections are discussed under three sub-headings which are: overall wage employment prospects, youth wage employment prospects, and gender dimensions of employment.

5.1 Overall employment prospects

For the current growth path, the share of total wage employment in the IWOSS sectors is projected to decline from 33.7 percent in 2018 to 24.6 percent in 2030. On the other hand, the employment share of non-IWOSS sectors is projected to increase from 58.3 percent to 67.1 percent. The increase in the share of non-IWOSS is driven mainly by the projected large growth in domestic services rather than by a more vibrant industrial subsector encompassing mining, utilities, and construction (Table 16).

On the sectoral level, under this growth path, IWOSS is still important for total wage employment and so is manufacturing and non-IWOSS. The specific sectors projected to contribute to the largest share of wage employment in 2030 are: construction (non-IWOSS), trade and repairs (IWOSS) and manufacturing, with shares of 10.8, 8.3 and 7.9 percent, respectively. The other significant sectors are mainly IWOSS, including tourism, horticulture, and ICT with respective shares of 5.5, 4.0, and 3.5 percent, respectively. The wage employment prospects suggest that all these three broad sectors will be significant for the creation of wage employment for the working-age group in Kenya to the year 2030 (Table 16).

Additional evidence points to substantial growth in informal employment (or informalization) in some IWOSS sectors suggesting the contribution of IWOSS can potentially be larger if new jobs can be made to be decent. For example, in horticulture, the relatively low wage employment growth is partly explained by a large increase in non-wage jobs resulting from a large expansion in small-scale producers rather than large farms. In financial services, there has been a decline in the share of mainstream wage jobs amid financial innovations that have seen a large increase of the money transfer as well as banking agents who are mainly self-employed.

Table 16: Sector shares to total GDP and wage employment, 2001-2018 (actual) & 2030 (proj.)

	Employment		Share of total wage employment (%) 15-64 years		Share of youth wage employment (%)		Share of absolute change in employment	Employment growth rates (%)
	2018	2030	2018	2030	2018	2030	2001-2018	2001-2018
Total	2,669,787	6,861,936	100	100	100	100	100	3.1
Total IWOSS	899,997	1,689,700	33.7	24.6	26.0	27.5	30.2	2.7
Agro-processing	31,378	35,143	1.2	0.5	1.1	0.7	0.4	0.9
Export crops & horticulture	229,839	271,476	8.6	4.0	6.5	4.3	0.5	0.1
Tourism	88,796	378,878	3.3	5.5	2.5	5.9	3.7	3.5
ICT	123,290	241,220	4.6	3.5	3.2	3.4	9.0	9.5
Transport	90,647	106,963	3.4	1.6	2.1	1.4	3.1	2.7
Financial and business services	75,621	112,485	2.8	1.6	2.1	1.7	-0.8	-0.6
Trade and repairs	260,426	543,534	9.8	7.9	8.7	10.1	14.3	5.3
Manufacturing	213,490	566,849	8.0	8.3	6.0	8.8	7.2	2.7
Other non-IWOSS	1,556,300	4,605,387	58.3	67.1	35.9	63.7	62.5	3.4
Agriculture	74,120	79,730	2.8	1.2	4.2	2.5	1.3	1.2
Mining	15,364	45,947	0.6	0.7	0.3	0.6	0.9	6.5
Utilities	34,132	39,724	1.3	0.6	0.3	0.2	1.2	2.8
Construction	171,565	739,363	6.4	10.8	3.9	9.5	8.9	4.8
Domestic services	966,110	3,310,032	36.2	48.2	26.3	50.3	37.0	3.2
Government	295,009	390,592	11.0	5.7	0.9	0.7	13.2	3.9

Note: Youth refer to ages 15 to 24 years.

Source: Authors' calculations based on KIHBS 2015/16.

5.2 Youth employment prospects assuming historical growth trends

With respect to the potential to create wage jobs for the youth aged 15 to 24 years—the focus of this project—wage employment projections suggest that IWOSS, manufacturing, and non-IWOSS will be important for creating wage jobs. Wage employment projections to 2030 indicate that the sectors with the highest potential of creating wage jobs for the youth are trade and repairs (IWOSS); construction (non-IWOSS) and manufacturing (non-IWOSS) with respective shares of 10.1 percent, 9.5 percent and 8.8 percent. The other sectors with the great potential (for the 15 to 24 years old youth) in succeeding order are tourism, horticulture, and ICT (all IWOSS) with respective shares of 5.9 percent, 4.3 percent, and 3.4 percent of total wage employment in 2030 (Table 17).

Table 17: Youth (15 to 24) employment across IWOSS and non-IWOSS sectors, 2018 and 2030

	Employment ('000)	Additional jobs ('000)	Annual growth (%)	Share of total employment (%)

	2018	2030	2018-2030	2018-2030	2018	2030
Overall, 15 to 24 years	505	1,422	917.3	9.0	100.0	100.0
Total IWOSS	193	374	180.5	5.6	38.3	26.3
Agro-processing	8	9	1.0	1.0	1.5	0.6
Export crops and horticulture	49	58	9.0	1.4	9.6	4.0
Tourism	18	75	56.5	12.5	3.6	5.3
ICT	23	48	24.8	6.2	4.6	3.4
Transport	15	18	3.0	1.5	3.1	1.3
Financial and business services	15	23	7.9	3.5	3.0	1.6
Trade and repairs	64	143	78.3	6.8	12.8	10.0
Manufacturing	44	130	85.5	9.4	8.8	9.1
Other non-IWOSS	267	918	651.3	10.8	52.9	64.6
Agriculture	31	33	2.4	0.6	6.1	2.3
Mining	2	8	5.8	10.7	0.5	0.6
Utilities	2	3	0.4	1.3	0.4	0.2
Construction	29	154	125.1	14.9	5.8	10.9
Domestic services	195	711	515.1	11.4	38.7	50.0
Government	7	9	2.5	2.7	1.3	0.7

Source: Authors' calculations based on KIHBS, 2015/16.

If the current growth path is projected into the future, the proportion of the youth with wage jobs will increase to 24.7 percent (of a youth labor force of 5.7 million) in 2030 from the estimated 14.6 percent of the youth labor force of 5.1 million individuals in 2018. In comparison, even if Kenya achieves its aspirational growth rate of about 10 percent in the next 10 years, only about 29.3 percent of the entire youth labor force will be in wage employment, and a significant share will be in the informal economy. Based on the relatively low share of projected wage employment of the youth, even for Kenya's aspirational growth rate of 10 percent, and the large share of non-wage jobs, we can infer that interventions in enhancing the share of wage jobs (out of the new jobs that are created) will be key in the overall employment policy framework for Kenya.

These projections of wage jobs to 2030 are sensitive to the growth rates for individual sectors. Notably, even when varying growth rates are assumed, IWOSS remains to be a key sector. More specifically, trade and repairs, construction, manufacturing, and, to some extent, tourism remain important job creators for the youth. As examples:

- (i) If it is assumed that tourism continues to grow at the same rate of growth in the 2009 to 2018 period (rather than two-thirds that rate as assumed in the projections) the sector shall have the second-highest share of total employment for both 15 to 24 and 15 to 34 age groups in 2030. For the 15 to 24 years age group, tourism's share of 9.6 percent will be second to construction (10.3 percent) and leapfrog several sectors including trade and repairs (9.5 percent) and manufacturing (8.7 percent).

- (ii) If manufacturing was to achieve a 10 percent growth per annum, assuming the other “most likely growth scenarios” do not change, it would be the third-most important sector in generating wage employment for the youth (after construction and trade and repairs). A similar growth assumption (of 10 percent) for export crops and horticulture would make the sector contribute 10 percent to wage jobs and be the second-most important sector in creating wage jobs for the youth. A higher growth for agro-processing does not seem to result in a significant increase in its wage employment creation potential and a 10 percent growth assumption, *ceteris paribus*, results in a 1.3 percent share of wage jobs for the youth in 2030.

What explains the performance of the sectors especially the trade and repairs sector? The trade and repairs sector encompasses repairs of motorcycles and motor vehicles. The number of motorcycles has expanded rapidly in Kenya especially over the last 10 years. The number of newly registered motorcycles grew by an average of 7.1 percent annually between 2009 and 2016. The growth after 2016 has averaged 22.8 percent and was highest between 2016 and 2017 (at 55.1 percent) when the government removed the excise duty on motorcycle imports in 2016. The sustained increase can also be explained by the rise in demand for motorcycles as an alternative mode of passenger transport in Kenya. There are few entry barriers to these transport modes, and many youth (predominantly males) are engaged as riders and in related activities such as repair work (Hall, 2018).

5.3 Youth employment prospects assuming IWOSS constraints are addressed

If IWOSS was assumed to grow faster than based on historical trends the outlook is likely to change. We assume constraints are dealt with and that IWOSS growth is given a Philip to the extent of achieving envisaged growth rates in the sector plans. It is assumed that horticulture, ICT and tourism growth at 10 percent per annum. The other IWOSS sectors are assumed to grow at 5 percent except trade and repairs whose growth is fixed at 10 percent. Non-IWOSS and manufacturing are assumed to retain the most likely growth prospects.

Under this scenario the overriding observation is that IWOSS, non-IWOSS, and manufacturing remain important for youth wage job creation in Kenya. Trade and repairs (13.0 percent), construction (9.9 percent) and manufacturing (8.3 percent) are the top three job creators. The importance of IWOSS is reflected by the fact that the next three important sectors are all IWOSS sectors – i.e. horticulture, ICT and Tourism with respective shares of 5.6 percent, 4.7 percent and 3.7 percent in 2030.

5.4 Gender dimensions of employment

For the youth aged 15 to 24 years, a larger share of females (50 percent) than males (32 percent) were in domestic services. The sectors with the greatest potential for males (outside of domestic services) in 2018 were: trade and repairs, manufacturing and export crops and horticulture with respective shares of 15.6 percent, 10.3 percent and 10.2 percent. For female youth, the sectors with the greatest potential were export crops and horticulture (8.6 percent), trade and repairs (7.9 percent), and construction (7.5 percent) (Table 18). For the youth aged 15 to 34 years, the sectors with the greatest potential for males were trade and repairs (12.5 percent share), manufacturing (9.8 percent), and export crops and horticulture (7.9 percent). For females in this age group, the sectors with the greatest potential are construction, export crops and horticulture, and trade and repairs.

Table 18: Employment share for youth by sex, 2018 and 2030

Sector

	Share of youth (15 to 24 years) employment (%)		Share of employment, male aged 15-24 (%)		Share of employment, female aged 15-24 (%)		Share of employment, male aged 15-34 (%)		Share of employment, female aged 15-34 (%)	
	2018	2030	2018	2030	2018	2030	2018	2030	2018	2030
Total	100	100	100	100	100	100	100	100	100	100
Total IWOSS	38.3	27.5	43.6	29.9	29.3	25.1	48.0	28.3	33.5	27.4
Agro processing	1.5	0.7	1.6	0.9	1.4	0.4	1.1	0.6	1.0	0.4
Export crops and horticulture	9.6	4.3	10.2	3.7	8.6	5.0	7.9	2.8	7.2	5.1
Tourism	3.6	5.9	4.2	5.7	2.6	6.1	4.1	5.3	2.7	7.8
ICT	4.6	3.4	5.0	5.1	4.0	1.7	5.8	5.5	5.0	3.4
Transport	3.1	1.4	3.8	2.7	1.8	0.1	4.0	2.9	2.0	0.2
Financial and business services	3.0	1.7	3.1	1.0	2.9	2.5	2.8	1.4	2.8	2.1
Trade and repairs	12.8	10.1	15.6	10.9	7.9	9.3	12.5	9.9	6.7	8.5
Manufacturing	8.8	8.8	10.3	10.5	6.1	7.2	9.8	12	6.2	6.7
Other non-IWOSS	52.9	63.7	46.1	59.7	64.7	67.8	42.2	59.6	60.3	65.9
Agriculture	6.1	2.5	6.5	2.8	5.5	2.3	3.0	1.3	2.7	1.4
Mining	0.5	0.6	0.7	0.9	0.1	0.2	0.7	1.0	0.2	0.2
Utilities	0.4	0.2	0.5	0.3	0.3	0.1	1.0	0.5	0.8	0.4
Construction	5.8	9.5	4.8	17.6	7.5	1.3	4.6	18	7.7	1.4
Domestic services	38.7	50.3	32.2	37.6	50.0	63.2	25.9	33.9	42.8	60
Government	1.3	0.7	1.4	0.6	1.2	0.8	7.0	4.8	6.2	2.5

Source: Authors' calculations based on KIHBS 2015/16.

Notably, the projections indicate that there will be wider sex disparities in wage employment if the prevailing growth trends persist (and no interventions are put in place) for both for the working-age and youth groups. On aggregate, male youth (15 to 24 years) are forecasted to dominate the more productive sectors including manufacturing, construction, and trade and repairs at rates 1.5, 13.8, and 1.2 times greater than females, respectively. In ICT, there will be nearly 3.0 times more males than females if present growth trends persist. The projections also indicate that there will be more females in horticulture (1.3 times more) and tourism (1.1 times more) (Table 19).

Table 19: Total potential youth employment generation in IWOSS and non-IWOSS sectors by sex, 2030 projections

Employment by activity	Youth (ages 15-24) jobs ('000)		Youth (ages 15-34) jobs ('000)	
	Males	Females	Males	Females
Total IWOSS and non-IWOSS	724.5	697.4	2,304.4	1,923.4
Total IWOSS	204.9	168.9	618.0	508.9
Agro-processing	5.9	2.9	12.5	7.0
Export crops and horticulture	24.7	32.9	58.7	93.0

Tourism	36.3	38.5	107.6	137.0
ICT	36.1	12.1	123.4	65.6
Transport	18.0	0.5	62.5	2.8
Financial and business services	6.6	16.7	31.1	39.3
Trade and repairs	77.4	65.3	222.1	164.2
Manufacturing	77.3	52.4	282.3	134.8
Other non-IWOSS	442.2	476.1	1,404.0	1,279.8
Agriculture	18.4	14.9	26.9	25.5
Mining	6.7	1.5	25.2	4.8
Utilities	1.9	0.6	10.9	6.6
Construction	144.0	10.4	469.6	32.1
Domestic services	267.1	443.4	764.7	1,163.6
Government	4.0	5.2	106.7	47.3

Source: Authors' calculations based on KIHBS 2015/16

Although the population ratio of males to females is about 1 to 1 in Kenya, males take up a larger share of wage jobs in the fast-growing non-service sectors. On aggregate, the respective ratios of females to males in wage jobs is about 1 to 1.3 for those aged 15 to 64 years and 1:1 for the youth (15 to 24 years). The wage employment ratios are more uneven across the sectors, and, on aggregate, women tend to dominate in some of the IWOSS sectors including in horticulture (63 percent of jobs) and tourism (55 percent). Women also have a larger share of wage jobs in a couple of non-IWOSS sectors including agriculture (53 percent) and domestic services (53 percent). The share of males is particularly large in the sectors associated with high productivity and high output and employment growth, including the IWOSS sectors of ICT (68.1 percent) and trade and repairs (57.3 percent) as well as agro-processing wage jobs with a share of 61.4 percent. Males also dominate manufacturing (71.4 percent) and the non-IWOSS sector of construction (94.6 percent). Indeed, the distribution by sex in wage jobs suggest that efforts to enhance employment should focus on empowering women in these sectors, especially ICT, agro-processing, manufacturing, utilities, and construction.

6. Labor skills requirements and skills gaps

In order to accurately assess the potential of IWOSS to generate productive employment, we must first understand their current and future labor skills requirements and gaps. This section examines skills supply and gaps by estimating sectoral employment potential; obtaining the profiles for sectors' occupational requirements based on estimate of employment potential; determining skills requirements; and identifying skill gaps based on the skills requirements of the sector and the stock of skills in the target population (youth). The standardized O*NET (Occupational Network) database⁹ was used to develop a profile of occupations and analyze skills gaps, with specific focus on tourism,

⁹ The O*NET database contains information on standardized and occupation-specific mix of knowledge, skills and abilities. The study focused on the occupational descriptors for tourism, horticulture and ICT.

horticulture and information and communication technology (ICT). This broad approach was complemented by a survey to assess the nature of skills gaps at the firm level.

Skills are an important element in an economy and their availability have implications for sustainable job creation for the youth. Investment in human capital and strong education and training systems are drivers of economic growth and sustainable development. At the same time, skills gaps constrain industries' ability to grow. Such gaps may be caused by a qualitative skills mismatch where industries do not find employable graduates even when they have the right qualifications on paper, and a quantitative mismatch where not enough young people are educated and trained at certain levels and in specific fields to satisfy specific industry needs.

6.1 Profiling sectors' occupational and skills requirements of IWOSS

The skills supply consists of the unemployed youth with the required skills set within the population at the time in question, while the skills requirement is demand based on employment within the sector during the same time period. The skills gap is then computed as the difference between sectoral skills supply and requirements. An occupation can therefore either record skills adequacy when demand equals requirement or deficit or surplus. The skills requirement profile is based on an occupational profile and relates to the set of occupations required for a particular sector to reach its employment potential. O*NET data was used to map occupations to their skills requirements' profile for occupations in horticulture, ICT, and tourism sectors. The skills supply is computed as modal years of schooling among the youth while the skills requirement is given based on employment within the sector during the same time period. The skills gap is then computed as the difference between sectoral skills supply and requirements, as indicated below:

$$\text{Sectoral (Modal) Skills Gap} = S_i - D_i$$

Where S_i is the skills supply for the sector or node and D_i is the skills demand (requirement) for the sector

A positive sectoral skills gap gives an indication of whether or not a particular skill is available within the general target population. The skills availability ratio, computed using the skills supply and requirement, complements the sectoral skills gap as it indicates whether the skills can be attracted to the particular sector/node. Based on data from KIHBS 2015/16, the aggregate modal skills level for youth aged 15 to 34 years is 8 years of schooling (Table 20). The modal years of education, however, differs across different age categories within the youthful population. The highest modal years of education was 12 years of schooling, and this is observed among those aged 20-24 years. The aberrant value for modal schooling for this age cohort can be attributed to the effects of free primary education and free day secondary education policy interventions that were introduced in 2003 and 2008, respectively. The free primary and free day secondary education policies have contributed to increased years of schooling per child as the previously disadvantaged youth stay longer in school to attain secondary education, and more youth have been able to transition to tertiary education.

The modal years of education are used to compile the occupational skills gaps for each sector. The sector occupation profile is mapped based on occupations identified in the population in the particular sector in the KIHBS 2005-2006 with skills (including soft and digital) requirements mapped based on O*NET data. The occupational skills requirements are based on the five levels prescribed in the Kenya National Occupation Classification Standard (KNOCS) (Table 21).

Table 20: Aggregate modal years of education for youth in Kenya

Age category	Modal years of schooling (2015/16)
15-19 years	8
20-24 years	12
25-29 years	8
30-34 years	8

Source: Authors' calculations based on KIHBS 2015/16.

Table 21: Description of the skills levels

Skill Level	Description
1st skill level	Primary education: 8 years of schooling; may be followed by brief on-the-job training.
2nd skill level	Post-primary education (excludes secondary and tertiary education): 10 years of schooling; leads up to an artisan-level certificate.
3rd skill level	Secondary education: 12 years of schooling; period of on-the-job training.
4th skill level	Post-secondary education: 15 years of schooling; may last up to 3 years after secondary school and leads to awarding of a diploma or certificate.
5th skill level	Tertiary education including undergraduate and postgraduate degrees or equivalent: 16+ years of schooling.

Note: There were no employees within the node categorized under the 2nd Skill Level.

Source: Authors' conceptualization.

Skills gaps under growth scenario without constraints

This section analyses KIHBS data in an attempt to answer the key questions on skills gaps, with a focus on examining the employment potential of IWOSS sectors in the future, as well as skill requirements and deficits. The analysis includes the findings of 24 firm-level interviews conducted across the three selected IWOSS sectors, i.e., horticulture, ICT, and tourism. For each sector, the issues considered included: activities of the firms; current and expected youth occupations and employment; skills required for the youth; and skill deficits of current youth employees.

Horticulture

We assess the occupational skills gap for horticulture over 30 occupations (Table 22) and find there are not enough people with the required skills set in occupations under skills level one. However, there were skills surpluses for occupations under skills levels three to five. For skills levels, where there was a skills surplus, the skills availability ratio remained below 10 implying that the skills may not be readily attracted to the sector.

Table 22: Selected sectoral skills gap for horticulture by occupation (number of people)

	1st Skill Level	3rd Skill Level	4th Skill Level	5th Skill Level	Total
Skills supply	179,772	92,159	31,797	10,238	313,966
Skills requirement	287,111	53,422	26,585	1,847	368,965
Administrators and managers	5,552	3,530	1,178	830	11,090

Professionals	0	323	45	0	368
Clerical workers	379	1,155	0	0	1,534
Services and sales workers	26,711	6,240	8,115	0	41,067
Skilled agriculture worker	13,669	608	604	0	14,880
Craft and traders	38,634	11,318	7,296	1,017	58,265
Plant and machinery operator	7,164	1,085	478	0	8,727
Elementary occupations	194,953	29,163	8,868	0	232,984
Armed forces	50	0	0	0	50
Skills gap	-107,340	38,738	5,213	8,391	-54,998
Skills availability	0.63	1.73	1.20	5.54	0.85

Note: There were no employees within the node categorized under the 2nd skills level.

Source: Authors' calculations based on KIHBS, 2015/16.

Table 23 summarizes occupational categories with the largest skills gaps. The overall average skills gap for the youth (15 to 24) was 6.3 years of education and actually increases to 14.3 years for the cohort aged 30 to 34 years. Soil and plant scientists, agricultural technicians, and nursery and greenhouse managers were some of the occupations with the largest skills gaps.

Table 23: Selected occupational skills gap for horticulture (years)

Occupation	Modal Schooling years (O*NET)		Skills gap based on schooling by age cohort		
		15-19	20-24	25-29	30-34
Soil and plant scientists	18	-10	-10	-10	-18
Agricultural technicians	18	-10	-10	-10	-18
Biologists	18	-10	-10	-10	-18
Nursery and greenhouse managers	16	-8	-8	-8	-16
Farm and ranch managers	16	-8	-8	-8	-16
Aqua cultural managers	16	-8	-8	-8	-16
First-line supervisors of landscaping, lawn service, and groundskeeping workers	15	-7	-7	-7	-15
Landscaping and groundskeeping workers	12	-4	-4	-4	-12
Pesticide Handlers, Sprayers, and Applicators, Vegetation	12	-4	-4	-4	-12
Farmworkers and laborers, crop farmers	10	-2	-2	-2	-10
Average (for 15 occupations)		-6.3	-6.3	-6.3	-14.3

Source: Authors' calculations using KIHBS, 2015/16.

6.2.2 ICT sector

Based on national-level household data, the ICT sector had skills surpluses for all skills levels. However, only skills level one has a skills availability ratio of above 10, implying the unemployed youth can be readily attracted to the sector (Table 24).

Table 24: Selected occupational skills gap for ICT (number of people)

	1st skill level	3rd skill level	4th skill level	5th skill level	Total
Skills supply	179,772	92,159	31,797	10,238	313,966
Skills requirement	11,685	27,453	34,430	6,209	79,777
Administrators and managers	291	1,420	1,824	1,506	5,041
Professionals	188	3,786	3,983	3,549	11,506
Technicians and associate professionals	409	3,721	7,062	890	12,082
Clerical workers	3,067	3,797	12,346	175	19,386
Services and sales work	0	494	2,086	0	2,580
Craft and traders	966	8,657	2,464	0	12,087
Plant and machinery operators	128	756	721	0	1,604
Elementary occupation	6,638	4,821	3,510	89	15,058
Armed forces	0	0	434	0	434
Skills gap	11,685	27,453	34,430	6,209	79,777
Skills availability	15.4	3.4	0.9	1.6	3.9

Source: Authors' calculations based on KIHBS, 2015/16

The occupations here are those unique to firms classified under ISIC Rev 2 codes: 3420, Printing, Publishing and Allied Industry; 7200, Communications; 8323, Data Processing; and 9592, Photographic studios activities. Occupations within the ICT sector demand high skills, and so most fall under Skills Level 5. There exists a skills shortage for all occupations for all age cohorts (Table 25).

Table 25: Skills gap analysis for occupations in ICT (years)

Occupation	Modal years of schooling (O*NET)	Skills gaps			
		15-19	20-24	25-29	30-34
Computer science teachers, postsecondary	18	-10	-6	-10	-10
Computer systems analysts	16	-8	-4	-8	-8
Network and computer systems administrators	16	-8	-4	-8	-8
Software developers, systems software	16	-8	-4	-8	-8
Information security analysts	16	-8	-4	-8	-8
Computer user support specialists	16	-8	-4	-8	-8
Computer network support specialists	16	-8	-4	-8	-8

Software developers, applications	16	-8	-4	-8	-8
Computer programmers	16	-8	-4	-8	-8
Web administrators	16	-8	-4	-8	-8
Bioinformatics scientists	16	-8	-4	-8	-8
Computer systems engineers/ architects	16	-8	-4	-8	-8
Average skills gap (19 occupations)		-8.75	-4.75	-8.75	-8.75

Source: Authors' calculations using KIHBS, 2015/16.

6.2.3 Tourism

O*NET categorizes 30 occupations in the tourism sector along three levels: operational, middle, and technical. The occupations have varied skills requirements. Generally, there is a skills deficit among the youth in various occupations within the tourism sector. The skills availability ratio is also below 10, which indicates that attracting skills to the sector may be difficult for all skills levels.

The tourism sector has over 30 occupations categorized into 5 nodes namely: accommodation, food and beverages, souvenirs and entertainment, transportation, and excursions including sports. We compute skills gaps for 13 select occupations in tourism sector (Table 26). In general, for the sample of occupations selected for this node there appeared to be a skills deficit, with the smallest deficit being observed in the age cohort between 20 and 24 of 1.63 years. This can in part be attributed to the introduction of free primary and free day secondary school education between 2003 and 2008. Skills adequacies and surpluses were only observed for occupations requiring between Skill levels 1 and 3.

Table 26: Selected occupational skills gap for tourism (number of people)

	1st skill level	3rd skill level	4th skill level	5th skill level	Total
Skills supply	179,772	92,159	31,797	10,238	313,966
Skills requirement	351,787	141,367	128,975	12,071	634,200
Administrators and managers	5,176	1,341	3,057	2,089	11,663
Professionals	2,274	6,861	8,168	6,601	23,904
Technicians and associate professionals	3,504	8,062	14,569	2,231	28,365
Clerical workers	7,628	8,258	12,349	262	28,497
Services and sales work	126,001	47,817	36,749	675	211,243
Craft and traders	26,985	4,230	3,458	0	34,673
Plant and machinery operators	57,994	30,901	35,744	0	124,639

Elementary occupation	121,319	33,897	14,447	212	169,875
Security	906	0	434	0	1,340
Skills gap	-172,015.8	-49,208.2	-97,177.5	-1,832.6	-320,234.1
Skills availability	0.5	0.7	0.2	0.8	0.5

Note: There were no employees within the node categorized under the 2nd skills level.

Source: Authors' calculations using KIHBS, 2015/16.

Occupations in food and beverages are mostly skill level 3 and below. For the sample of occupations selected for this node, there was an average skills deficit of 4.4 years of schooling, with the smallest deficit being observed in the youth cohort between 20 and 24 (0.4 years) (Table 27). Skills adequacies and surpluses were only observed for this cohort. Some of the skills with the largest skills gaps were Occupational Health and Safety Specialists (8 years), and Chefs and Head Cooks (8 years).

Table 27: Skills gap analysis for selected occupations in accommodation (years)

Skills gaps					
	Modal years of schooling (O*NET)	15-19	20-24	25-29	30-34
Supply chain manager	16	-8	-4	-8	-8
Lodging managers	16	-8	-4	-8	-8
Meeting, convention, and event planners	16	-8	-4	-8	-8
Real estate brokers	16	-8	-4	-8	-8
Concierges	12	-4	0	-4	-4
First-line supervisors of housekeeping and janitorial workers	12	-4	0	-4	-4
Average skills gap (for 20 occupations)		-5.63	-1.63	-5.63	-5.63

Source: Authors' calculations using KIHBS.

For entertainment and excursions, we calculate the skills gap for 20 occupations. Occupations in this node mainly require high skills (level 5). The average skills gap for the occupations was 6.7 years for all age cohorts except the 20- to 24-year-old age group, for which it was 2.7 years. Skills adequacies and surpluses were only observed for the 20- to 24-year-old cohort for six occupations. With respect to specific occupations, curators had the largest skills gap ranging from six (for the 20- to 24-year-olds) to 10 years for the rest of the age cohorts. Other occupations with large skills gaps were poets and creative writers, talent directors, producers, and environmental restoration planners.

The occupations under entertainment are those unique to firms classified under Creative, arts and entertainment activities. The occupational skills gap for a sample of occupations in the node was found to be as follows:

Table 21a: Skills gap analysis for occupations in entertainment

Occupation	Skills gaps
------------	-------------

	Modal years of schooling (O*NET)	15-19	20-24	25-29	30-34
Curators	18	-10	-6	-10	-10
Poets, lyricists, and creative writers	16	-8	-4	-8	-8
Agents and business managers of artists, performers, and athletes	16	-8	-4	-8	-8
Talent directors	16	-8	-4	-8	-8
Musicians, instrumental	16	-8	-4	-8	-8
Producers	16	-8	-4	-8	-8
Singers	16	-8	-4	-8	-8
Choreographers	16	-8	-4	-8	-8
Directors- stage, motion pictures, television, and radio	16	-8	-4	-8	-8
Film and video editors	16	-8	-4	-8	-8
Reporters and correspondents	16	-8	-4	-8	-8
Coaches and scouts	16	-8	-4	-8	-8
Fine artists, including painters, sculptors, and illustrators	15	-7	-3	-7	-7
Actors	12	-4	0	-4	-4
Dancers	12	-4	0	-4	-4
Audio visual equipment technicians	12	-4	0	-4	-4
Amusement and recreation attendants	12	-4	0	-4	-4
Costume attendants	12	-4	0	-4	-4
Athletes and sports competitors	10	-2	2	-2	-2
Average skills gap		-6.68	-2.68	-6.68	-6.68

Source: Authors' calculations using KIHBS.

For excursions, there was a skills gap for all occupations above skills Level 3 for all age cohorts (Table 28b). Highest skills gap was recorded among environmental restoration planners. Other most affected occupations were fish and game wardens, forest and conservation technicians, first-line supervisors of aquacultural workers, range managers, zoologists and wildlife biologists.

Table 28b: Skills gap analysis for occupations in excursions

Occupation	Modal years of schooling (O*NET)	Skills gaps			
		15-19	20-24	25-29	30-34
Environmental restoration planners	18	-10	-6	-10	-10
Fish and game wardens	16	-8	-4	-8	-8
Forest and conservation technicians	16	-8	-4	-8	-8
First-line supervisors of aquacultural workers	16	-8	-4	-8	-8

Range managers	16	-8	-4	-8	-8
Zoologists and wildlife biologists	16	-8	-4	-8	-8
Tour guides and escorts	12	-4	0	-4	-4
Non farm animal caretakers	12	-4	0	-4	-4
Photographers	12	-4	0	-4	-4
Reservation and transportation ticket agents and travel clerks	12	-4	0	-4	-4
Average skills gap		-6.75	-2.75	-6.75	-6.75

Source: Authors' calculations using KIHBS.

When reflecting on the five outlined skill levels in terms of the select IWOSS sectors, we find that:

- i) Horticulture has skills deficits for occupations requiring post-primary education (level 2) and skills surpluses for occupations that require at least some secondary education (levels 3 to 5). For these levels, the skills availability ratio remains below 10, implying that the skills may not be readily attracted to the sector.
- ii) In ICT, on the other hand, there are skills surpluses for all skills levels. However, apart from skills level 1, the skills levels have a skills availability ratio of below 10, implying that, when all other sectoral labor needs/demands are put into consideration, the unemployed youth may not be readily attracted to the sector.
- iii) Tourism had a skills deficit for all skills levels. Its skills availability ratio is also below 10, which indicates that attracting skills to the sector may be difficult for all skills levels.

6.3 IWOSS sector skills deficits and gaps based on firm survey

This section supports the above analysis by using findings from interviews of 24 firms across the three IWOSS sectors to capture insights on the nature of skills gaps. An important caveat is that this IWOSS firm survey (2020) data do not cover a representative number of firms in the respective sectors, i.e., horticulture, ICT, and tourism. Even so, it offers important insights on current and anticipated skills requirements and deficits.

6.3.1 Horticulture – overview of firms interviewed

Three horticultural firms participated in the survey conducted in 2020. With respect to firm size, one firm, with 32 employees, could be categorized under small firms; the second was medium-sized with 110 employees, while the largest firm had 1,200 employees. In addition to vegetable production, all the firms produce other leguminous crops. One of the firms was involved in seed production used for propagation. The firms carry out basic value-addition activities like sorting, grading, and packaging produce for the export market. These firms had their farm-based operations in several counties namely, Kirinyaga, Kiambu, Machakos, and Makeni, which are all close to Nairobi.

As highlighted in Table 28, the economic activities of the three surveyed firms cut across the horticulture value chain. The smallest of the three firms had established an out-grower business model where the firm identifies and partners with small-scale farmers and provides technical assistance through the entire production and marketing process. It then coordinates harvesting, transport, and sorting and grading of the produce before exporting. Using this out-grower model, relatively small firms

can have footprints in the export market. The larger firms, on the other hand, have large farms of their own and do not rely on small-scale producers to meet their domestic and export demand.

Table 28: Main economic activities by surveyed firms, horticulture

Firm type	Description of economic activity undertaken	3-digit SIC code
Growing of vegetable and seed grower and distributor	Growing of vegetables	011
	Collecting, sorting and grading	016
	Packaging of vegetables	829
	Seed production	016
	Growing of leguminous crops	011
	Packing and exporting of produce	829

Source: Authors' calculations based on IWOSS data (2020).

When it comes to age composition of employees, 20 percent of the largest firm's workforce are youth while only about 10 percent of the other firms' are. In some firms, women made up 70 percent of farm workers. In some cases, firms actually push hiring women: The packhouse of one of the firms interviewed provides preferential employment to single mothers and these made up about 70 percent of its workforce. The preferential employment of women is, in turn, used as a branding tool in its European markets.

Youth employment in firms interviewed: current and expected

The youth employed within horticultural firms are restricted within a narrow range of occupations that mainly require manual labor despite the presence of specialized occupations, which tend to require individuals with post-secondary education. The occupations in these firms require higher-skilled jobs such as integrated pest management (plant pathologist, entomologist), agronomists, breeders, biotechnologist, and food technologists.

Importantly, each of the three firms intends to “expand its operations” or “diversify products” over a 5- or 10-year horizon—indicating significant growth in output and employment with a relatively large demand for low skilled individuals. Regarding jobs to be created in the future, respondents indicated that there would be scope to hire more youth into their firms and anticipate that the new jobs to be created will largely come from current occupations rather than new ones. In total, the three firms expect to create 60 new youth-orientated jobs within the next five years. About 55 percent of potential new jobs are for farm workers such as production, harvesting, sorting, grading, and packaging.

Skill requirements for the youth

As reported by the sampled firms, the formal education requirements for the horticulture sector vary across different occupational roles (Table 29). The large variation in the minimum educational requirements across the horticulture sector is indicative of job opportunities across a large spectrum of the skill distribution. Low-skilled jobs, such as farm workers and plant extractors, are in demand and cater to low-skilled individuals, while individuals with specialized skills can find employment in occupations such as a seed processing and agronomists. Access to some of the occupational opportunities is pegged on the achievement of higher educational requirements such as a diploma or a university degree. Some of these occupations include integrated pest management (plant pathologists, entomologist) and agricultural engineers. The value chain also requires individuals who

can manage large-scale farms, packhouses, canning factories, and contract farming as well as skilled logisticians, marketers, and international trade experts.

Table 29: Main minimum educational requirements for current occupations, horticulture firms

Occupation	Formal education requirement
Farm worker	No formal education
Horticulturist	Secondary education
Plant extractor	No formal education
Seed processor, breeders, horticultural technicians	Post-secondary education
Agronomist, entomologist, engineers, operational managers, marketers	University degree

Source: Authors' calculations based on IWOSS data (2020).

In identifying soft skills that firms require, the survey focused on the occupations in which the youth are most often employed in horticultural firms. Social skills were one of the most important set of skills required by firms. Particularly important for these sets of skills is coordination and instructing skills, according to the firm survey respondents. Basic skills, encompassing active learning and listening skills, seem to also be highly valued by employers. Respondents also indicated that digital skills would be important in the horticulture industry especially in future. The nature of the digital skills required across all interviewed firms seem relatively basic, e.g., reading measurements and literacy of basic computer packages such as Microsoft Office, as well as being able to use new communication channels. In the case of laboratory workers, such as the plant pathologist, the level of digital literacy increases as they are required to work with other electronic equipment requiring more advanced digital skills. The digital skills are also important for the marketing of produce and analysis of data.

Skill gaps of the employed youth

The sampled firms were asked to provide a measure of skills deficit on a 5-point scale ranging from 1 – *meets skill requirements* to 5 – *does not meet skills requirements at all*. The range of skills assessed for the skills deficit were lumped together in six broad categories, including basic skills, social skills, and technical skills, among others (Table 30). Overall, the skill deficit of employees in the firms surveyed in the horticulture industry can be considered low, with an average skill gap measure of approximately 1.1 out of 5. Indeed, the firms surveyed indicate that the workers meet the skill requirements and there are no skills in deficit. However, we note that this finding is based on a narrow set of occupations in the larger horticultural sector among a small set of interviewed firms.

Table 30: Skills deficit by firm type in the tourism industry

Skill category	Average (1 to 5)
Basic skills	1
Social skills	1
Problem-solving skills	1
Technical skills	1
Systems skills	1
Resource management skills	1.3
Average	1.1

Source: Authors' calculations based on IWOSS data (2020).

6.3.2 ICT sector – overview of ICT firms interviewed

We surveyed six ICT firms, four of which are located in Nairobi and the other two are in Kisumu and Kirinyaga counties. The selected firms have varied roles in the ICT value chain. One of the firms is a core infrastructure provider while the others are end-user service providers. The interviewed firms ranged in size from three employees up to more than 100 employees. The economic activities undertaken by the six firms are represented in Table 31 and include computer programming, consultancy and support activities, software engineering, and software publishing.

Table 31. Main economic activities by surveyed firms, ICT

Firm type	Description of economic activity undertaken	3-digit SIC code
ICT services	Computer programming activities	620
ICT services	Computer consultancy and computer facilities management activities	620
ICT services	Data processing, hosting, and related activities	631
ICT services	Web portals	631

Source: Authors' calculations based on IWOSS data (2020).

Youth employment of firms interviewed: current and expected

The surveyed ICT firms anticipate significant growth in employment and note that most of these new jobs will require high skill levels. Together, the surveyed firms expected to add about 194 jobs within the next five years. Notably, the firms report that all anticipated 194 jobs will require a post-secondary degree, with nearly 90 percent requiring a degree (63 percent) or a post-graduate degree (24 percent). The numbers are indicative of a high-growth outlook, which is supported by the strong performance in both output and employment of the ICT sector in Kenya over the last two decades. Some of the occupations identified by firms as relevant to youth were consultancy and support activities, data processing, sales, software engineering, and software publishing.

Skill requirements for the youth

Education and/or skills development will be important for the country to be able to tap into gainful jobs for the youth in the ICT sector given the relatively high skills requirements of nearly all the occupations in ICT.¹⁰ The minimum educational requirements for occupations ranged from post-secondary education (i.e., individuals have some certificate or diploma) to post-graduate education (Table 32).

With respect to soft skills, the surveyed ICT firms indicated that social skills are important but relatively less so for some occupations, such as ICT technicians and software developers for whom technical skills are key (approaching a score of 5). Basic skills, social skills, and problem-solving skills were described as “very important” for some occupations, including GIS developers and software engineers.

Table 32: Minimum educational requirements for current occupations, ICT firms

Occupation	Demanding firm industry	Formal education requirement
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¹⁰ These requirements are representative of the level of education currently held by employees in each given occupation. Where appropriate, however, respondent firms indicated that they would look for the same level of education in new hires for these occupations.

End-user service workers (e.g., cyber Assistant)	End-user service providers	Post-secondary
Service and sales workers	Financial institutions	Degree
ICT technician	IT support firms	Degree
Database and network technician	ICT training,	Post-secondary
Software developer	Industry; regulator	Degree
Software engineer	ICT research; ERP solutions	Degree
GIS developer	ICT research services	Degree
Statisticians	ICT research services	Degree

Source: Authors' calculations based on IWOSS data (2020).

Skill gaps of the employed youth

Overall, the skill deficit of employees in the ICT firms surveyed can be considered low or moderate with an average skill gap measure of approximately 1.9 out of 5 (Table 33). The skills with a higher deficit score were resource management skills with an average score of 2.5 out of 5. Generally, all the other skills have a score of 1.8 or less. Firms describe employees in technical and problem-solving skills in banking sector technology solutions, software engineering, and in services to end users, including enterprise resource planning (ERP) solutions as meeting skill requirements.

Table 33: Skills deficit by firm type in the ICT sector

Skill category	Skill deficit (1-5)
Basic skills	1.8
Social skills	1.7
Problem-solving skills	1.7
Technical skills	1.8
Systems skills	1.8
Resource management skills	2.5
Average	1.9

Note: 1 - meets skill requirements to 5 - does not meet skills requirements at all.

Source: Authors' calculations based on IWOSS data (2020).

Concerning the main deficit areas with respect to skills, the surveyed ICT firms indicated that, although there was potential for growth in the ICT sector, this growth would predominantly be along the lines of expanding current operations. The new occupations will require much higher skill levels than the current occupations available to youth in the sector. Moreover, moderate skill gaps in a number of soft skills will need to be addressed before the true potential of the ICT sector as an engine for tackling youth unemployment in Kenya can be realized.

6.3.3 Tourism sector – overview of firms interviewed

Firm interviews were conducted primarily in the accommodation and food and beverages segments of the tourism value chain. These subsectors account for the bulk of the tourism value chain and, hence, job creation potential for the youth. Overall, the sample of firms in the tourism sector included 14 hotels (ranging from non-rated facilities to 5-star facilities). The firms were located in major urban centers in Kenya including Nairobi (1), Mombasa (5), Nakuru (3), Machakos (2), Kirinyaga (3), and Isiolo (1). Mombasa had more establishments since it is the principal tourism destination.

The establishments interviewed ranged in size from 14 employees to about 260 employees. The largest hotel was a 5-star rated facility. The medium-sized hotels ranged from unrated (5 firms) and 3- or 4-star rated facilities (7 firms), and 5-star rated hotels (2). The main economic activities undertaken by the firms, as well as their corresponding 3-digit SIC code mapping, are summarized in Table 34. All 14 firms identify accommodation and serving food and beverages as one of their main economic activities.

Table 34. Main economic activities by surveyed firms, tourism

Firm type	Description of economic activity undertaken	3-digit SIC code
Large, medium, and small hotels	Accommodation services	551
	Serving food and beverages	561,563
	Camping site	552
	Recreational and retreat centre	932
	Hosting meetings, weddings, and conferences	823
	Spa services	932

Source: Authors' calculations based on IWOSS data (2020).

With respect to gender, the 14 firms indicated that overall, there were more males than females in wage employment. Even so, in some occupations, such as waiters, the share of men and women was just about equal. The larger proportion of males on aggregate may be surprising but mirrors the larger wage employment shares of men in accommodation and food and beverages segments (of about 67.3 percent) reported in the national official statistics (KNBS, 2020).

Youth employment of firms interviewed: current and expected

Across all interviewed firms in the tourism sector, the three most-common occupations identified by firms as relevant to youth were front office staff (hotel receptionists), hotel cleaners, and waiters and bartenders. Nearly 70 percent of the current youth workforce of the surveyed hotels were in these three occupations. Other, less numerous occupations where the youth are employed include bookkeepers and ICT support. With respect to expansion plans, nine out of the 14 firms had plans to expand their businesses in the next 5 years. These plans were diverse and entailed plans to expand accommodation facilities/services, upgrade facilities, increase product variety (such as introducing game drives), and open more branches in other towns.

In terms of expected job creation over a 5- and 10-year horizon, 70 percent of the firms indicated they had plans to increase their employment levels. Among the firms that were able to provide estimates of jobs to be created, they expect to create an average of 179 jobs within the next five years and 284 in 10 years. Most of these jobs (90 percent) would come from occupations that already exist within the firm while 10 percent would come from firms hiring individuals for new occupations. If these observations apply to establishments in the overall economy, then we would expect that a significant share of tourism-related establishments have a positive outlook in terms of their growth in operations and employment of the youth.

Food and beverage services accounted for the bulk (about 60 percent) of the expected increase in jobs. Housekeeping and chefs followed, each with a share of 15 percent. Some of the new occupations identified as likely to create new jobs include ICT support services, web designers, concierge, communications personnel, gym instructors, plumbers, events managers, and banqueting managers.

Skill requirements for the youth

As indicated in Table 35, firms in the tourism sector require, at minimum, complete secondary education, and firms anticipate that future employees will need to have a degree.

Table 35. Minimum educational requirements for current and future occupations, tourism firms

Occupation	Education current occupations	Education future occupations
Bookkeeper/ accountant	Post-secondary and Degree	Post-secondary and degree
Housekeeper	Secondary education	Post-secondary and degree
Chef	Post-secondary education	Post-secondary for smaller hotels and degree for larger hotels
Front office staff	Post-secondary education	Post-secondary education and degree (for larger hotels)
ICT support	Post-secondary	Post-secondary education
	Degree	Degree
Waitron/food and beverages	Secondary education	Post-secondary education

Source: Authors' calculations based on IWOSS data (2020).

Soft skill requirements

The importance of a particular skill varies with occupation. Overall, respondents deemed basic skills important but not as important as social skills.¹¹ Social skills and problem-solving skills are generally relatively more important set of skills required among the tourism firms—with scores of 4 or more for most occupations. For all the occupations, with the exception of ICT support, social skills score at least 4 out of 5 points—reflecting the high level of importance firms attach to these skill sets. The more important skills required by tourism firms include problem-solving skills, technical skills, and system skills. Key skills gap identified across the firms include soft skills such as external communication with guests, product/service quality, value packaging, and independent quality management.

Reported skill gaps of the employed youth

The range of skills assessed for skills deficit were lumped together in 6 broad skills categories (Table 36). Overall, the skill deficit of employees in the surveyed firms can be considered moderate, with an average skill gap measure of approximately 2.2 out of 5. The skills most critically in deficit are systems skills, with an average of 2.9 out of 5, followed by basic skills¹² with a score of 2.4 and technical skills with a score of 2.3 out of 5 (Table 36).

¹¹ Basic skills included active learning, active listening, speaking, reading comprehension, and writing. Social skills were include: coordination, instructing, negotiation, and persuasion. Technical skills encompass selection and maintenance of equipment, operation monitoring, troubleshooting, and quality control. Resource management includes management of financial resources.

¹² Systems skills are only required in 3 out of 8 occupations identified by respondents. Moreover, only some of the listed systems skills were applicable to these occupations. As a result, the deficit present in these skills may not be as practically serious as the deficits in other areas, such as basic skills or social skills.

Table 36: Skills deficit by firm type in the tourism industry

Skill category	Skill deficit (1-5)
Basic skills	2.4
Social skills	2.0
Problem solving skills	1.8
Technical skills	2.3
Systems skills	2.6
Resource management skills	2.3
Average	2.2

Note: 1 – meets skill requirements to 5 – does not meet skills requirements at all.

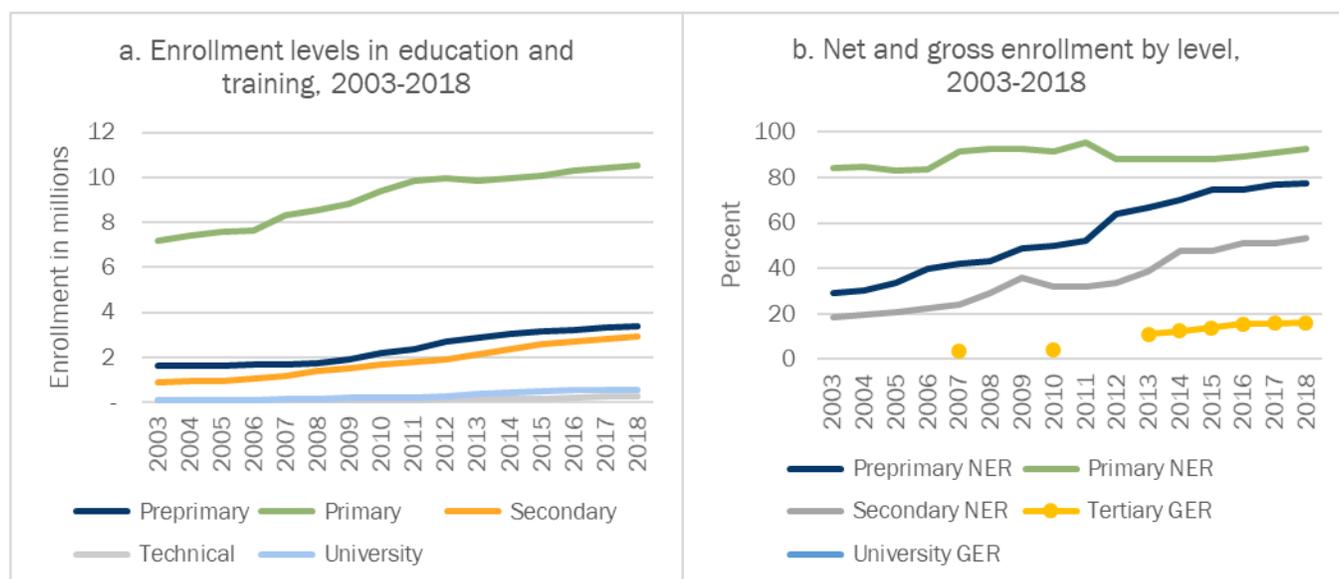
Source: Authors' calculations based on IWOSS data (2020).

According to the survey results, although there was potential for growth in the tourism sector, this growth would predominantly be along the lines of expanding current operations. Most establishments (12 out of the 14) indicated that their three main youth occupations require digital skills, but the level of skill required varied from basic skills to more advanced and specialized skills. Examples of relatively basic types of digital skills required by establishments include online booking, ability to use a smartphone, ability to operate CCTV cameras, typing using a computer, and email communication. More advanced digital skills included digital marketing, social media marketing, working with a digital accounting system, web design and maintenance, and network administration.

6.4 Factors contributing to skills gaps

The gaps across the sectors can be associated with unsatisfactory education and training outcomes. Although the country recorded consistent expansion in participation in education and training between 2003 and 2018, most of the progress was in basic education (Figure 10a and b). Tertiary education in Kenya is still low relative to a typical middle-income country. The enrollment rate gap among the levels of education is wide: Indeed, there are low aggregate shares of university and technical enrollments, as they fail to absorb secondary graduates.

One of the factors driving the skills gap is the weak linkages between education and training, and industry and the labor market. As a result, the country lacks technical skills in various sectors, including IWOSS. The country has shortages of skilled manpower especially in technical skill areas, including engineering, which is critical for many IWOSS industries. Although there has been considerable increase in student's enrollment in tertiary education, students' chosen areas of specialization do not address market gaps. For example, in 2018 most students in local tertiary institutions were enrolled in education (20.2 percent), humanities and general studies (12.5 percent), and business, administration and law (26.9) compared to 2 percent in civil engineering, architecture, design and building (Table 37). Agriculture accounted for 5 percent; ICT 6.6 percent and services (where hospitality and tourism are captured), 0.9 percent. To a large extent, most of the humanities programs are general training for the open labor market, with flexibility in acquiring specific skills. As a result, firms have to retool staff, a process that may not be cost-effective both in terms of finance and time allocation.

Figure 10: Trends in skills supply (education and training) by level, 2003-2018


Note: NER = net enrollment rate; GER = gross enrollment rate.
Source: Economic Survey, 2005-2019.

Table 37: Enrollment in public and private universities or higher education skills supply by field of education and training (2018)

Field	Doctorate	Masters	PGD*	Bachelors	Diploma	Total	Share (%)
Agriculture, forestry, fisheries, and veterinary	266	1,429	171	25,746	655	28,267	5.0
Art and Humanities	1,400	7,684	58	57,517	3,738	70,397	12.5
Business, administration, and law	5,067	25,693	208	110,750	9,764	151,482	26.9
Education	2,254	3,082	307	106,403	1,783	113,829	20.2
Engineering, manufacturing, and construction	316	1,045	34	27,327	1,025	29,747	5.3
Health and welfare	845	4,265	592	30,133	2,558	38,393	6.8
Information and communication technology	283	1,508	18	32,892	2,349	37,050	6.6
Natural sciences, mathematics, and statistics	3,068	3,781	-	49,030	228	56,107	9.9
Services	958	136	38	3,380	788	5,300	0.9
Social sciences, journalism, and information	201	2,922	1	26,915	3,337	33,376	5.9
Total	14,658	51,545	1,427	470,093	26,225	563,948	100.0

Notes: PGD = Post-graduate diploma; The selected IWOSS sectors of horticulture falls under agriculture; tourism, under services; and ICT is a stand-alone categorization.

Source: Commission for University Education, 2018

7. Conclusion: Implications for policy and action plan

This Kenya case study set out to assess the scope for IWOSS—particularly horticulture, ICT, and tourism—to generate adequate wage employment opportunities, particularly for the youth. The study also identified the constraints that inhibit growth and job creation potential across the identified IWOSS sectors. This was followed by projections of employment creation over the next decade in scenarios assuming presence and absence of the identified constraints. The study also assessed the labor skills requirements of IWOSS.

7.1 Implications for policy and action plan

Although Kenya’s economic growth improved in the two decades leading to 2020, this growth has yet to be translated into adequate wage employment and/or may not have been strong enough to generate adequate wage employment. Only 64.4 percent of those aged 15 to 64 years are employed and, among the employed, less than 20 percent hold wage jobs (KNBS, 2020).

Although some IWOSS sectors—including ICT and tourism—were among the sectors with relatively strong potential for growth and creation of wage jobs, other IWOSS sectors (such as horticulture and financial services) experienced high output growth amid quite large growth in non-wage jobs. We interpret this as suggestive of inherent potential in creation of wage jobs in these sectors—if the expanding informality can be turned into a positive development.

The study examined the constraints stifling the performance of horticulture, ICT, and tourism. The key cross-cutting issues that emerged in relation to the investment climate (infrastructure, the regulatory environment, and skills) are as follows:

- (i) **Road and railway transport costs** are a key constraint. The cost of transport in Kenya is generally higher than a comparator set of countries, which impacts different parts of the sample value chains. For example, USAID (2012) estimated that the poor road infrastructure of the feeder roads has been a major cause of the large post-harvest losses in the horticultural value chain (estimated at 42 percent). Such losses serve as disincentives to further investments in some IWOSS sectors, such as agro-processing and horticulture. Furthermore, relative to a comparator set of countries in the region, Kenya’s power supply is more costly and unreliable.¹³ A lack of policies and regulations on *net-metering* and *wheeling* system, among other policy gaps, undermines the growth of off-grid solutions, which has resulted in high operating costs—notably the main reason cited by our survey respondents for relocation of firms out of the country.
- (ii) ICT services are also characterized by relatively **high cost of mobile broadband services and a large digital divide between urban and rural areas**. These constraints emanate from weak competition associated with the quality of regulations. Kenya will need to address the limited (but increasing) interoperability between mobile payment operators, which affects the ability of smaller players to grow thus potentially creating inefficiency resulting from one or a few large players dominating the industry.

¹³ These countries include Egypt, Nigeria, South Africa, and Tanzania.

- (iii) **Weak performance in selected aspects of business enabling environment including cross-border trade.** Although Kenya fares better than most African countries, the country's average performance in the 2020 World Bank's Doing Business rankings is weak on aspects such as cross-border trade (117) and getting a construction permit (105). Kenya also trails behind other middle-income countries in terms of rules that enable a market-based economy (ranked 72 out of 129 countries). These could be ameliorated by addressing concerns about monopoly behavior and relatively strong participation of the government in some of the markets (such as agricultural input markets).
- (iv) With respect to skills, a broad constraint is that **educational achievement in Kenya is low relative to a typical middle-income country**, as 46.5 percent of the working-age population has primary education or less as their highest education level. Kenya also faces skills mismatches between skills demanded and skills available across the economic sectors.

Table 38 highlights additional constraints for the sectors and the respective recommendations or action plan.

Table 38: Action plan

Sector and issue	Recommendation	Responsible agency
Horticulture		
Inadequate skills among producers—e.g., limited capacity to maneuver around dynamic non-tariff trade barriers (NTTBs) such as the European Good Agricultural Practice (EuroGAP) and maximum pesticide residue levels	Support continuous skills transfer and support to local producers, e.g., in leveraging on consumer driven standards	Ministry of Agriculture; Horticulture Development Authority
Limited branding of products	Support continuous skills transfer in enhanced marketing strategies	Ministry of Agriculture; Horticulture Development Authority
Lack of a cold chain infrastructure resulted in high post-harvest losses (as high as 42%).	Promote investments in cold chain infrastructure, e.g., “cold” collection centers and pack houses. Enhance investments in feeder roads transport infrastructure	National and county governments and private investors
Declining skill pool as a result of declining attraction of agricultural and related courses (to students) in institutions of higher learning and middle level colleges (including food science, agricultural engineering).	Adopt accessible continuous learning approaches to enhance standards	Ministry in charge of higher education
Inadequate skills levels especially among small scale producers leading to large share of substandard outputs.	Promote accessible continuous learning approaches to enhance skills	Government through line ministries and agencies such as the Ministry of Agriculture Cooperative societies
Youth's aversion of agriculture in general and agricultural related activities	Sustain the ongoing efforts to mold preference of youth towards agriculture	Government through line ministries and agencies such as the Ministries in charge of education, MSMEs and agriculture
ICT		

Non-competitive market structures – resulting from firm entry barriers mainly due to lack of transparent regulatory framework for pro-competitive spectrum allocation – leading to higher service costs.	Put in place a policy framework that enhances competitive markets to improve affordability/access to services by last mile users.	Ministry in charge of ICT
Lack of a comprehensive policy and legal framework for E-commerce and consumer protection. This results in vulnerability of consumers to inadequate disclosures, misleading and unfair commercial practices, consumer fraud, product safety, dispute resolution and redress, as well as privacy and security of consumer data.	Put in place an all-encompassing policy for e-commerce.	Ministry in charge of ICT
Limited access by last mile users	Enhance affordability using various interventions including regulations that enhance competition.	Ministry in charge of ICT
Perceived limited support (e.g., in marketing and enhancing visibility) especially in the BPO sub sector. In addition, the country has inadequate BPO infrastructure (such as internationally competitive communication infrastructure)	Allocate resources to support marketing initiatives and enhance visibility of the local BPO subsector.	Ministry in charge of ICT
Inadequate human resources with advanced skills in ICT, e.g., BPO sector lacks specialized ICT and soft skill levels like good typing speed, good listening skills, interpersonal skills and patience.	Promote private sector investments in education for high-level ICT skills and soft skills (e.g., animation skills and good interpersonal skills). Retool skilled workforce and attract diaspora skills such as skilled programmers.	Ministry in charge of education, Ministry in charge of ICT
Low adoption of emerging technologies such as cloud computing and artificial intelligence Many firms are running on manual processes and outdated technologies leading to costlier, slow, and inefficient delivery of products and services	Promote adoption of emerging technologies, e.g., via public sector adoption.	Ministry in charge of ICT
Increased cyber threats: Kenya is increasingly becoming attractive to cyber threats due to presence of high number of digital services and poor cyber security posture among institutions	Promote private sector led initiatives in capacity development/capacity building.	Ministry in charge of ICT
Tourism		
Congestion and, hence, erosion of the value of the product offerings	Increase entry charges for prime locations. Promote new product innovations	Ministry in charge of tourism and agencies such as Tourism Research Institute
Gradual driving out of locals in tourism value chain, which leads to limited inclusion of local MSMEs.	Promote community conservancies.	County governments
Relatively high transport costs and a limited focus on domestic tourists	Enhance development of access roads and promote competitive air transport	All stakeholders
Limited availability of large venues for MICE subsector	Fast-track the construction of larger venues at Nairobi and Mombasa cities.	National government and partners
Cross-cutting		

Inadequate policies and regulations on net metering and wheeling system (particularly addressing issues of access from off-grid solutions).	Put in place net metering regulations or guidelines.	Ministry in charge of energy
Absence of clear regulatory framework to promote best practices in infrastructure sharing among market players within and across sectors, which limits entry in markets and results in inefficiency.	<p>Incorporate within and across-sector infrastructure deployment in broadband policies.</p> <p>Encourage cross-sector consultations for infrastructure developments, both urban and rural.</p> <p>Provide sufficient financial support to ensure infrastructure sharing can take place where public works are undertaken by the government.</p> <p>Create planning databases containing detailed information of infrastructure available for sharing.</p>	Ministry in charge of Energy and all stakeholders
Absence of clear regulatory framework to promote best practices in infrastructure sharing among market players, which limits entry in markets and results in inefficiency.	Put in place clear regulatory framework or guidelines on infrastructure sharing.	Competition Authority of Kenya
Limited transparent regulatory framework for pro-competitive spectrum allocation, which affects entry and the level playing field for all potential providers of broadband services.	Put in place transparent regulatory framework for spectrum allocation.	Competition Authority of Kenya
The limited interoperability between mobile payment operators affects the ability of smaller players to grow thus potentially creating inefficiencies resulting from one or a few large firms dominating the markets.	Enhance interoperability through appeals or persuasion to the industry	Competition Authority of Kenya
Growing informality in the economy and in the job creating sectors such as horticulture.	<p>Simplify regulations and ease taxes. (some studies point to the need to offer differentiated taxes based on firm size).</p> <p>Streamline and strengthen enforcement of regulations.</p>	National government including line MDAs and partners.

7.2 Conclusion

This study examined whether IWOSS sectors can provide adequate wage job opportunities for Kenyan youth. Some key observations are that while IWOSS sectors present an opportunity to increase off-farm employment opportunities with higher productivity than in agriculture, the enduring nature of agriculture suggests that increasing productivity in the sector would be a worthwhile agenda for Kenya in the next decade.

Kenya has achieved a relatively diverse economy in which IWOSS, non-IWOSS, and manufacturing have good potential to create jobs. Projections indicate that all these sectors shall remain significant

sources of employment in the next 10 years. IWOSS and manufacturing have certain advantages over agriculture, including their high productivity levels, making them instrumental for reducing poverty. IWOSS also has high employment-to-growth elasticity, further cementing its key role in generating more employment relative to non-IWOSS.

Even so, this study observes that a large share of new jobs in IWOSS are non-wage jobs, a trend that could be the result of diverse factors including complex regulations, weak enforcement of regulations, high taxes, or even simply tax evasion. Due to complexity of the subject, further research is needed to carefully examine how this growing and expanding informality (which varies across sectors) can be turned into a positive development.

A fundamental finding is that the growth observed in IWOSS and other sectors of the economy is curtailed by several constraints. Some of these constraints are binding and, if addressed, have the potential to generate higher growth in output and wage employment. The broad area of infrastructure and regulatory framework stands out as important in making the economy increasingly functional and thus in creating job creation. Moreover, policymakers should prioritize identifying and eliminating regulatory bottlenecks at sector/subsector levels on a continual basis, which will require strong monitoring and evaluation through continual stakeholder engagements and subjecting all new laws and regulations to regulatory impact assessments.

The overriding finding on skills is that skills deficits can be a constraint to growth of IWOSS and other sectors. Indeed, skills mismatches may prevent the youth from accessing gainful and productive employment. Monitoring skills needs will be a key task for ensuring the youth are equipped for available jobs. Stakeholders, including both industry and education and training institutions, need to strengthen partnerships for skills development and enhance programs that combine on-the-job and in-class training. The education and training system should be tailored to produce skills demanded by the market rather than academic credentials.

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