

## **RWANDA SKILLS SURVEY 2012**

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## **MANUFACTURING SECTOR REPORT**

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## Executive Summary

This Report presents the findings of the skills survey of the Manufacturing Sector Establishments in the Private Sector in Rwanda. The focus is on skills profiles, proficiencies, and gaps in the Manufacturing Sector. The survey was commissioned by Rwanda Development Board as a national private sector skills survey targeting 8 priority sectors including ICT, Mining, Energy, Tourism, Manufacturing, Construction, Agriculture, Finance and Insurance. The survey was carried out in the five provinces in the country targeting large, medium, small and micro financial sector establishments in the Private Sector.

### Principal Activities and Overall Labor Units in the Sector

The Manufacturing sector in the private sector in Rwanda has 66 principal activities, with most of establishments doing more than two activities. The four top economic activities in Rwanda's sector are: manufacturing of food products constituting 20.5%; repair and installation of machinery and equipment 11.7%; printing and reproduction of recorded materials 8.7%, and manufacture of furniture constituting 8.5%.

The leading activities within the food subsectors are: manufacturing of beverages and other related food products (5.5%), processing and preserving of meat (3.8%), the processing of grain mills (3.3%), manufacturing of bakery products (3.6%), and manufacturing of dairy products (2.5%). Activities of production of coffee products (0.3%), manufacturing of starches and starch products (0.3%), and manufacturing of prepared animal feeds 0.3% had the least representation in this subsector.

The manufacturing sector in Rwanda had a total of 27,769 labor units employed as Managers, Professionals (Engineers), Liberal Professionals, Technicians and Artisans. Women constitute of 32.3% of the labor force while men are 67.7%. Artisans and office service personnel comprise of three quarters of total employees (74.8%) compared to Scientists (0.9%), Technicians (4.9%), Managers (13.4%), and Liberal Professionals (6.1%).

**Skills Gaps:** - Within the manufacturing sector, apart from the limited competency in soft skills, the overall technical skills gap is 7,568 labor units in the short term. This gap was highest among Artisans cadre of 5,980 (79.0 %), followed by Managers 842 (11.1%), Associates Liberal Professionals 334 (4.4%), Technicians 267 (3.5%), and Scientists Professionals 144 (1.9%). The existing employees also need training in soft (qualitative) skills like leadership, human resource management, business communication, and innovation.

**Supply of Skills by Training Institutions:** - Training institutions offering manufacturing related courses include universities, Integrated Polytechnic Regional Centers (IPRC), Vocational Training Centers (VTC) and Technical Secondary Schools (TSS). Degree and diploma courses mainly at universities include Mechanical Engineering, Automobile Technology, Food Science, Science and production Analysis: Chemistry and Physics. Certificate and diploma courses at IPRC include Mechanical Engineering and Air Conditioning and refrigeration, while certificate courses at

VTC/TSS include Tailoring & Dressmaking, Food processing & Food products, Culinary Art & Fine Art, Welding & Plumbing, and Motor Mechanics.

The survey has indicated that the level of skills gaps in both technical and soft skills in the manufacturing sector is high. There are about 6,000 existing employees (79% artisans) who have limited proficiency in technical skills at their work place. Furthermore, 90.4% of existing employees in the manufacturing sector needs training in soft skills to make them effective and efficient in their occupation.

The lack of both technical and quality skills in the industry impacts the establishments negatively, making the sector uncompetitive. Moreover, the lack of a comprehensive national internship policy and specific programs in both the training institutions and the establishments in the sector results in missed opportunity for students who are looking to acquire practical skills and learn the particulars of doing business in the manufacturing sector.

The findings of the skills survey implies that there is need for concerted, coordinated and comprehensive efforts, strategy and investment to enhance skills development for the manufacturing sector across Rwanda. Comprehensive and urgent efforts are needed to provide skilled personnel to drive and sustain manufacturing industry as articulated in Rwanda Vision 2020. Thus the following recommendations are put forth with this objective in mind.

1. Enhance technical and qualitative skills among employees in the Manufacturing.
2. Promote University-Industry Linkage in Rwanda.
3. Launch and managing a national science congress and competition.
4. Develop a National Internship Policy.
5. Public education on Labor Market Information Systems (LMIS).
6. Promoting PPP for internships and attachment programs.
7. Explore with relevant stakeholders in the public and private sectors the possibility of establishing a Textiles Training College in Kigali that can further act as a Center of Excellence in the region.
8. Expand the Capacities of TVET institutions, IPRC and selected VTC.

## 1.0 MANUFACTURING SECTOR OVERVIEW

Manufacturing sector is defined as those establishments (industries) that involve transforming an idea into a physical product that can then be sold in the marketplace. The traditional manufacturing industries involve turning raw materials into products. However, manufacturing, in a broader sense, constitutes taking into consideration design, logistics, after-sales service and marketing, which have grown in importance as part of the total value of products World-wide. These are central to manufacturing companies and to maintaining their competitiveness in a globalized economy.

In a globalized and technological oriented world, which Rwanda is part, high quality and skilled work force is a critical input that ensures effective competitiveness and innovation, improved quality of products and services, increased turnover for establishments, increased, and effective adjustment of operations frameworks and products in the manufacturing sector.

Skills demand in manufacturing is usually necessitated by job openings created by retirements, occupational mobility and related reasons. Such demand has to be met by supply from training institutions. Locating sufficient numbers of skilled people to meet replacement and market demand can be a particular challenge for traditional industries that have suffered substantial job loss over the a period of time.

### 1.1 Manufacturing Sector in Rwanda

Rwanda's manufacturing sector has experienced a high overall growth in the last decade. According to UNIDO policy brief, Rwanda is considered to be among the World's ten fastest growing countries in 2010 (Table 1).

**Table 1: World's ten fastest –growing economies, 2001-2010**

Country	Annual Average Growth Rate
Angola	11.1
China	10.5
Myanmar	10.3
Nigeria	8.9
Ethiopia	8.4
Kazakhstan	8.2
Chad	7.9
Mozambique	7.9
Cambodia	7.7
Rwanda	7.6

Source: Economist, IMF, UNIDO policy brief, November 2011

Overall, Rwanda's economy grew at 7.5 percent in 2010, two percent higher than the East African Community (EAC) and even more than Sub Saharan Africa (SSA). During 2010 the services and industrial sectors progressed in their growth recovery.

Compared to most other African countries, manufacturing in Rwanda is small and includes firms with very different capabilities: small firms that cater for the local market and more modern large firms some of which export. The share of manufacturing fell from 12% in 1997 to 6.7% in 2010. However, in the period 2006 to 2009, this share was 6.8, 6.1, 6.2 and 6.4 respectively. In the period 2000-2006, the share of employment in manufacturing increased from 1.7% to 3.3% to total employment. Table 2 shows that Food and beverages are the leading contributors to GDP in the manufacturing sector.

**Table 2: Contribution of Manufacturing to GDP, 2006-2010 [Billion RWF]**

<b>Sector</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>
<i>GDP at Current Prices</i>	1,716	2,045	2,574	2,985	3,277
Manufacturing	117	125	159	190	218
Food	49	49	65	80	92
Beverages & Tobacco	28	31	41	56	60
Textile, clothing	8	9	10	10	11
Wood, paper & printing	6	7	8	8	10
Chemicals, rubber Plastics	7	8	9	9	10
Nonmetallic minerals	11	11	14	15	17
Furniture	7	9	12	12	17
Manufacturing % of GDP	6.8	6.1	6.2	6.4	6.7
% of manufacturing					
Food	41.9	39.2	40.9	42.1	42.2
Beverages & Tobacco	23.9	24.8	25.8	29.5	27.5
Textile, clothing	6.8	7.2	6.3	5.3	5.0
Wood, paper & printing	5.1	5.6	5.0	4.2	4.6
Chemicals, rubber Plastics	6.0	6.4	5.7	4.7	4.6
Nonmetallic minerals	9.4	8.8	8.8	7.9	7.8
Furniture	6.0	7.2	7.5	6.3	7.8
Manufacturing	100.0	100.0	100.0	100.0	100.0

Source: Compiled from Rwanda Statistical Year Book 2011

In 2011, the industrial sector is projected to grow by 15% led by construction (22.3%) and manufacturing industries (6.8%).

As presented in Table 3, food-processing industries have the highest share in the manufacturing industries. They include rice production, vegetable conservation, milk processing, milk products, yoghurt, animal feeds, bakeries, biscuits, and flour milling.

**Table 3: Production of Major Selected Industries**

Commodity	Unit	2010			2011
		Jan-Sept	4th Q	Total	Jan-Sept
Cement production	Tons	77,115	17,986	95,101	68,643
Bricks and tiles	Tons	39,127	9,017	48,144	43,033
Flour milling	Tons	26,769	8,572	35,341	34,572
Tea production	Tons	16,315	5,848	22,163	17,853
Animal feeds	Tons	12,143	3,637	15,780	12,919
Coffee production	Tons	14,450	3,732	18,182	11,112
Metals	Tons	7,111	2,915	10,026	9,460
Rice production	Tons	8,755	3,375	12,130	7,260
Sugar production	Tons	6,579	4,004	10,583	6,319
Soaps	Tons	4,084	1,473	5,557	4,327
Paints	Tons	2,795	1,295	4,090	4,186
Cassette-rite-fins	Tons	4,613	659	5,272	4,262
Other chemical products	Tons	981	469	1,450	1,131
Biscuits production	Tons	1,993	361	2,354	1,621
UTEXIRIWA	000's yards	1,526	267	1,793	1,064
Lime production	Tons	864	242	1,106	1,405
Plastic products	Tons	1,046	302	1,348	852
Bakeries products	Tons	633	91	724	732
Modern beer	HL	733,312	274,548	1,007,860	892,081
Soft drinks	HL	295,568	99,645	395,213	344,413
Domestic electricity	000's kWh	206,755	74,264	281,019	254,795
Water in cubic meters	1000's liters	20,206	7,721	27,927	23,413
Mineral water	1000's liters	10,860	4,089	14,949	12,173
Juice production	1000's liters	1,724	660	2,384	2,477
Milk processing	1000's liters	1,248	318	1,566	1,997

Source: National Bank of Rwanda, Statistics Division, Quarterly Bulletin, 2011

The manufacturing industries significant increase in their turnovers was attributed essentially to breweries (+25.2%), other manufacturing industries (+21.9%) as well as printing shops (+20.5%). As a result, the overall turnovers of the manufacturing industries during the first nine months of 2011 marked an increase of 23.0%. During the period 2009 to 2010, imports in value rose by 8.8% while the volume increased by 17.7%. For the industrial products, their value rose by 16.5% and this increase in value is partly explained by various industries and chemical industries (National Bank of Rwanda, 2011).

## 2.0 CONTEXT OF THE SKILLS SURVEY

The Rwanda Development Board's (RDB) mandate is to promote private sector development through investment promotion. In order to attract the requisite investment, it is important to ensure that the country has the right quantity and quality of skills to support the emerging and growing industries. The Human Capital and Institutional Development (HCID) Department at RDB supports the private sector by developing mechanisms to ensure there is adequate availability of skills with the right quality. It is expected to address the human capital challenge both from an institutional and individual level, through sustainable interventions. Establishing and running such strategic interventions to fill skills gaps in the private sector requires evidence-based quantitative and qualitative data/information. HCID is committed to supporting interventions that would fill the potential gaps and reconcile both labor supply and demand in the private sector in Rwanda.

### 2.1 Rationale for the survey

Strategic and sustained investment in skills development requires credible and comprehensive labor market data and information in the private sector and training institutions. Presently, there is inadequate data and information on skills gaps in the private sector and the match and/or mismatch between the supply of skills by various training institutions (TVET and university institutions) and the labor market demand particularly in the priority sectors.

In addition, though RDB has a Labor Market Information system (LMIS), it is still new and hence difficult to know the actual skills needs and gaps of various sectors of development let alone identifying the labor/skills challenges and opportunities the various sectors are facing/having. It is also not possible to conduct medium and long-term labor force forecasting for the various sub-sectors in the private sector. This is mainly because of lack of a series of cumulative credible data and limited use of robust methodological approaches. This skills survey is a strategic start towards building a credible skills database for decision making and planning.

It is from the above context that RDB-HCID commissioned a national private sector skills survey targeting 8 priority sectors including ICT, Mining, Energy, Tourism, Manufacturing, Construction, Agriculture, Finance and Insurance. A regional consultancy firm OWN and Associates Limited, working with the HCID team, was commissioned to lead this strategic national skills survey in the private sector in Rwanda. The survey was launched in August 2011.

### 2.2 Objectives

This national skills survey targeted the Private Sector in Rwanda, with a focus on:

- ❖ Establishing a robust methodology for strengthening Labor Market Information System (LMIS) and conducting periodical labor market forecasting and manpower surveys.

- ❖ Collecting, collating and reconciling both labor supply and private sector labor demand: establishing sufficient quantitative and qualitative information to identify the potential skills gaps in the private sector.
- ❖ Providing RDB/HCID with comprehensive empirical data on the existing and/or projected human capacity gaps against which training /capacity development interventions and performance can be based, including sustainable and cost effective interventions such as internships, trainings, and scholarships.
- ❖ To conduct a SWOT analysis of respective private sector companies with respect to human capital covering individual, institutional and environment.
- ❖ Provide prioritized recommendations and an action plan that the government and other key stakeholders should undertake to address these gaps.

### **2.3 Design and Methodology**

To carry out a comprehensive, credible and informative skills survey in the selected sub-sectors a rapid assessment methodology, applying qualitative and quantitative techniques was used. The survey was national and carried out on appropriately selected sectors in all the 5 provinces of the country, reflecting both the urban and rural settings. The research team worked with the National Institute of Statistics Rwanda (NISR) to get the right sampling framework and sample size for the skills survey. The NISR Establishment Census 2011 was used as a basis for the selection of the organisations to be visited during the study.

The key respondents during the survey were; employers (owners or/CEOs), employees, and representatives of academic departments of training institutions in Rwanda. The results of the “Establishment Census 2011” conducted by the Ministry of Public Service and Labor, Ministry Commerce and Industry, National Institute of Statistics Rwanda and the Private Sector Federation<sup>1</sup> were used as the framework to determine the sample sizes of the respective sectors for the National Skills Sector Survey.

Based on the Establishment Census 2011 data, NISR worked with the research core team and used a stratified sampling method to select the establishments for the survey across the country. The respondents were stratified using the following 3 criteria:

1. Sectorial activity,
2. Firm size,
3. Geographical location

The stratification by firm size divides the population of firms into a 4 strata as in the Establishment Census, 2011: i.e.

- Micro firms (1 Employee )
- Small Firms (2-3 Employees)

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<sup>1</sup> Republic of Rwanda. (June 2011). *Establishment Census, 2011: Final Results*. Kigali: Ministry of Public Service and Labor, Ministry of Commerce and Trade, National Institute of Statistics Rwanda, and Private Sector Federation.

- Medium Firms (4-9Employees)
- Large Firms (10+Employees)

A geographical distribution is defined to reflect the distribution of the economic establishments across the country within the different provinces i.e. Kigali, Southern, Eastern, Northern and Western Provinces.

Sector activity was based on the eight (8) priority sector identified by RDB as part of the terms of reference.

## 2.4 Sampling framework

The sectors identified by RDB were categorized within the economic activities of the establishment census as shown in Table 4 below. Using the formulae below the sample size was determined for each sector.

$$\text{Using Yamane (1967:888) } n = \frac{N}{1 + N(e)^2}$$

Where N is the population size

n- Sample size

e -level of precision: a precision of 5% was assumed for the skills sector surveys

### Weights

To ensure that all sample estimates are reflective of the population parameters, weights for the different strata against the respective sample sizes have been tabulated. These have been reported in the respective sections. Weights have been computed using  $w = n/N$ , the reciprocal of which will be used to weight the sample results to get the overall population skills status magnitude. All weights have been incorporated in the databases.

**Table 4: Sector Survey Sampling Framework**

Sector*	Population**	Sample Size	Sample%
ICT (Information and Communication)	558	223	40
Energy	360	250	69
Mining	50	50	100
Construction	117	117	100
Tourism	33,305	476	1
Manufacturing	4,559	439	10
Agriculture	675	282	42
Finance & Insurance	970	330	34

\*\*This population is based on the NISR **Establishment Census, 2011 Report**

## 2.5 Data collection

Through a collaborative process between the research core team, RDB and NSIR , a questionnaire was developed which had a core set of questions along with a series of sector specific modules which directly related to the footprints of each of the sectors. The core set of questions which examined generic recruitment issues, skills gaps, resources for training and future skills needs were drawn form to the international skill survey instruments.

For each of the sectors an individual set of questions (or modules) were developed which varied depending upon the priorities of that particular sector. The importance of such an approach was twofold. First, it allowed each of the sectors to gather specific workforce data on organizations which fell into their footprint. Second, it captured the duality of functions that employees often fulfill within private organizations and that would have otherwise not been captured through the more generic core questions.

Given the complexity of the questionnaire and the need to ensure that as many as possible establishments and training institutions within the sector were included in the research, focus groups and telephone interviews were deemed to be the most appropriate, manageable and cost effective method. The interviews were conducted by trained bilingual enumerators.

Experts from RDB and key stakeholders from the selected sectors validated the survey instruments

The number of respondents from the organizations and training institutions are shown in table 5. Experts from RDB HCID, sectoral department, and key stakeholders in each sector validated the survey instruments and were also involved in focus group discussion and/or interviews

**Table 5: Sector Survey Respondents per Sector**

<b>Sector*</b>	<b>Establishments</b>	<b>Training institutions</b>
ICT (Information and Communication)	211	31
Energy	243	31
Mining	41	31
Construction	83	33
Tourism	476	33
Manufacturing	439	33
Agriculture	310	19
Finance & Insurance	310	19

## 2.6 Report structure

While the surveys were conducted over three phases with at least 2 sectors being analyzed at a time, the reports have been developed separately for each of the eight sectors under review.

The following sections of this report present the **Manufacturing sector** finding and recommendations.

The findings are divided into two parts.

Part 1 (Section 3) presents the composition (profiles) of skills in the manufacturing establishments within the Private Sector in Rwanda that responded to the survey. The occupational structure of current employment in the establishments provides insights into the types of skills employed in the manufacturing sector, while the employment of foreigners and vacancies distributions bear evidence of the skills gaps in the sector and the needs that still exist within the sector.

Part 2 (Section 4) present the potential of training institutions in Rwanda in supplying relevant skills to the manufacturing sector in the country. We also present the challenges facing these institutions that affect their effectiveness and quality of training they offer.

### 3.0 PART I: SKILLS PROFILES IN MANUFACTURING ESTABLISHMENTS IN THE PRIVATE SECTOR.

The composition of skills in the manufacturing sector was analyzed by looking at the current employment in various establishments within the private sector. The occupational structure of the current employment provides a comprehensive insight into the types of skills profiles employed in the Sector, while the distribution of foreign employees and vacancies is evidence of the skills gaps needed in the establishment and the transformation needs that still exist.

#### 3.1 Manufacturing Establishments surveyed

The survey targeted establishments in the manufacturing sector whose population according to the 2011 census of establishments was 4,559. A sample of 493 establishments was selected of which 366 establishments responded to the survey, giving a response rate of 83.4%. All the large and medium manufacturing establishments identified by RDB were included and responded to the survey. The establishments covered were weighted to give an estimate of 3,462 establishments, which forms the basis of analysis.

##### 3.1.1 Geographical distribution

Table 6 presents the geographical distribution of establishment by province. Half of the establishments were located in Kigali. The number of establishments in the Western and Northern provinces comprised 20.3% and 17.6% respectively of the total establishments, while the Southern Province and Eastern Provinces had 9.4% and 2.2% respectively.

**Table 6: Distribution of Establishment by Province**

Province	No. of establishments	%
Kigali	1,735	50.1
Western	703	20.3
Northern	608	17.6
Southern	327	9.4
Eastern	76	2.2
Not stated	13	0.4
<b>Total</b>	<b>3,462</b>	<b>100.0</b>

##### 3.1.2 Principal Activities

The survey indicates that there are 66 principal activities in the manufacturing sector in Rwanda, with most of them doing more than two activities. As indicated in Table 7 the four top economic activities in Rwanda in the sector are manufacturing of food products (20.5%); repair and installation of machinery and equipment (11.7%); printing and reproduction of recorded materials (8.7%) and manufacture of furniture (8.5%).

**Table 7: Distribution of Establishment by Aggregated Economic Activity**

<b>Activity</b>	<b>No. Establishments</b>	<b>%</b>
Manufacture of food products	75	20.5
Manufacture of beverages	13	3.6
Manufacture of tobacco products	1	0.3
Manufacture of textiles	25	6.8
Manufacturing of wearing apparels	1	0.3
Manufacturing of leather & related products	12	3.3
Manufacturing of wood & products of wood & cork, except furniture; manufacturing of articles of straw & plaiting materials	28	7.7
Manufacture of paper & paper products	3	0.8
Printing and reproduction of recorded materials	32	8.7
Manufacture of chemical & chemical products	13	3.6
Manufacture of rubber and plastic products	8	2.2
Manufacture of other non-metallic mineral products	22	6.0
Manufacture of basic metals	3	0.8
Manufacture of fabricated & metal products except machinery & equipment	25	6.8
Manufacture of computer, electronics and Optical products	3	0.8
Manufacture of electrical equipment	2	0.5
Manufacture of motor vehicles, trailers & semi trailers	1	0.3
Manufacture of other transport equipment	1	0.3
Manufacture of furniture	31	8.5
Other manufacturing	21	5.7
Repair & installation of machinery & equipment	39	10.7
Others	1	0.3
Not stated	6	1.6
<b>Total</b>	<b>366</b>	<b>100.0</b>

A further analysis of the major aggregated economic activities by sub-sectors was undertaken and the findings were as follows:

**a) Manufacture of Food Products (share 20.5%)**

Manufacturing of food products is the largest subsector in the Manufacturing Sector accounting for 20.5% of all the establishments in the sector. Table 8 indicates the distribution of type of business activities within the Food Processing establishments. The leading activities within the subsectors are manufacture of beverages and other related food products (5.5%), processing and preserving of meat (3.8%), the processing of grain mills (3.3%), manufacturing of bakery products (3.6%), and manufacturing of dairy products (2.5%). Activities of production of coffee products (0.3%), manufacture of starches and starch products (0.3%), and manufacture of prepared animal feeds 0.3% had the least representation in this subsector.

**Table 8: Distribution of Activities in Manufacture of Food Products**

<b>Activity</b>	<b>No</b>	<b>%</b>
Manufacture of beverages and other related food products	20	5.5
Processing and preserving of meat	14	3.8
Manufacture of grain mill products	12	3.3
Manufacture of bakery products	13	3.6
Manufacture of dairy products	9	2.5
Manufacture of macaroni, noodles, couscous and similar farin	2	0.5
Manufacture of vegetable and animal oils and fats	2	0.5
Manufacture of prepared animal feeds	1	0.3
Manufacture of starches and starch products	1	0.3
Production of coffee product	1	0.3
<b>Total</b>	<b>75</b>	<b>20.5</b>

**b) Repair & Installation of Machinery & Equipment (share 10.7%)**

This sub-sector accounted for 10.7% of the total manufacturing industries. Table 9 shows the main activities covered in this subsector, including repair of electronic and optical equipment (5.7%), repair of electrical equipment (2.2%), repair of machinery (1.4%), repair of fabricated metal products (1.1%), and repair of transport equipment, except motor vehicles (0.3%).

**Table 9: Activities in Repair & Installation of Machinery & Equipment**

<b>Activity</b>	<b>No</b>	<b>%</b>
Repair of electronic and optical equipment	21	5.7
Repair of electrical equipment	8	2.2
Repair of machinery	5	1.4
Repair of fabricated metal products	4	1.1
Repair of transport equipment, except motor vehicles	1	0.3
<b>Sub sector</b>	<b>39</b>	<b>10.7</b>

**c) Manufacture of Furniture (8.5) %:**

The manufacturer of furniture was the only economic activity in the sub-sector and constituted 8.5% of the total activities in the manufacturing sector.

**d) Printing and Reproduction of Recorded Materials (9.4%)**

The economic activities in this sub sector of manufacturing were printing (4.9%), services related to printing (2.2%) and reproduction of recorded media (1.6%).

**e) Manufacture of fabricated & metal products except machinery & equipment (7.7%)**

The leading activity in this sub-sector was manufacture of structural metal products which had a share of 3.8% followed by forging, pressing, stamping and roll-forming of metal powder and manufacture of other fabricated metal products with shares of 2.2% and 0.8% respectively.

**f) Manufacturing of wood, & products of wood & cork, except furniture, manufacturing of articles of straw & plaiting materials (7.3%):**

The principal activity was manufacture of builders' carpentry and joinery, with a share of 4.9%. The other two activities were sawmilling and planing of wood and manufacturing of wood & products of wood & cork except furniture, manufacturing of articles of straw & plaiting materials each with a share of 1.4%.

**g) Manufacture of other non-metallic mineral products (6.0%)**

Table 10 shows that in this sub-sector of manufacturing, the main activity was manufacture of clay building materials (4.9%).

**Table 10: Manufacture of Other Non-Metallic Mineral Products**

Activity	No	%
Cutting, shaping and finishing of stones	1	0.3
Manufacture of cement, lime and plaster	1	0.3
Manufacture of articles of concrete, cement and plaster	1	0.3
Manufacture of clay building materials	18	4.9
Manufacture of refractory products	1	0.3
<b>Sub total</b>	<b>22.</b>	<b>6.05</b>

**h) Manufacture of Textiles (6.8%)**

In this sub-sector there were four activities of which finishing of textiles comprised 3.6%. Others were weaving of textiles (1.4%), preparation and spinning of textile fibers (0.3%) and manufacture of knitted and crocheted fabrics (1.6%).

**i) Other manufacturing n.e.c (5.7%)**

Manufacture of jewelry and related articles, and manufacture of imitation jewelry and related articles constituted 1.1% and 1.0% respectively. Other manufacturing activities n.e.c accounted for 4.1%

**j) Manufacture of chemicals & chemical products (3.6%)**

Manufacture of paints, vanishes and similar coatings, and printing ink constituted 1.4% and manufacture of soap and detergents, cleaning and polishing products 1.1% were the two leading activities. The remaining activities were manufacture of basic chemicals 0.8% and manufacture of chalk and other related products (0.3%).

**k) Manufacture of beverages (3.6%)**

The three activities were manufacture of wines (1.0%), manufacture of soft drinks; production of mineral waters and other bottled waters (0.7%) and manufacture of malt liquors and malt (0.5%).

**l) Manufacture of leather & related products (3.3%)**

This subsector comprised of three activities lead by manufacture of footwear (1.9%) followed by manufacture of luggage, handbags and saddler (0.5%) and tanning and dressing of leather; dressing and dyeing of fur (0.8%).

**m) Manufacture of wearing apparels (0.3 %)**

The main activity was manufacture wearing apparel except fur apparel 0.3%.

**n) Manufacture of rubber and plastic products (2.2%)**

Three activities were enumerated in this sub-sector namely; the manufacture of plastic products, manufacture of other rubber products and manufacture of rubber tires and tubes; retreading and rebuild of rubber tires with shares of 1.4%, 0.3% and 0.5% respectively.

**o) Manufacture of computer, electronics and optical products (0.8%)**

This sub activity had an equal proportion of share (0.3%) each in activities namely, manufacture of computers and peripheral equipment, manufacture of communication equipment and manufacture of magnetic and optical equipment.

**p) Manufacture of paper and paper products (0.8%)**

The two economic activities were manufacture of other articles of paper and paperboard (0.5%) and manufacture of corrugated paper and paperboard and other related products (0.3%).

**q) Manufacture of electrical equipment (0.5%)**

The activity of establishments enumerated was the manufacture of domestic appliance.

**r) Manufacture of basic metals (0.8%)**

This sub-sector had relatively fewer establishments whose activities were manufacture of basic precious and other metals (0.3%) and casting of iron and steel (0.5%).

**s) Manufacture of motor vehicles, trailers & equipment of semi-trailers (0.3%)**

The establishments covered here were in the activity of manufacture of motor vehicles.

**t) Manufacture of other transport equipment (0.3%)**

This comprised establishments engaged in manufacture of bicycles and invalid carriages.

**u) Manufacture of tobacco products (0.3%)**

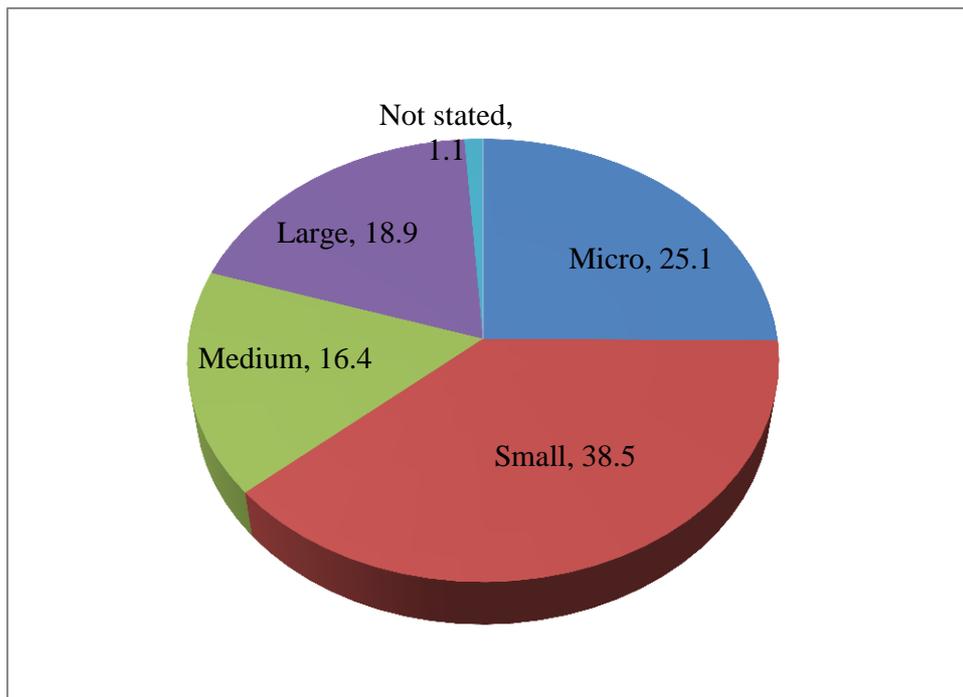
The survey covered establishments whose activities were manufacture of tobacco products.

### 3.2 Size of Establishments, Legal Status and Ownership

The size of the establishments was adopted from the establishment census that was done by the National Institute of Statistics which defined micro establishments as employing one labor unit, Small (1-4) labor units, medium (5-9) and large (10 plus).

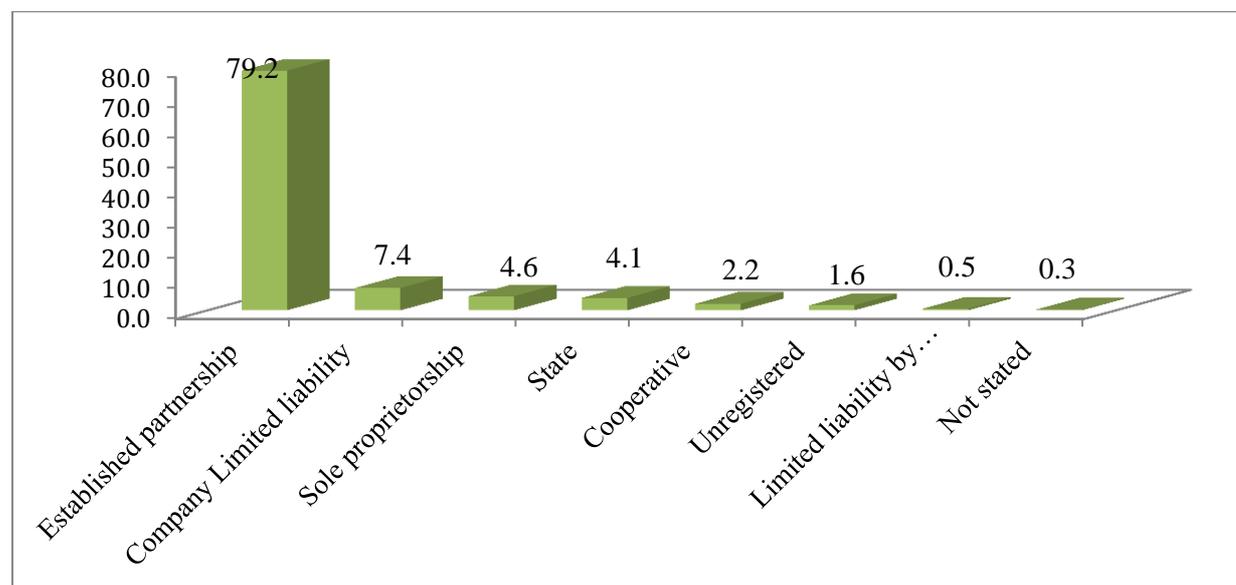
Figure 1 indicates that the majority of the establishments are Small entities constituting 38.5%, Micro enterprises (25.1%), Medium (16.4%) and Large Establishments (18.9%).

Figure 1: % Distribution of Establishment by Size



The survey results show that 79.2% of the establishments were in partnership; 7.4% were limited liability; 4.6% sole proprietorship, and 4.1% state owned (Figure 2).

Figure 2: % Distribution of Establishments by Legal Status



### 3.3 Ownership Structure

The results presented in Table 11, shows that 86.9% of the establishments were private fully Rwandans owned. Public participation in ownership of establishments was minimal with 0.5% and 0.3% of the establishments "Fully Government owned" and "Joint public and private Rwandese owned" respectively.

Table 11: Distribution of Establishment by Ownership Structure

Ownership structure	No of establishments	%
Private, fully Rwandese owned	318	86.9
Private, Rwandese majority owned	23	6.3
Private, Fully Majority Owned	9	2.5
Private, Fully Foreign Owned	6	1.6
Public, Fully Rwandese (Government)	2	0.5
Joint Public and Private (Rwandese)	1	0.3
Not stated	7	1.9
<b>Total</b>	<b>366</b>	<b>100</b>

### 3.4 Managers' Education and Qualification in the Sector

In any business undertaking the level of education and training of management is an important factor of consideration. In this survey respondents were asked to indicate the highest education level and professional qualifications of managers. Table 12 presents the distribution of manager's by highest level of education. Of the institutions which responded, about 69% of the establishments did not disclose the level of education of their managers, indicating that this was a personal matter. Of 366 establishments who participated in the survey, only 6.6% of the enterprises reported having managers who are university graduates and only 3.3% of the establishments reported having TVET graduates.

**Table 12: Distribution Managers by Highest Level of Education**

Highest Level of education	Number	%
Primary school graduate	22	6.0
Attended but didn't finish lower secondary	1	0.3
Lower secondary graduate	24	6.6
Attended but didn't finish upper secondary	1	0.3
Upper secondary graduate	26	7.1
Attended but didn't finish TVET	4	1.1
TVET graduate	12	3.3
University graduate	24	6.6
University Student	1	0.3
Didn't specify	251	68.6
<b>Total</b>	<b>366</b>	<b>100</b>

Table 13 shows the details of certificate level of education by type of the certificates reported by a sample of 23 establishments. The establishments with managers having management certificate constituted 21.7% and those managers with BBA certificate level constitutes 8.7%.

**Table 13: Distribution of Institutions by Managers**

Type of certificate	No	%
Management	5	21.7
BBA	2	8.7
B.Com	1	4.3
Construction engineering	1	4.3
Education	1	4.3
IT	2	8.7
MASSCOM	1	4.3
Mechanical engineering	1	4.3
Secretary	1	4.3

Environment engineering	2	8.7
Economics	1	4.3
Mechanics	1	4.3
Finance and Commerce	1	4.3
Industrial production	1	4.3
Other	2	8.7
<b>Total</b>	<b>23</b>	<b>100.0</b>

The low level of education and professional qualification of managers in the manufacturing establishments is explained by the fact that the majority (63.6%) of the establishments in Rwanda are small and micro (informal) owned by individuals – most of whom are primary and secondary school graduates.

### 3.5 Skills Profiles of Occupation in the Sector

#### 3.5.1 Overall Labor Units in the Sector

The manufacturing sector in Rwanda has a total of 27,769 employees comprising of 32.3% women and 67.7% men. Table 14 shows that 88.2% of the employees were in permanent employment compared to 8.6% and 3.2% who were direct casual employees and sub contracted workers respectively. The proportion of women in direct casual employment was relatively higher (12.1%) than that of men (7.0%).

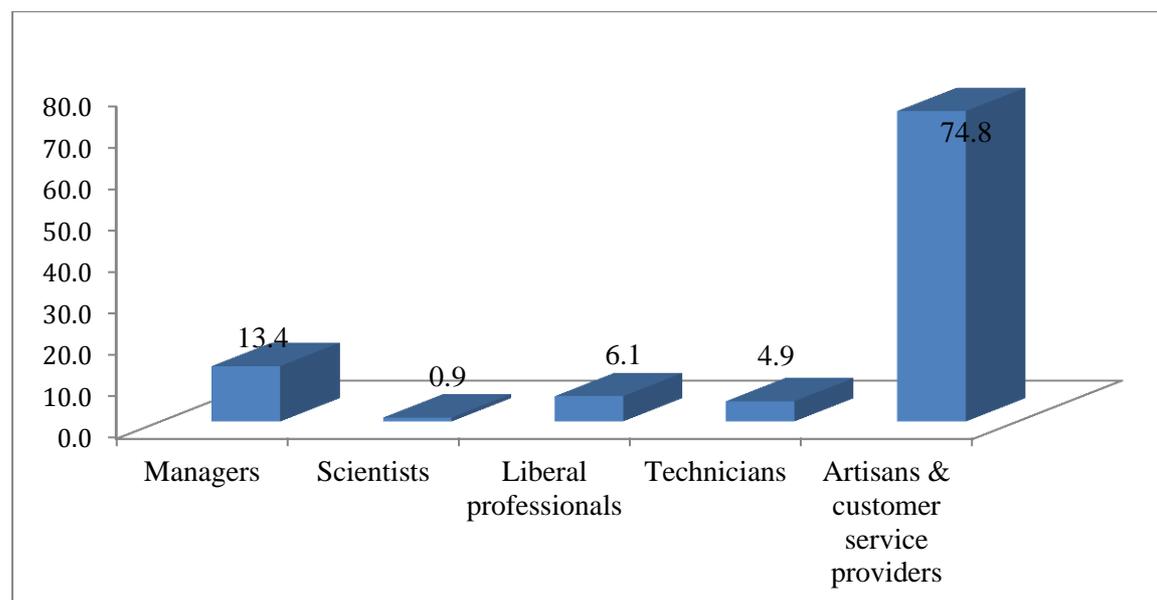
**Table 14: Distribution of Employees by Nature of Employment & Gender**

<b>Nature of employment</b>	<b>Total</b>	<b>%</b>	<b>Women</b>	<b>%</b>	<b>Men</b>	<b>%</b>
Permanent employees	24,480	88.2	7,587	84.6	16,893	89.8
Direct casual employees	2,400	8.6	1,083	12.1	1,317	7.0
Sub contracted workers	889	3.2	294	3.3	595	3.2
<b>Total</b>	<b>27,769</b>	<b>100.0</b>	<b>8,964</b>	<b>100.0</b>	<b>18,805</b>	<b>100.0</b>

#### 3.5.2 Distribution of employees by Occupation

Figure 3 presents a summary distribution of employees by broad occupational groups. Artisans and office service personnel comprise of three quarters of total employees (74.8%) compared to scientists (0.9%) and technicians (4.9%). The other cadres were managers (13.4%), and Liberal professionals (6.1%). Analysis of the skill ratio shows a skills ratio between professionals, technicians and artisans of 1:5:33 (254:1321:8439). This is an encouraging skill mix so long as the proficiency of the employees is ensured.

**Figure 3: % Distribution of Employees by Broad Occupations**



**a) Managers**

Table 15 indicates that the manufacturing sector had 3,629 managers of whom 645 (17.8%) were women and 293 (8.1%) expatriates. Managing directors and chief executives comprised 39.2% of all the managers followed by manufacturing managers (23.0%). Of the 645 women managers, 249 were managing directors and chief executives and 185 were sales and marketing managers. Among Finance Managers, out of 274 employees, 168 (61.3%) were expatriates and 57 (20.8%) women. Table 3.2 presents the details.

**Table 15: Distribution of Managers by Occupation, Gender & Nationality**

Occupation	Employees	Of which women	Of which expatriates
Managing directors and chief executives	1,423	249	54
Finance managers	274	57	168
Advertising and public relations managers	33	3	0
Human resource managers	168	52	0
Business services and administration managers	15	15	10
Sales and marketing managers	438	185	10
Research and development managers	120	5	5
Agricultural and forestry production managers	6	0	0
Aquaculture and fisheries production managers	16	0	0
Manufacturing managers	836	94	21
Supply, distribution and related managers	221	0	35
Information and communications technology service managers	79	0	0
<b>Total</b>	<b>3,629</b>	<b>645</b>	<b>293</b>

## b) Scientists Professionals

The occupational distribution of Scientists Professionals in the manufacturing sector is shown in Table 16. Product & garment designers comprised 96 out of 254 personnel, electrical engineers were 69, and electronic engineers 32 and chemical engineers were 24. Women constituted 15.7%. And expatriates were 9.8, the majority employed as 'product & garment designers' and 'electrical engineers'.

**Table 16: Distribution by Scientists Professionals by Occupation, Gender and Nationality**

Occupation	Employees	Of which women	Of which expatriates
Environmental protection professionals	10	0	0
Industrial & production engineers	5	0	0
Environmental engineers	3	0	0
Chemical engineers	24	0	0
Electrical engineers	69	0	5
Electronics engineers	32	0	0
Telecommunications engineers	15	0	0
Product & Garment designers	96	40	20
<b>Total</b>	<b>254</b>	<b>40</b>	<b>25</b>

## c) Liberal Professions

In the Manufacturing sector there are 1,647 labor units as shown in Table 17. The predominant occupation was accountant with 610 or 37.0% of the total employees in the liberal profession. This is also the only occupation where there were expatriates (15). Although women were distributed in almost the entire occupations the majority were accountants as 393 out of 571 accountants. Other major occupations where women were employed include, manufacturing supervisors (48), commercial sales representatives (44), policy and planning managers (25) management & organization analysts (20) and financial and investment advisors (15) amongst others.

**Table 17: Number and Occupational Category of Liberal Professions**

Occupation	Employees	Of which women	Of which expatriates
Accountants	610	393	15
Financial & Investment advisors	15	15	0
Financial analysts	3	0	0
Management & organization analysts	56	20	0
Policy & planning managers	156	25	0
Personnel & careers professionals	14	5	0

Training & staff development professional	5	5	0
Advertising & marketing professionals	10	5	0
Public relations professionals	5	0	0
Manufacturing supervisors	327	48	0
Commercial sales representatives	378	44	0
Legal secretaries	8	8	0
Information & communication technology operations technicians	60	3	0
<b>Total</b>	<b>1647</b>	<b>571</b>	<b>15</b>

#### d) Technicians

The number of technicians in the manufacturing sector is 1,312 and distributed as shown in Table 18. Most of the technicians are 'Electronics Engineers' (40.5%), 'Electrical Engineering technicians (35.6%), and 'Power Production Plant Operators' (18.5%). The other technicians were chemical physical science technicians and chemical engineering technicians with a proportion of 2.5% and 3.0% respectively. Women were mainly employed as electrical engineering technicians, and all the expatriates (1.5%) were chemical engineering technicians.

**Table 18: Number of Technicians by Occupational Category by Gender & Citizenship**

<b>Occupation</b>	<b>Employees</b>	<b>Of which women</b>	<b>Of which expatriates</b>
Chemical physical science technicians	33	0	0
Electrical engineering technicians	470	117	0
Electronics engineering technicians	535	0	0
Chemical engineering technicians	39	0	20
Power production plant operators	244	0	0
<b>Total</b>	<b>1321</b>	<b>117</b>	<b>20</b>

#### e) Artisans and Office Service Personnel

In the manufacturing sector, artisans and customer service providers were the majority of personnel representing 75.5% of total employees. As shown in Table 19, there were 20,327 'Artisans' of whom 5780 (28.4%) were women and 963 (4.7%) non-citizens. Artisans were distributed across many occupations with notable numbers in handcraft workers in wood, basketry & related materials (5.7 %), wood treaters (3.7%), printers (2.8%) and woodworking-machine tool setters and operators (2.5%). However customer service providers comprised a majority with production clerks (22.3%) and manufacturing laborers (20.4%). The majority women were found in such positions as production clerks, manufacturing laborers, and hand packers. Non-citizens were employed as bakers, pastry-cooks and confectionery makers accounted for (13.4%) of non-citizen employees.

**Table 19: Number & Occupational Category of Artisans & Office Service Personnel**

<b>Occupation</b>	<b>Employees</b>	<b>Women</b>	<b>Expatriates</b>
Metal molders and core makers	106	0	2
Welders and flame cutters	382	5	0
Sheet-metal workers	16	0	0
Toolmakers and related workers	47	17	17
Metal working machine tool setters and operators	67	0	30
Metal polishers, wheel grinders and tool sharpeners	67	0	39
Musical instrument makers and tuners	57	0	0
Potters and related workers	24	0	0
Glass makers, cutters, grinders and finishers	10	0	0
Sign writers, decorative painters, engravers and etchers	20	0	0
Handicraft workers in wood, basketry and related materials	1154	911	15
Handicraft workers in textile, leather and related materials	340	331	9
Printers	572	134	20
Print finishing and binding workers	377	134	15
Bakers, pastry-cooks and confectionery makers	401	188	129
Dairy-products makers	202	119	15
Fruit, vegetable and related preservers	60	30	0
Tobacco preparers and tobacco products makers	149	60	0
Wood treaters	757	90	0
Woodworking-machine tool setters and operators	472	146	17
Tailors, dressmakers, furriers and hatters	356	228	30
Garment and related pattern-makers and cutters	60	60	60
Sewing, embroidery and related workers	194	90	60
Upholsterers and related workers	20	0	0
Pelt dressers, tanners and fellmongers	43	22	0
Shoemakers and related workers	246	28	25
Product graders and testers (excluding foods and beverages)	224	104	0
Blacksmiths, hammer smiths and forging press workers	463	0	0
Metal processing plant operators	154	0	30
Chemical products plant and machine operators	35	45	0

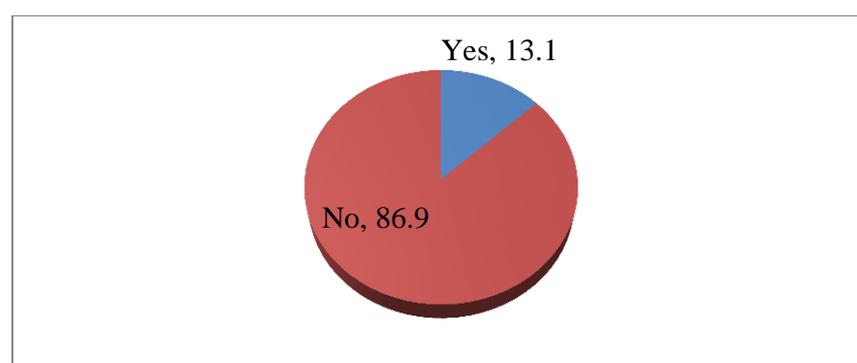
<b>Occupation</b>	<b>Employees</b>	<b>Women</b>	<b>Expatriates</b>
Plastic products machine operators	302	5	0
Fiber preparing, spinning and winding machine operators	50	0	0
Weaving and knitting machine operators	92	83	0
Food and related products machine operators	344	30	15
Pulp and papermaking plant operators	16	0	0
Wood processing plant operators	386	0	30
Rubber products machine operators	66	0	0
Packing, bottling and labeling machine operators	108	34	0
Production clerks	4541	1254	51
Secretaries (general)	206	166	0
Stock clerks	457	73	84
Transport clerks	458	5	0
Personnel clerks	10	0	0
Fire-fighters	69	0	50
Security guards	362	35	40
Heavy truck and lorry drivers	110	0	0
Hand packers	913	441	60
Manufacturing laborers n.e.c.	4153	633	0
Garbage and recycling collectors	15	0	15
Refuse sorters	8	8	0
Sweepers and related laborers	410	251	90
Messengers, package deliverers and luggage porters	176	20	15
<b>Total</b>	<b>20327</b>	<b>5780</b>	<b>963</b>

### **3.6 Existing Vacancies**

#### **3.6.1 Overall Existing Vacancies**

Establishments were asked if they had vacancies in their institutions in the last 12 months before the survey. Figure 4 shows that 13.1% (nearly one in every ten establishments) were found to have had vacancies, which they had not filled. There were a total of 1,000 vacancies at the time of the data collection period.

**Figure 4: % Share of Establishment with Vacancies**



The highest number of vacancies was for 'Banana Plant Caretakers' (28.2%). This was followed by 'Shoe Maker Technicians' (14.1%) and 'Machine Operators' (9.9%). The details are presented in Table 20.

**Table 20: Distribution of Existing Vacancies by Occupation**

Occupation	No	%
Banana Plant caretakers	282	28.2
Shoemaker technicians	141	14.1
Machine operators	99	9.9
Shoemakers	71	7.1
Plaiters of hairs	60	6.0
Wood theaters	56	5.6
Sales & marketing manager	35	3.5
Knitting	26	2.6
Product garment designer	26	2.6
Accountants	25	2.5
Sales & marketing	25	2.5
Hair dressers	24	2.4
Technicians	20	2.0
Research & development	15	1.5
Managing directors	14	1.4
Marketing	14	1.4
Chief technicians	10	1.0
Machines supervisors	10	1.0
Printer technicians	10	1.0
Production clerks	10	1.0
Store keepers	8	0.8
Procurements	6	0.6
Furniture supervisors	5	0.5
Paint chemists	5	0.5

Driver	3	0.3
<b>Total</b>	<b>1000</b>	<b>100</b>

### 3.6.2 Hard-to-Fill Positions

Table 21 indicates that a total of 523 (52.3%) vacancies were considered to be in hard-to-fill category. This included 'Shoemaker Technicians' (27%) with duration of 5 months, and 'Banana processing Technician (27%) with duration of one month. The vacancies that had taken the longest duration to fill were 'Machine Supervisors (1.9%) with duration of 14 months, followed by 'Chief Technicians' and 'Paint Chemists', which had taken 12 months.

**Table 21: Number of Hard to Fill Vacancies by Occupation & Duration**

<b>Occupation</b>	<b>Number of vacancies</b>	<b>Duration weeks</b>	<b>Duration months</b>
Printer technicians	10	0	3
Knitting	26	0	3
Shoemaker technician	141	0	5
Banana processing	141	0	1
Paint chemists	5	0	12
Chief technicians	10	0	12
Machine supervisors	10	0	14
Accountant	5	0	3
Shoemakers	71	0	4
Marketing	5	0	8
Machine operators	99	2	0
Total	523		

### Reasons for Hard to Fill

From the survey, the key reasons given by respondents for had to fill vacancies include:

- 'Applicants were lacking core job specific skills' (7 out of 15),
- lack of experience (3 out of 15) and
- inability to meet educational and training qualification by applicants (3 out of 15).

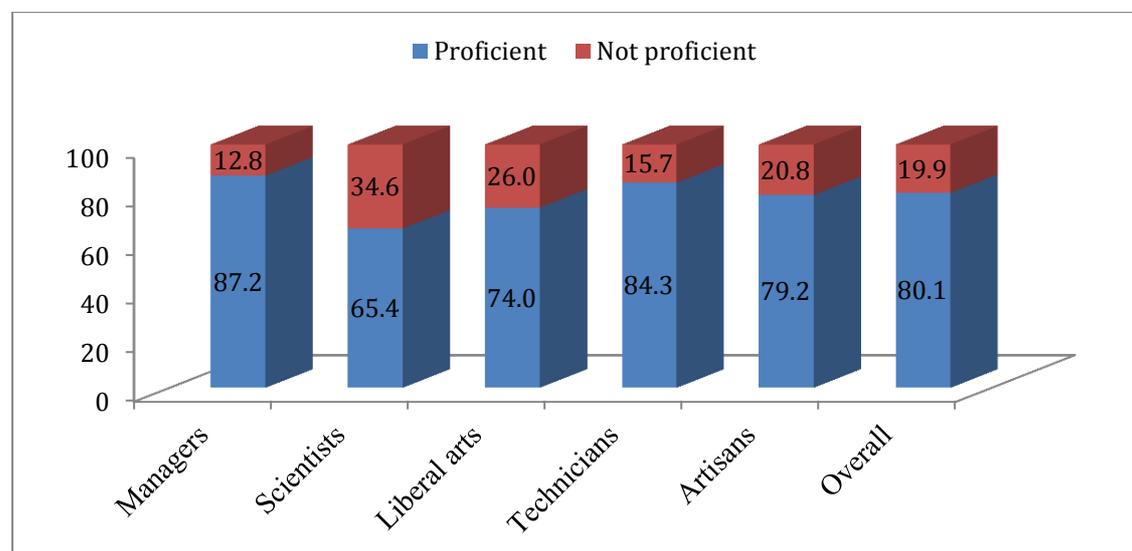
The other reasons were competition from employers and lack of such skills as IT skills and language.

### 3.7 Employees' Level of Proficiency by occupation

The CEO / Owners of establishments were asked to assess and indicate the proficiency of their employees. Figure 5 shows that the overall proficiency level in the manufacturing sector is 80.1%. In term of specific occupation, managers have a proficiency level of 87.2%, scientists 65.4%, liberal

professionals 74.0%, technicians 84.3% and artisans have a proficiency level of 79.2%.

**Figure 5: Skills' Proficiency by Occupation (%)**



### a) Managers' Proficiency

Table 22 presents the level of proficiency among managers by specific occupations. The overall proficiency of managers was 87.2%. The proficiency levels among managers are higher in all the occupations except among 'Managing Directors' and 'Chief Executives' with 77.6%, and 'Advertising and Public Relations Managers' with 84.8% proficiency level.

**Table 22: Proficiency among Managers**

Occupation	Number	No. Proficient	%
Managing directors and chief executives	1423	1104	77.6
Finance managers	274	256	93.4
Advertising and public relations managers	33	28	84.8
Human resource managers	168	165	98.2
Business services and administration managers nec	15	15	100.0
Sales and marketing managers	438	413	94.3
Research and development managers	120	110	91.7
Agricultural and forestry production managers	6	6	100.0
Aquaculture and fisheries production managers	16	16	100.0
Manufacturing managers	836	757	90.6

Supply, distribution and related managers	221	221	100.0
Information and communications technology service managers	79	74	93.7
<b>Total</b>	<b>3629</b>	<b>3165</b>	<b>87.2</b>

### b) Scientists Professionals' Proficiency

Table 23 indicates the proficiency level among scientists' professionals to be 65.4%. According to employers, the level of proficiency is higher among Electronics Engineers (100%), Electrical Engineers (85.2%) and Environmental Protection Professionals (80.0%); but lower among Product & Garment Designers (54.2%) and Chemical Engineers (62.5%). The employers in the manufacturing establishments that participated in the survey did not report on the proficiency of Environmental Engineers, Telecommunication Engineers, and Industrial & Production Engineers.

**Table 23: Level of Proficiency among Scientists Professionals**

<b>Occupation</b>	<b>Number</b>	<b>No. Proficient</b>	<b>%</b>
Environmental protection prof	10	8	80.0
Industrial & production engineers	5	0	0.0
Environmental engineers	3	0	0.0
Chemical engineers	24	15	62.5
Electrical engineers	69	59	85.5
Electronics engineers	32	32	100.0
Telecommunications engineers	15	0	0.0
Product & garment designers	96	52	54.2
<b>Total</b>	<b>254</b>	<b>166</b>	<b>65.4</b>

### c) Liberal Professionals

Table 24 shows that 74% of liberal professionals were considered proficient by the employers. Notably, management organization analysts, personnel & careers professionals and commercial sales representatives had a relatively less number of proficient personnel.

**Table 24: Level of Proficiency among Liberal Professionals**

<b>Occupation</b>	<b>Number</b>	<b>No. Proficient</b>	<b>%</b>
Accountants	610	521	85.4
Financial & Investment advisors	15	0	0
Financial analysts	3	3	100.0
Management & organization analysts	56	8	14.3

Policy & planning managers	156	154	98.7
Personnel & careers professionals	14	9	64.3
Training & staff development professional	5	5	100.0
Advertising & marketing professionals	10	10	100.0
Public relations professionals	5	5	100.0
Manufacturing supervisors	327	274	83.8
Commercial sales representatives	378	174	46.0
Legal secretaries	8	8	100.0
Information & communication technology operations technicians	60	47	78.3
<b>Total</b>	<b>1647</b>	<b>1218</b>	<b>74.0</b>

#### d) Manufacturing Technicians

Table 25 shows the proficiency levels among manufacturing technicians to be high at 84.3%. Two cadres, "Chemical Physical Science" technicians and "Chemical Engineering" technicians were all considered fully proficient compared to "Electrical Engineering" technicians (93.4%), "Power Production Plant Operators" (79.9%) and "Electronics Engineering" technicians (76.3%).

**Table 25: Proficiency Levels among Manufacturing Technicians**

<b>Occupation</b>	<b>Number</b>	<b>No. Proficient</b>	<b>%</b>
Chemical physical science technicians	33	33	100.0
Electrical engineering technicians	470	439	93.4
Electronics engineering technicians	535	408	76.3
Chemical engineering technicians	39	39	100.0
Power production plant operators	244	195	79.9
<b>Total</b>	<b>1321</b>	<b>1114</b>	<b>84.3</b>

#### e) Artisans, Office Support & Customer Service Workers

Table 26 shows that the overall level of proficiency among 'Artisans' in various occupations in the sector was 79.2%. The level of proficiency within occupations varies from occupation to occupation; but very low among 'Blacksmiths', 'Hammer-smiths and Forging press' workers 13.8%; 'Sign writers, decorative painters, engravers and etchers' (15%); 'Bakers, pastry-cooks and confectionery makers' (22.2%); 'Fruit, vegetable and related preservers' (23.3%); and 'Garment and related pattern-makers and cutters' (23.3%).

**Table 26: Level of Proficiency among Artisans**

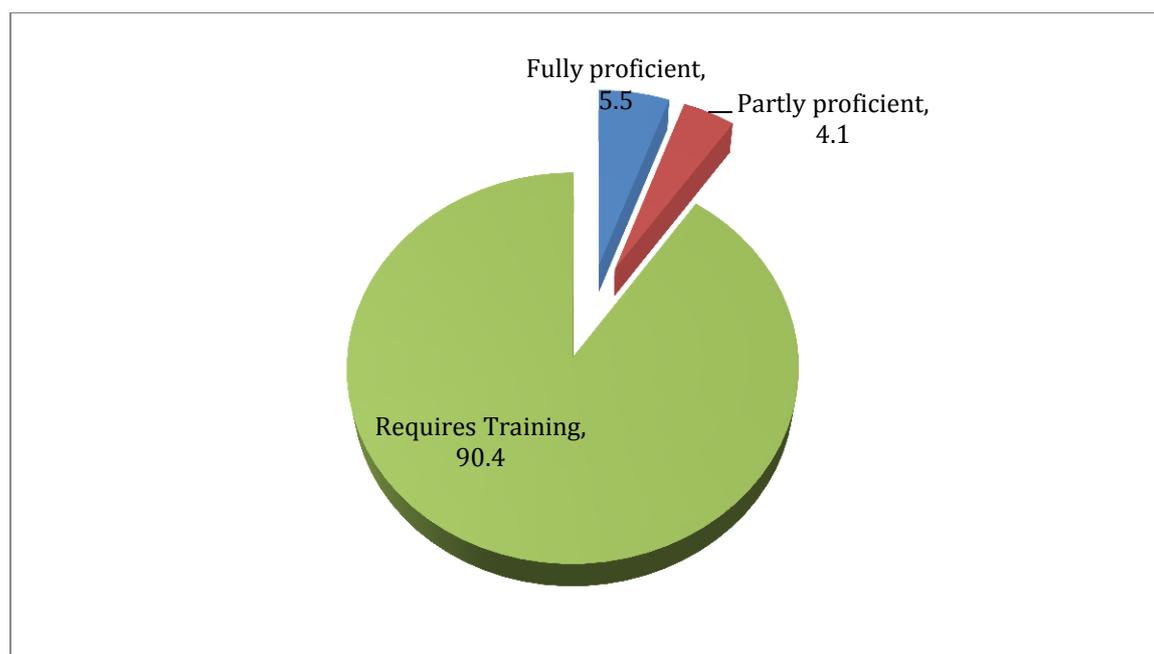
<b>Occupation</b>	<b>Number</b>	<b>No. Proficient</b>	<b>%</b>
Metal molders and core makers	106	52	49.1
Welders and flame cutters	382	319	83.5
Sheet-metal workers	16	16	100.0
Toolmakers and related workers	47	14	29.8
Metal working machine tool setters and operators	67	67	100.0
Metal polishers, wheel grinders and tool sharpeners	67	57	85.1
Musical instrument makers and tuners	57	0	0.0
Potters and related workers	24	18	75.0
Glass makers, cutters, grinders and finishers	10	7	70.0
Sign writers, decorative painters, engravers and etchers	20	3	15.0
Handicraft workers in wood, basketry and related materials	1154	1068	92.5
Handicraft workers in textile, leather and related materials	340	340	100.0
Printers	572	462	80.8
Print finishing and binding workers	377	188	49.9
Bakers, pastry-cooks and confectionery makers	401	89	22.2
Dairy-products makers	202	123	60.9
Fruit, vegetable and related preservers	60	14	23.3
Tobacco preparers and tobacco products makers	149	34	22.8
Wood treaters	757	664	87.7
Woodworking-machine tool setters and operators	472	123	26.1
Tailors, dressmakers, furriers and hatters	356	106	29.8
Garment and related pattern-makers and cutters	60	14	23.3
Sewing, embroidery and related workers	194	48	24.7
Upholsterers and related workers	20	0	0.0
Pelt dressers, tanners and fellmongers	43	17	39.5
Shoemakers and related workers	246	127	51.6
Product graders and testers (excluding foods and beverages)	224	224	100.0
Blacksmiths, hammer smiths and forging press workers	463	64	13.8
Metal processing plant operators	154	154	100.0
Chemical products plant and machine operators	35	35	100.0
Plastic products machine operators	302	263	87.1
Fiber preparing, spinning and winding machine operators	50	23	46.0
Weaving and knitting machine operators	92	92	100.0
Food and related products machine operators	344	344	100.0

<b>Occupation</b>	<b>Number</b>	<b>No. Proficient</b>	<b>%</b>
Pulp and papermaking plant operators	16	16	100.0
Wood processing plant operators	386	298	77.2
Rubber products machine operators	66	45	68.2
Packing, bottling and labeling machine operators	108	99	91.7
Production clerks	4541	3463	76.3
Secretaries (general)	206	165	80.1
Stock clerks	457	434	95.0
Transport clerks	458	427	93.2
Personnel clerks	10	0	0.0
Fire-fighters	69	20	29.0
Security guards	362	351	97.0
Heavy truck and lorry drivers	110	110	100.0
Hand packers	913	898	98.4
Manufacturing laborers n.e.c.	4153	4086	98.4
Garbage and recycling collectors	15	15	100.0
Refuse sorters	8	0	0.0
Sweepers and related laborers	410	369	90.0
Messengers, package deliverers and luggage porters	176	142	80.7
<b>Total</b>	<b>20327</b>	<b>16107</b>	<b>79.2</b>

### **3.8 Employees' Competency in Qualitative Soft Skills**

The establishments were asked to state the percentage of their employees with adequate competence in qualitative (soft) skills namely: leadership skills, written communication skills, oral communication skills, customer handling skills, team work, problem solving skills and innovativeness. Figure 6 and Table 26 shows that the overall 90.4% of existing employees in the manufacturing sector needs training in soft skills to make them effective and efficient in their occupation.

**Figure 6: Employees' Competency in Qualitative Soft Skills**



The Table 27 shows that the level of workers' competency and needs for training in specific soft skills in the industry.

**Table 27: % Distribution of Employees Overall Assessment of Soft Skills**

Soft skills indicators	Full proficient	Partly proficient	Requires training	100.0
General IT	1.2	0.6	98.2	100.0
Written communication	0.6	0.5	98.9	100.0
Oral communication	1.5	0.8	97.7	100.0
Customer handling	1.1	0.3	98.6	100.0
Team work	0.4	0.3	99.3	100.0
Problem solving	0.6	1.4	98.0	100.0
Leadership	0.2	0.1	99.8	100.0
<b>Overall</b>	<b>5.5</b>	<b>4.1</b>	<b>90.4</b>	<b>100.0</b>

The number of employees who require further training in general IT soft skills is 26,686(98.2%) relative to 321 (1.2%) and 171(0.6%) who were fully proficient and partly proficient respectively (Figure 7).

Figure 7: Competency and Need for Training in 'general IT Skills

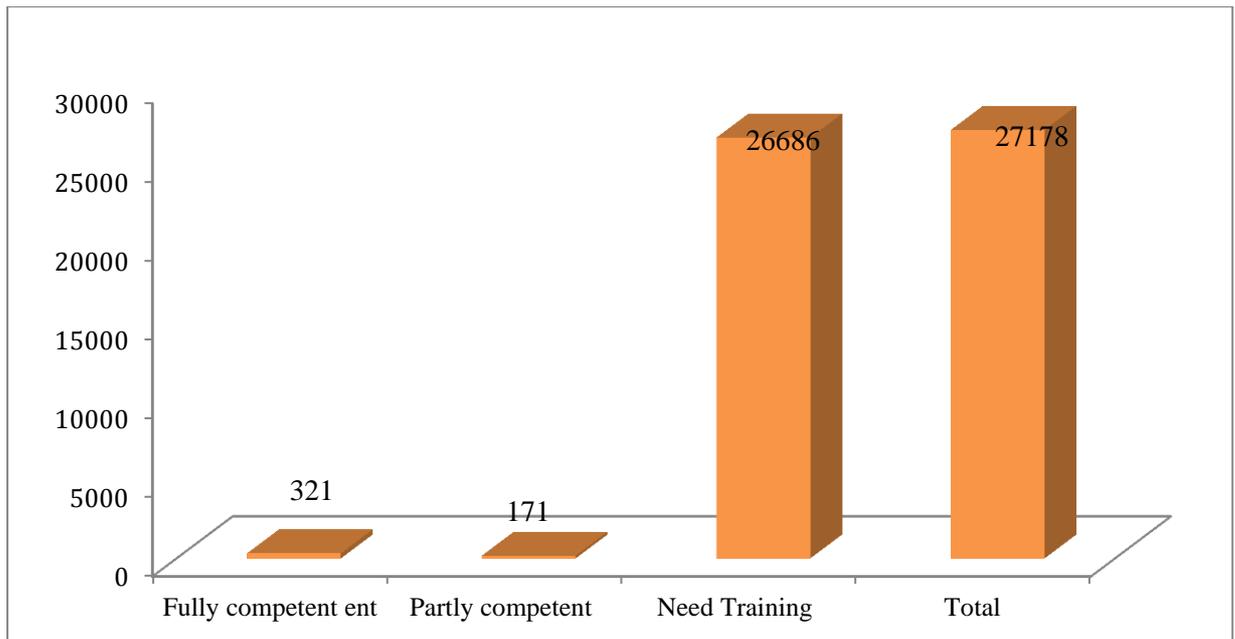
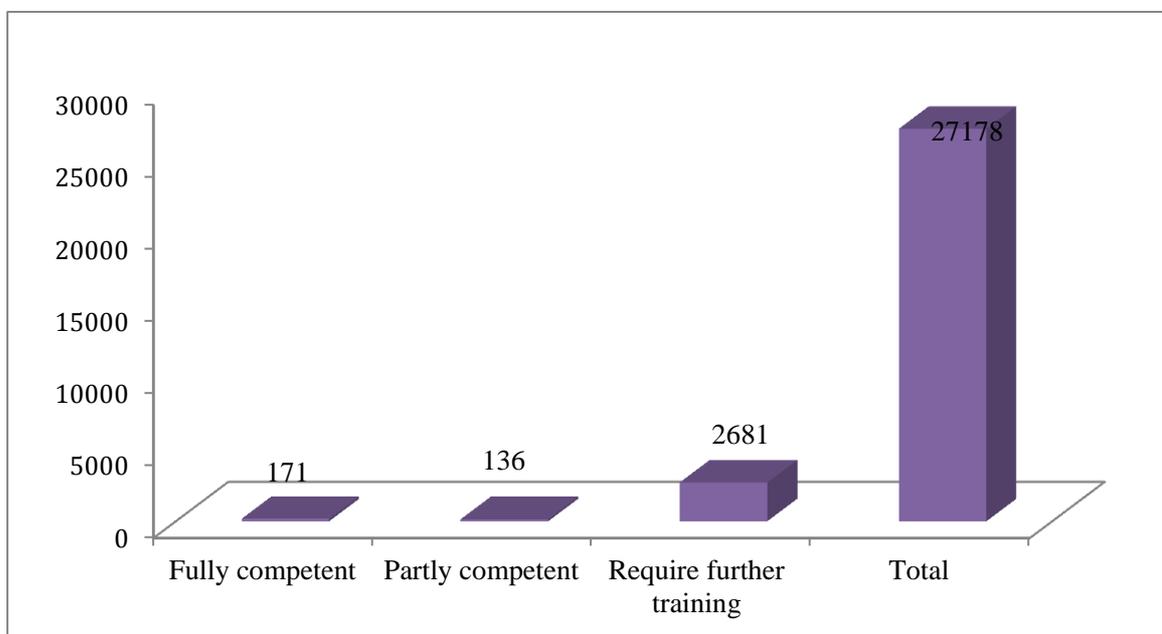


Figure 8 presents the competence and need for further training in written communication skills. A total of 27,178 employees in the sector need further training in this skill.

Figure 8: Competency & Need for Training by Employees in Written Communication



The number of employees competent in oral communication skills were 414 and 221 were partly competent and a majority 26,543 having the need for further training (Figure 9).

Figure 9: Competency & Need for Training by Employees in Oral Communication Skills

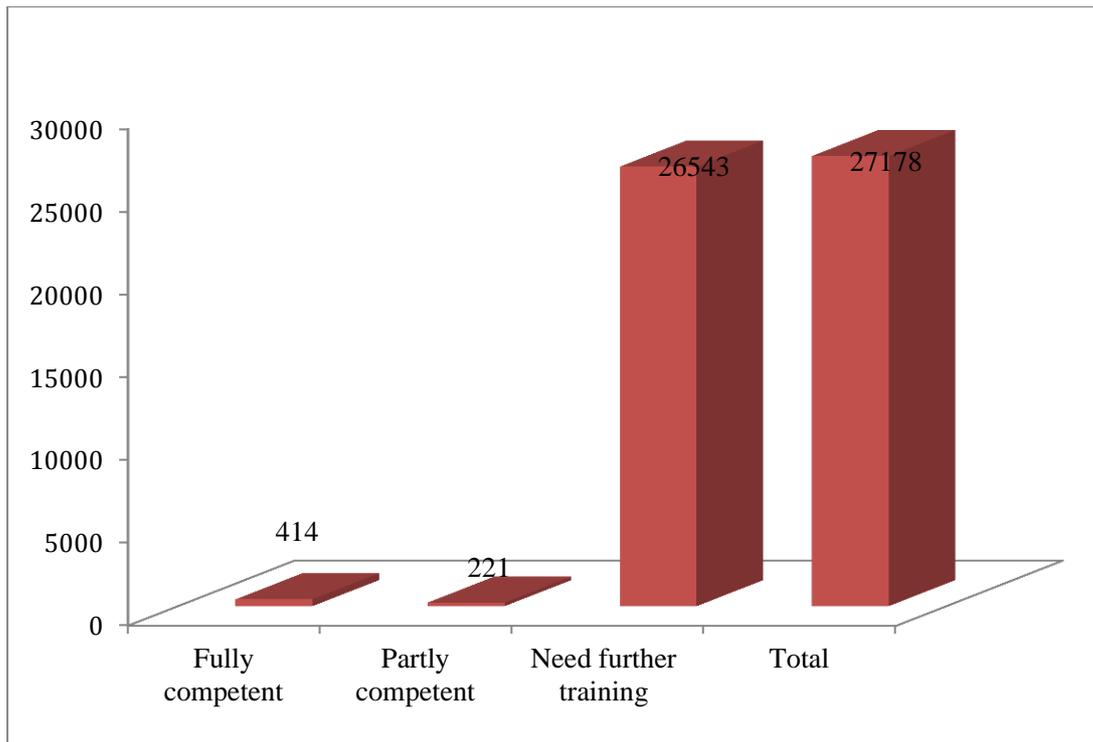
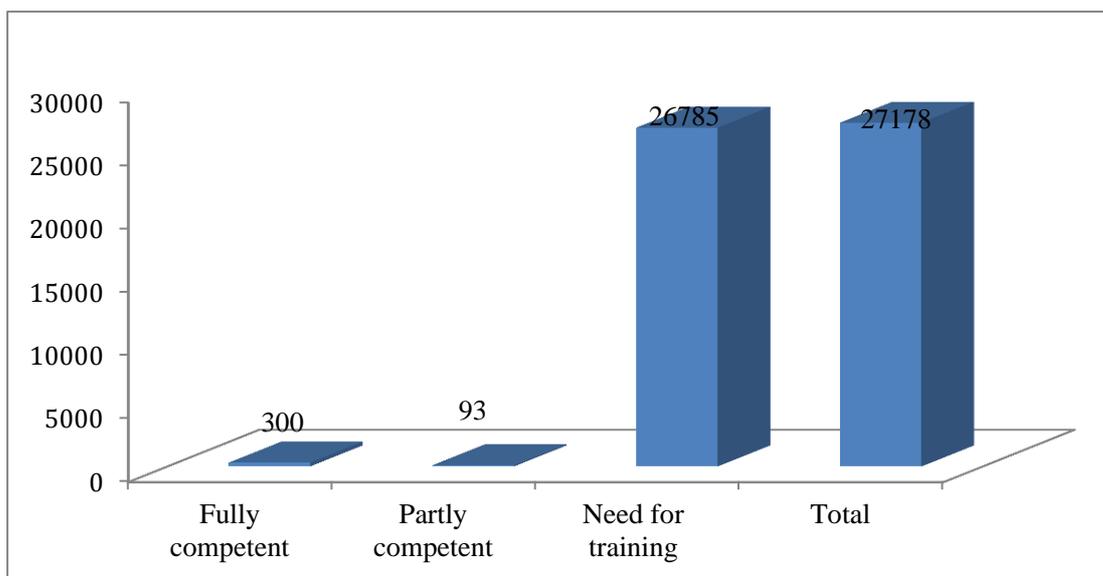


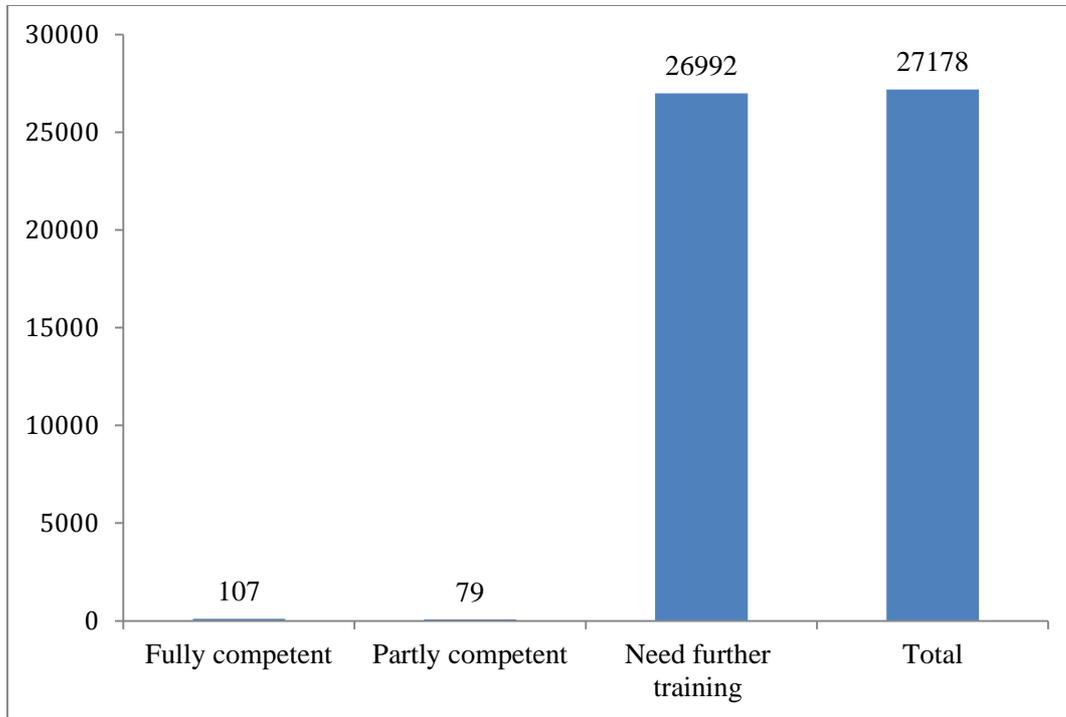
Figure 10 indicates that about 26,785 employees require training in customer.

Figure 10: Competency & Need for Training by Employees in Customer Handling



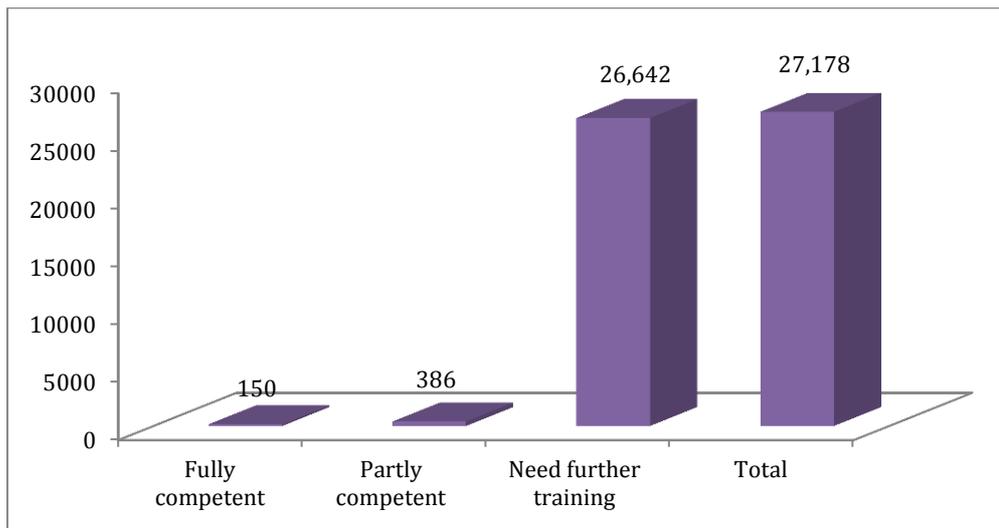
The number of employees in the sector requiring training in teamwork is 26,992 (Figure 11).

**Figure 11: Competency & Need for Further Training by Employees in Team work Skills**



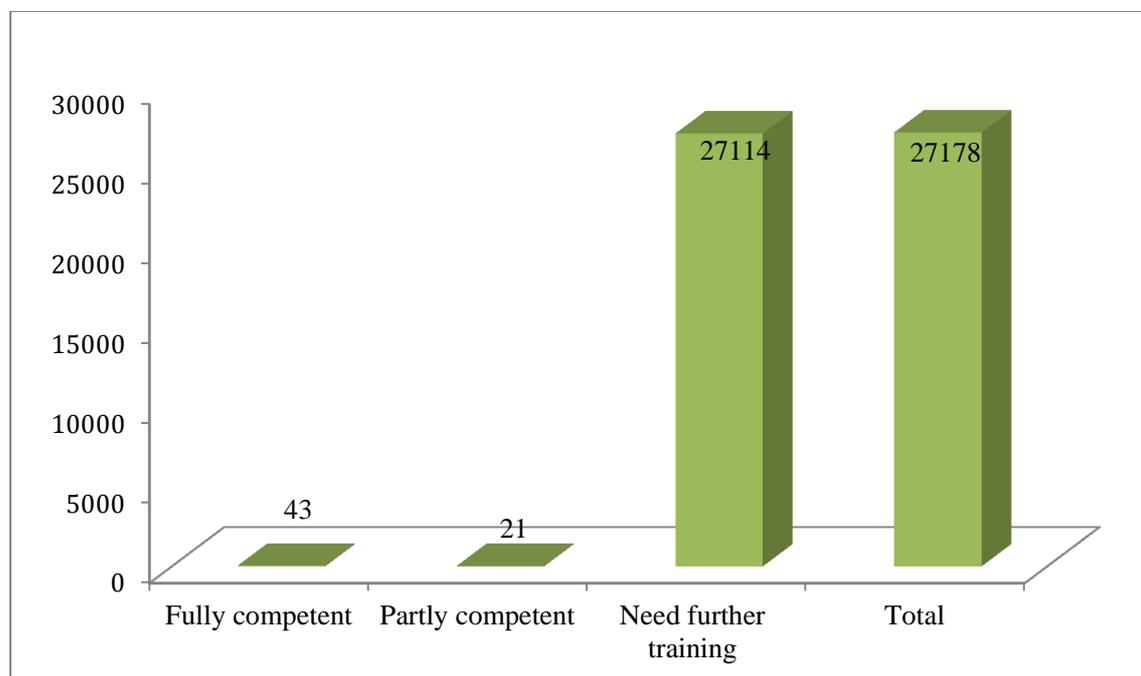
About 26,642 existing employees require training in problem solving skills in the manufacturing establishments (Figure 12).

**Figure 12: Competence & Need for Training in Problem Solving Soft Skills**



Nearly all employees 27,114 (99.8) needed further training in Leadership Skills (Figure 13).

**Figure 13: Competence & Need for Further Training in Leadership Skills by Employees**



### 3.9 Overall Technical skills Gap in Manufacturing Sector

A skills gap is a significant gap between the organization's skill needs and the current capabilities of its workforce. In the manufacturing sector, apart from the limited competency in soft qualitative skills; the overall technical skills gap is 7568. This gap is and was highest among artisans cadre 5980 (79.0 %), followed by Managers 842 (11.1%), Associates Liberal professionals 334 (4.4%), Technicians 267 (3.5%, and Scientists Professionals 144 (1.9%).

Below we present the technical skills gap in each of the existing occupations in the sector.

#### 3.9.1 Skills Gaps among Managers

As presented in Table 28 the overall skills gap among managers was 842 consisting of 465 from proficiency gap, 293 expatriates and 84 vacancies. The gap was highest in "Managing Directors and Chief Executives", "Finance Managers" and "Manufacturing Managers".

**Table 28: Overall Skills Gaps among Managers**

<b>Occupation</b>	<b>Vacancy</b>	<b>Proficiency gap</b>	<b>Expatriate</b>	<b>Total Gap</b>
Managing directors and chief executives	14	319	54	387
Finance managers	0	18	168	186
Advertising and public relations managers	0	5	0	5
Human resource managers	0	3	0	3
Business services and administration managers n.e.c.	0	0	10	10
Sales and marketing managers	35	25	5	65
Research and development managers	15	10	0	25
Agricultural and forestry production managers	0	0	0	0
Aquaculture and fisheries production managers	0	0	21	21
Manufacturing managers	0	79	35	114
Supply, distribution and related managers (procurement)	20	6	0	26
Information and communications technology service managers	0	0	0	0
<b>Total</b>	<b>84</b>	<b>465</b>	<b>293</b>	<b>842</b>

### 3.9.2 Scientists Professionals skills gap

Table 29 shows that the overall skills gap among scientists professionals in the manufacturing sector was 144 of which 62.5%, which was mainly for "Product and Garment Designers".

**Table 29: Overall Skills Gaps among Scientists**

<b>Occupation</b>	<b>Vacancy</b>	<b>Proficiency gap</b>	<b>Expatriate</b>	<b>Total Gap</b>
Environmental protection professionals	0	2	0	2
Industrial & production engineers	0	5	0	5
Environmental engineers	0	3	0	3
Chemical engineers	5	9	0	14
Electrical engineers	0	10	5	15
Electronics engineers	0	0	0	0
Telecommunications engineers	0	15	0	15
Product & garment designers	26	44	20	90
<b>Total</b>	<b>31</b>	<b>88</b>	<b>25</b>	<b>144</b>

### 3.9.3 Liberal professionals skill gap

Table 30 indicates the technical skills gaps among liberal professionals. Skills gaps are more pronounced among commercial sales representatives, manufacturing supervisors, accountants, and management/organizational analysts.

**Table 30: Overall Skills Gap among Liberal Arts Professionals**

Occupations	Vacancy	Proficiency gap	Expatriate	Total Gap
Accountants	25	89	15	129
Financial & Investment advisors	0	15	0	15
Financial analysts	0	0	0	0
Management & organization analysts	0	48	0	48
Policy & planning managers	0	2	0	2
Personnel & careers professionals	0	5	0	5
Training & staff development professional	0	0	0	0
Advertising & marketing professionals	25	0	0	25
Public relations professionals	0	0	0	0
Manufacturing supervisors	15	53	0	68
Commercial sales representatives	0	204	0	204
Legal secretaries	0	0	0	0
Information & communication technology operations technicians	0	13	0	13
<b>Total</b>	<b>65</b>	<b>429</b>	<b>15</b>	<b>509</b>

### 3.9.4 Technicians skill gaps

The overall skills gaps among technicians was 267 of which nearly half (47.6%) 127 was among "Electronics engineering" technicians. As shown in Table 31, all cadres of technicians had skills gaps.

**Table 31: Overall skills Gaps in Technicians Cadres**

Occupations	Vacancy	Proficiency gap	Expatriate	Total Gap
Chemical physical science technicians	40	0	0	40
Electrical engineering technicians	0	31	0	31
Electronics engineering technicians	0	127	0	127
Chemical engineering technicians	0	0	20	20
Power production plant operators	0	49	0	49
<b>Total</b>	<b>40</b>	<b>207</b>	<b>20</b>	<b>267</b>

### 3.9.5 Artisans, Office Support & Customer Service skill gap

Table 32 indicates the overall skills gap in the cadre of 'Artisans', which contributes to about 79% of the total skills gap in the whole manufacturing sector. The three leading contributors to the total gap in this occupational group was 'Production clerks' = 1139, 'Bakers, pastry-cooks and confectionery maker' = 411 and 'Blacksmiths, Hammersmith and forging press workers' = 416.

**Table 32: Overall Skills Gap among Artisans, Office & Customer Service Workers**

<b>Occupation</b>	<b>Vacancy</b>	<b>Proficiency</b>	<b>Expatriates</b>	<b>Total Gap</b>
Metal molders and core makers	0	54	2	56
Welders and flame cutters	0	63	0	63
Sheet-metal workers	0	0	0	0
Toolmakers and related workers	0	33	17	50
Metal working machine tool setters and operators	0	0	30	30
Metal polishers, wheel grinders and tool sharpeners	0	10	39	49
Musical instrument makers and tuners	0	57	0	57
Potters and related workers	0	6	0	6
Glass makers, cutters, grinders and finishers	0	3	0	3
Sign writers, decorative painters, engravers and etchers	0	17	0	17
Handicraft workers in wood, basketry and related materials	0	86	15	101
Handicraft workers in textile, leather and related materials	0	0	9	9
Printers	0	110	20	130
Print finishing and binding workers	0	189	15	204
Bakers, pastry-cooks and confectionery makers	0	312	129	441
Dairy-products makers	0	79	15	94
Fruit, vegetable and related preservers	0	46	0	46
Tobacco preparers and tobacco products makers	0	115	0	115
Wood treaters	56	93	0	149
Woodworking-machine tool setters and operators	0	349	17	366
Tailors, dressmakers, furriers and hatters	26	250	30	306
Garment and related pattern-makers and cutters	0	46	60	106
Sewing, embroidery and related workers	0	146	60	206
Upholsterers and related workers	0	20	0	20
Pelt dressers, tanners and fellmongers	0	26	0	26
Shoemakers and related workers	212	119	25	356
Product graders and testers (excluding foods and beverages)	0	0	0	0
Blacksmiths, hammer smiths and forging press	0	399	17	416

workers				
Metal processing plant operators	0	0	30	30
Chemical products plant and machine operators	0	0	0	0
Plastic products machine operators	0	39	0	39
Fiber preparing, spinning and winding machine operators	0	27	0	27
Weaving and knitting machine operators	0	0	0	0
Food and related products machine operators	0	0	15	15
Pulp and papermaking plant operators	0	0	0	0
Wood processing plant operators	0	88	30	118
Rubber products machine operators	0	21	0	21
Packing, bottling and labeling machine operators	0	9	0	9
Machine operators n.e.c.	99	0	0	99
Production clerks	10	1078	51	1139
Secretaries (general)	0	41	0	41
Stock clerks	8	23	84	115
Transport clerks	0	31	0	31
Personnel clerks	0	10	0	10
Fire-fighters	0	49	50	99
Security guards	0	11	40	51
Hairsplitters/dressers	84	0	0	84
Heavy truck and lorry drivers	3	0	0	3
Hand packers	0	15	60	75
Manufacturing laborers n.e.c.	282	67	0	349
Garbage and recycling collectors	0	0	15	15
Refuse sorters	0	8	0	8
Sweepers and related laborers	0	41	90	131
Messengers, package deliverers and luggage porters	0	34	15	49
<b>Total</b>	<b>780</b>	<b>4,220</b>	<b>980</b>	<b>5,980</b>

### 3.10 Training and Staff Development

The establishments visited were asked if they had funded or arranged training for their employees in the last 12 months to the date of data collection period. The results show that about 84.2% of the establishments had not arranged or funded any training for their employees compared to 14.8% who had trained their staff (Table 33). An analysis was done on budget allocation for training. The results indicate that about 80% did not have budget for training while 12.8% of the establishments did not state. Those which had training budget below 10% of their total budget constituted 3.6%; Institutions who's training budget was 10% and above represented 3.4% of the establishments.

**Table 33: Establishment Staff Training Cost to Total Budget Cost**

Percent of total budget	No. of establishment	%
0	292	79.8
1-9	13	3.6
10-20	5	1.4
21-30	3	0.8
31+	6	1.6
Not stated	47	12.8
Total	366	100.0

Establishments with higher percentage at 60% and 80% comprised of 1.1% and 0.3% of the total establishments interviewed. Those with training budget cost to staff cost at 50% or less represented 1.2%.

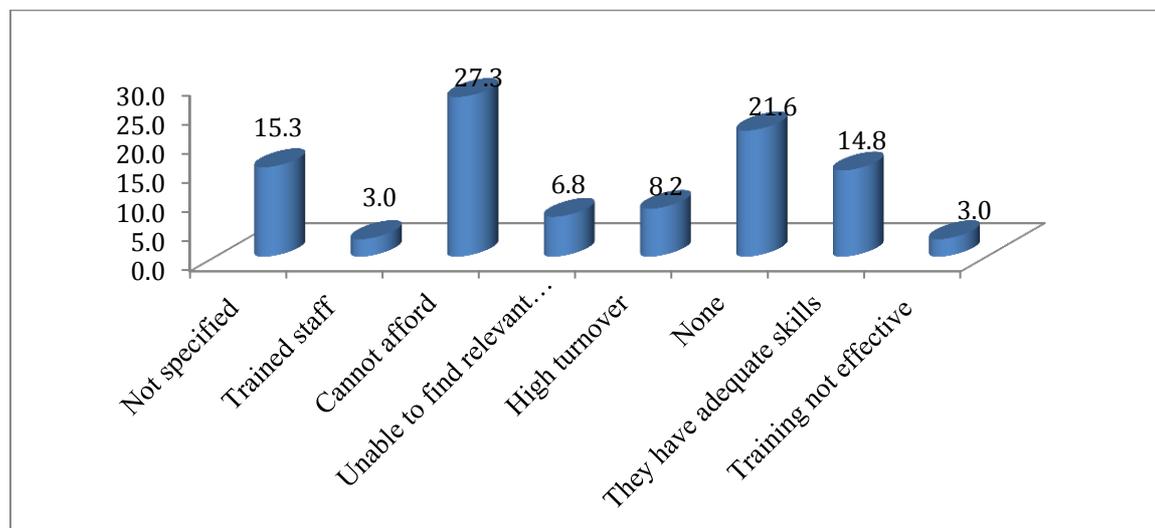
**Types of training funded:** - The responses from the establishments, which had funded training, indicate that employees were trained in various types of training (Table 34). As presented in Table 33, a total of 699 employees were trained of whom 51.4% were trained in 'job specific training' and 16.2% in a 'combination of job, induction and customer service training'. The least number of trainings were in 'team building' (0.3%).

**Table 34: Number of Employees Trained by Type of Training**

Type of training	Number trained	%
Job specific training	359	51.4
Job specific, induction and customer service	113	16.2
Job specific and IT user skill	60	8.6
Other trainings	54	7.7
Job specific, management /leadership & customer service	33	4.7
IT User skills	29	4.1
Job specific & team building	18	2.6
Job specific, IT user skills, Management & customers service	10	1.4
Management/Leadership	10	1.4
Job specific, induction and team building	5	0.7
Job specific & management/Leadership	3	0.4
Job specific and customer service	3	0.4
Team building	2	0.3
<b>Total</b>	<b>699</b>	<b>100.0</b>

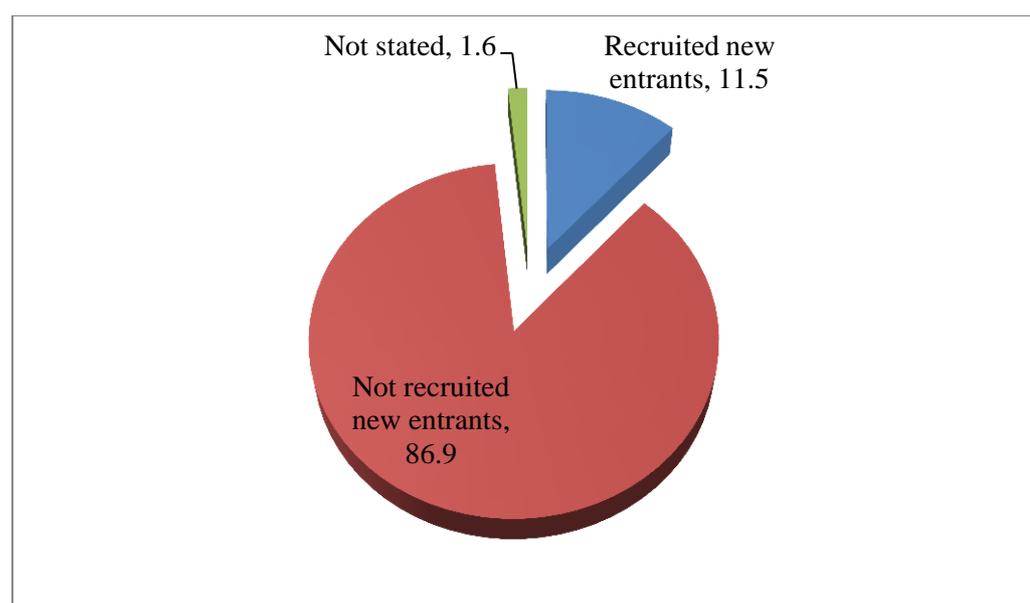
**Reasons for not offering staff training:** - Figure 14 shows that of the establishments surveyed reasons for not raining staff included inability to afford training cost (27.3%), employees having adequate skills (14.8%), and training considered to be not effective (3.0%).

**Figure 14: Distribution of Establishment by Reasons of Not Offering Staff Training**



Representative of establishment were asked if in the last 12 months before the survey they had recruited new entrants into the labor market. Figure 15 show that 11.5% of the establishments that participated in the survey had recruited new entrants while 86.9% had not recruited. The level of new young graduates entering the manufacturing sector in Rwanda is very low. This is an indication of the small size of the industry. It does not offer much opportunity of employment to young people.

Figure 15: % of Institutions Who Recruited New Entrants in Labour Market



There were a total of 31 recruits by the establishments visited. Those recruits from university level institutions comprised 61.3% and TVET 38.7%, as indicated in Table 35.

Table 35: Number of New Recruits by Institutions of Graduation

Name of institutions	Number of recruits	%
Kigali Independent University	8	25.8
Rwanda Tourism University College	1	3.2
National University of Rwanda	10	32.3
<b>Sub- total</b>	<b>19</b>	<b>61.3</b>
Kigali Institute of Science Technology	6	19.4
Kigali Institute of Management	2	6.5
Umutara Polytechnic	2	6.5
School of Finance and Banking	2	6.5
<b>Sub total</b>	<b>12</b>	<b>38.7</b>
<b>Total</b>	<b>31</b>	<b>100.0</b>

Table 3 shows that 13 institutions were mentioned as a source of recruitment although the specific number of recruits was not stated. These include institutes of technology 2, Health vocational institutions 5, education training institutions 4, and agriculture institutions 1.

**Table 36: Type of Institutions Mentioned Without Indication of Number of Recruits**

Nos	Type of institution	Name of institution
2	Institute of technology	Tumba College of Technology Kicukiro College of Technology
5	Health Vocational Institutions	Rwamagana School of Nursing and Midwifery Kigali Health Institute Nyagatare School of Nursing and Midwifery Kibungo School of Nursing and Midwifery Kabgayi School of Nursing and Midwifery
4	Education	Kigali Institute of Education Protestant Institute of Arts and Social Sciences Rukara College of Education Kavumu College of Education
1	Agriculture	Higher Institute of Agriculture and Animal Husbandry
1	Other	Institute Supérieur Pédagogique de Gitwe

### 3.11 Interns Programs, Research & Knowledge Transfer

The number of establishments visited that take interns comprised 17.5% compared to 81.4% that do not take interns. Table 37 shows that a total of 426 students were accepted for internship in the last 12 months of the survey date from the establishments visited. The results also show that 32.9 % and 38.0% of those under internship were university graduates and university students respectively. TVET graduates comprised of 10.1% and TVET students 18.1%. The average of internship ranged between 1 to 12 months and in 59 out of 75 establishments the average duration of internship was 1-3 months compared to 5 establishments, which had internship duration of 10-12 months. Only 20.5% of the establishments took students for internships.

**Table 37: Number of Internship by Level & Average Duration in Establishments**

Level of interns	Interns		Average duration months /establishment					
	Number	%	1-3	4-6	7-9	10-12	Total	%
University graduates	140	32.9	4	1	0	2	7	1.9
University students	166	39.0	20	6	3	0	29	7.9
TVET graduates	43	10.1	15	0	0	1	16	4.4
TVET students	77	18.1	20	1	0	2	23	6.3
<b>Total</b>	<b>426</b>	<b>100.0</b>	<b>59</b>	<b>8</b>	<b>3</b>	<b>5</b>	<b>75</b>	<b>20.5</b>

A relatively small number 1.1% of the establishments had research /knowledge transfer partnership with training institutions. There were 16 public institutions, which had research knowledge partnership with establishments. These included national university (1) Institute of technology (4) Health institutions (5) educational institutions (3) and other vocational institutions (3) as indicated in Table 37.

**Table 38: Public Institutions with Research/ Knowledge Transfer Partnership**

<b>Nos</b>	<b>Public Institutions</b>
1	National University of Rwanda
2	Kigali Institute of Science Technology
3	Tumba College of Technology
4	Kicukiro College of Technology
5	Umutara Polytechnic
6	Kigali Health Institute
7	Rwamagana School of Nursing and Midwifery
8	Nyagatare School of Nursing and Midwifery
9	Kibungo School of Nursing and Midwifery
10	Kabgayi School of Nursing and Midwifery
11	Kigali Institute of Education
12	Kavumu College of Education
13	Rukara College of Education
14	Higher Institute of Agriculture and Animal Husbandry
15	Institute of Legal Practice and Development
16	School of Finance and Banking

The establishments had partnership on research knowledge transfer with 12 private institutions as presented in Table 39.

**Table 39: List of Public Institutions on Research Knowledge Transfer**

<b>Nos</b>	<b>Institutions</b>
1	Kigali Independent University
2	Rwanda Tourism University College
3	Adventist University of Central Africa
4	Catholic University of Rwanda
5	Institut Polytechnique de Byumba
6	Protestant Institute of Arts and Social Sciences
7	Kigali Institute of Management
8	Institut Supérieur Pédagogique de Gitwe
9	Independent Institute of Lay Adventist of Kigali
10	Institut d'Enseignement Supérieur de Ruhengeri
11	Catholic Institute of Kabgayi
12	Byumba School of Nursing and Midwifery

### 3.12 Wages/Earnings

The survey sought information on earnings of the employees by their cadres. It was observed that the majority of the respondents from the manufacturing establishments were reluctant and thus not ready to provide information in their earnings. This was regarded a personal matter, which should not be disclosed to the public. The data

below thus just represents data from a sample of employers in the establishments that responded to the question.

**a) Managers' Earnings:** Table 40 presents earnings of managers in the manufacturing sector. The overall average earnings was Rwf341, 097. Policy and planning managers have the highest earnings relative to the other cadres. The lowest earnings was found among aquaculture and fisheries production managers.

**Table 40: Earnings of Managers by Occupation**

Occupation	Lowest	Highest	Average
Managing directors and chief executives	253,937	316,364	279,345
Finance managers	213,636	342,727	480,714
Human resource managers	241,500	368,500	312,500
Policy and planning managers	883,333	1,200,000	1,041,667
Sales and marketing managers	194,063	253,875	208,900
Advertising and public relations managers	262,500	362,500	312,500
Research and development managers	350,000	425,000	387,500
Aquaculture and fisheries production managers	20,000	40,000	30,000
Manufacturing managers	103,091	112,012	100,702
Supply, distribution and related managers	135,714	185,714	257,143
<b>Average</b>	<b>265,777</b>	<b>360,669</b>	<b>341,097</b>

**b) Earnings for Scientists:** - The average earnings for scientists ranged from RWF 50,000 for chemical engineers to RWF 275,000 for industrial and production engineers. Industrial and production engineers earned as high as RWF 325,000 (Table 41).

**Table 41: Earnings of Scientists by Occupation**

Occupation	Lowest	Highest	Average
Environmental protection professionals	200000	300000	250000
Industrial and production engineers	225000	325000	275000
Chemical engineers	36667	63333	50000
Electrical engineers	190000	300000	245000
Product and garment designers	200000	200000	200000
<b>Average</b>	<b>170,333</b>	<b>2,376,66.7</b>	<b>204,000</b>

c) **Liberal Arts Professionals:** - On average accountants earn RWF 6,500,433 which is much more compared to the earnings of personnel and careers professionals which was RWF 80,000 and financial and investment advisers at RWF 133,000 as presented in Table 42.

**Table 42: Average earnings by Liberal Professionals by Occupation**

<b>Occupation</b>	<b>Lowest</b>	<b>Highest</b>	<b>Average</b>
Accountants	5805433	8635433	6500433
Financial and investment advisers	80000	186000	133000
Financial analysts	150000	150000	150000
Personnel and careers professionals	60000	70000	80000
<b>Average</b>	<b>1,523,858</b>	<b>2,260,358</b>	<b>1,715,858</b>

d) **Earnings for Technicians:** - The result of the survey presented in Table 43 shows that the average earnings of technicians was RWF 232,000 with electrical engineering technicians and electronics engineering technicians among the highest earners.

**Table 43: Earnings by Technicians by Occupation**

<b>Occupation</b>	<b>Lowest</b>	<b>Highest</b>	<b>Average</b>
Chemical and physical science technicians	110,000	150,000	130,000
Electrical engineering technicians	405,000	520,000	465,000
Electronics engineering technicians	370,000	600,000	485,000
Chemical engineering technicians	40,000	50,000	45,000
Power production plant operators	35,000	35,000	35,000
<b>Average</b>	<b>192,000</b>	<b>271,000</b>	<b>232,000</b>

With the current skills gap in the manufacturing establishments, what is the status of the supply of skills for the sector from the training institutions in Rwanda? The next section provides answers to this question.

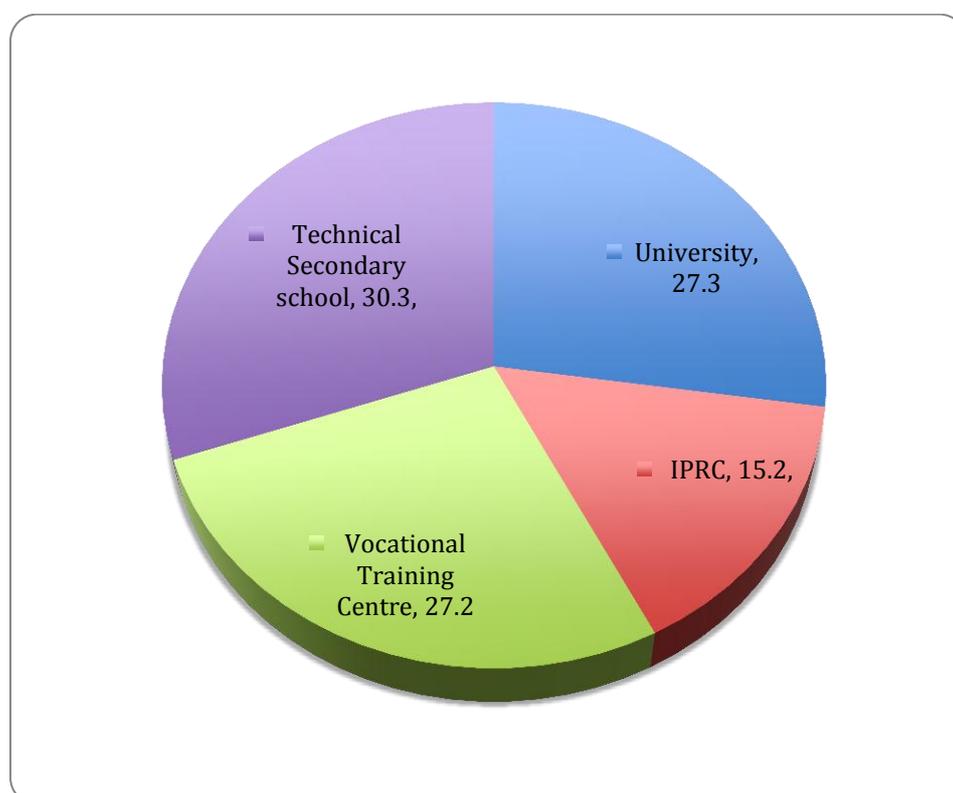
## 4.0 PART II: SUPPLY OF SKILLS FOR THE CONSTRUCTION SECTOR

To complete the picture and situation of skills profiles in the manufacturing sector in Rwanda, this section of the report presents issues and concerns about the supply of skills for the sector by the training institutions in Rwanda. The survey sought information on the training institutional profiles, training programs, outputs in terms of students, linkages with industry, and institutions capacities to supply needed skills.

### 4.1 Training Institutions

The study covered universities, Integrated Polytechnic Regional Centers (IPRC), Vocational Training Centers (VTC) and Technical Secondary Schools (TSS). A total of 33 institutions responded to the survey questionnaires consisting of university 27.3%, technical secondary schools 30.3%, and vocational training centers 27.3%, and IPRC 15.2% (Figure 16).

Figure 16: % Distribution of Training Institution by Type of Institution



A majority of the training institutions visited were located in Kigali. Out of the 33 institutions 23 (69.7%) were based in Kigali and 10 in the provinces. In Kigali 39.1% of the institutions were universities, IPRS and VTC each comprised of 17.4% and TSS 26.1%. In the other provinces, TSS comprised of 30.3% of the institutions, followed by University and VTC each 27.3% and IPRC 15.2% respectively.

## 4.2 Education & Training programs

Table 44 indicates the types of courses offered by various training institutions and level of training of such programs.

**Table 44: Type of Training Courses by Training Institutions & Level**

Type of institution	Name of Sector/Courses	Level of Training
VTC/TSS	Tailoring and Dressmaking	Certificate
	Food processing & Food products	Certificate
	Woodwork & Carpentry	Certificate
	Culinary Art & Fine art	Certificate
	Welding and Plumbing	Certificate
	Motor mechanics	Certificate
	Science of production: Chemistry & Physics.	Certificate and Diploma
IPRC	Automobile mechanical, Air conditioning and refrigeration	Certificate and Diploma
University	Mechanical engineering, Automobile technology	Degree
	Food Science	Degree
	Science and production analysis: Chemistry and physics	Degree and Diploma

## 4.3 Supply of Professionals

### *Degree Programs*

The data obtained on university graduates were from BSc. Courses. Table 45 presents the number of students graduating from university in the manufacturing sector by sector and gender in the period 2010-2012.

**Table 45: No. of Student Graduating from University by Sector & Gender 2010-2011**

Sector	2010			2011			2012		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Manufacturing	30	3	33	25	4	29	88	19	107
<b>Total</b>	<b>30</b>	<b>3</b>	<b>33</b>	<b>25</b>	<b>4</b>	<b>29</b>	<b>88</b>	<b>19</b>	<b>107</b>

At KIST – Centre of excellence for science and technology – in Rwanda, there are two faculties offering manufacturing related courses. These are:

- *The Faculty of Science, with three courses: A Bachelor of Science in Food Science Technology, Bachelor of Science in Applied Chemistry, and Bachelor of Science in Environmental Chemistry.*

- The Faculty of Engineering, with two courses: Bachelor of Science in engineering (Mechanical Engineering), and Diploma courses in Technology (Production Technology) and Automobile (A1).

KIST produces an average of 150 graduates per year for manufacturing establishments. In the last two years the institution produced a total of 292 graduates, of which 40% are in BSc in Food Science Technology, 25% in BSc in Environmental Chemistry, 16% in BSc in Applied Chemistry, and 13.4% in BSc Mechanical Engineering, and 5.5 Diploma in Technology (Production and Automobile).

Women are underrepresented in all the six courses, and the situation is worse in Environment Chemistry, Mechanical Engineering, and Production and Automobile Technology (Table 46).

**Table 46: KIST Graduates by Gender in Manufacturing Related Courses**

Department	Training Program	2010		2011		Total
		M	F	M	F	
Faculty of Science	Bachelor of Science in Food Science Technology	32	17	35	33	117
	Bachelor of Science in Applied Chemistry	21	4	14	8	47
	Bachelor of Science in Environmental Chemistry	27	5	20	21	73
Faculty of Engineering	Bachelor of Science in Engineering (Mechanical Engineering)	10	0	26	03	39
	Diploma in Technology (Production Technology and Automobile (A1))	-	-	16	0	16
<b>Total</b>		<b>90</b>	<b>26</b>	<b>111</b>	<b>65</b>	<b>292</b>
<b>Year totals</b>		<b>116</b>		<b>176</b>		<b>292</b>

#### *Diploma & Certificate Programs*

As indicated in Table 47 the number of diploma and certificate graduates in manufacturing related courses from IPRC and VTC has also not been great in the last three years, standing at 61 with diploma and 487 with certificate qualifications.

**Table 47: No. of Students Graduating with Certificate by Gender & Institution**

Sector	2009			2010			2011		
	M	Female	Total	Male	Female	Total	M	F	T
VTCs	66	171	237	181	306	487			
IPRCs	32	2	34	44	01	45			
<b>Total</b>									

## 5.0 CONCLUSIONS AND RECOMMENDATIONS

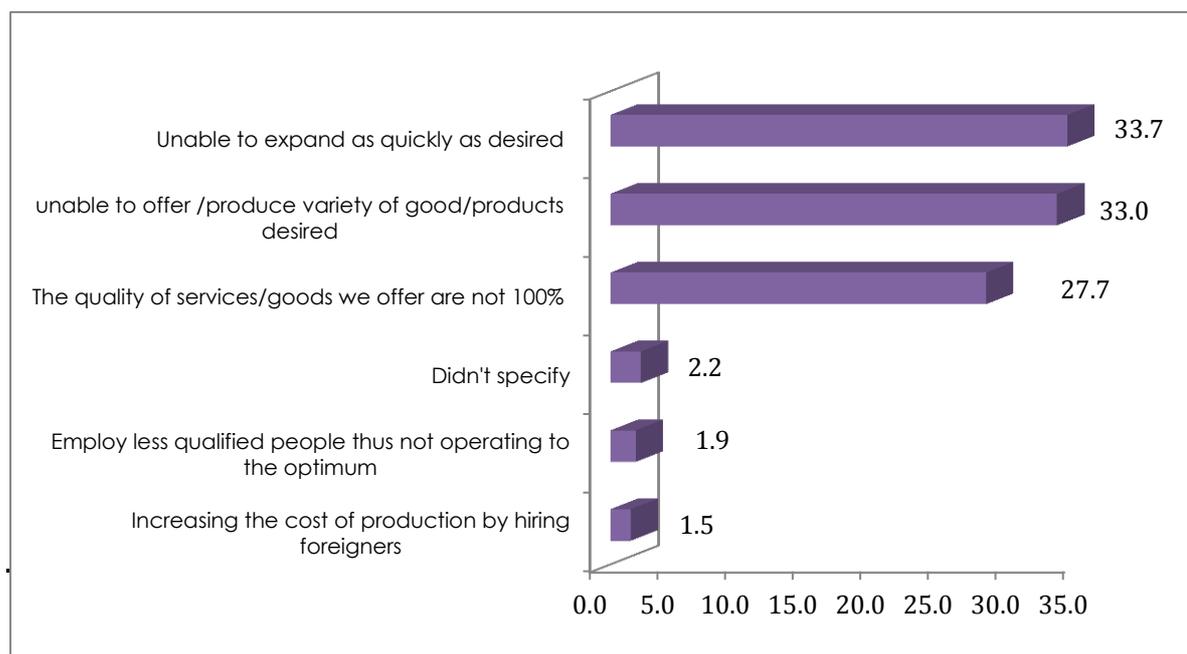
### 5.1 Emerging Issues & Discussions

The findings of the skills survey in the Manufacturing sector in Rwanda indicate that the sector is one of the priority sectors in Rwanda Vision 2010. Rwanda's manufacturing sector has experienced a high overall growth in the last decade. But it can do better if the skills gaps are addressed in a comprehensive and a sustained manner. Women are underrepresented in the manufacturing sector in all cadres of occupation, even among artisans where women constitute only 4.7%.

The survey has indicated that the level of skills gaps in both technical and soft (qualitative) skills in the manufacturing sector is high. There are about 6,000 existing employees (79% artisans) who have limited proficiency in technical skills at their work place. Besides, 90.4% of existing employees in the manufacturing sector needs training in soft skills to make them effective and efficient in their occupation. The soft skills include: leadership skills, written communication skills, oral communication skills, customer handling skills, team work, problem solving skills and innovativeness. These skills are critical in an emerging manufacturing sector like the one in Rwanda in order to make the establishments competitive and survive the onslaught and negative effect of market liberalization.

The lack of both technical and quality skills in the industry impacts the establishments negatively. During the survey, the owners were asked to indicate the effects lack of skills have had in their establishments in the last 12 months before the survey. Figure 17 shows that the main effects advanced by establishments included "inability to expand as quickly as desired" (33.7%), "inability to offer /produce variety of goods/products desired" (33%) and "the quality of goods and services not 100% perfect" (27.7%) as they would like.

Figure 17: Effects of lack of Core Skills on Production (%)



If the lack of skilled personnel in both technical and soft skills are not addressed in a comprehensive and sustained manner, manufacturing sector in Rwanda, especially the big and medium establishments in food processing, manufacturing of water and beverages, and production textile& cloths, the following scenarios will occur:

- i. The established facilities will continue importing skilled labor from the region in critical and strategic cadres namely: Finance managers, Product & Garment Designers, Accountants, Chemical Engineers, Bakers, Pastry-cooks and Confectionery Makers. The cost of operation in Rwanda will be high and making the country loose the much needed foreign currency.
- ii. Most establishments will continue employing poorly educated and untrained labor force, thus affecting negatively the quality of service and image of the sector. Those who cannot afford the cost of hiring expatriates and training their workers, will turn to the limited local market and hire whoever is available.
- iii. Most of the establishments will not be able to cope with stiff competition from the establishments in the EAC and COMESA countries and beyond. There will be little diversification, innovations and branding/rebranding in the industry, thus exposing the sector to stiff competition from the region. In the long run some business will be forced to close shop.

The lack of comprehensive national internship policy and specific programs in both the training institutions and the establishments in the sector makes students suffer and miss opportunity for acquiring practical skills and learn the principles of doing business in the manufacturing sector. Both the public and private establishments do not have comprehensive internship/attachment programs, which is pertinent in any developing country like Rwanda. Besides, the fact that university-industry linkage in Rwanda is still in its infancy stage exacerbates the situation for the young people who are interested in working in the manufacturing sector.

The challenge of the skills gap is not just from the demand side. There are also challenges from the supply side. This survey confirms the findings of a comprehensive assessment of training institutions in Rwanda (Watkins and Verma, 2008) and a report by the National Commission for Higher Education (NCHE) that indicated that the training institutions in Rwanda, including universities lack necessary equipment and facilities for hands-on practical training. As one stakeholder stated:

*"Students in our universities and TVET institutions are taught to be knowledgeable (learned) about a sector but not to be skilled (acquire practical knowledge). When they come to our establishment they want to sit in the office and look at papers. And not ready to go to the machine floor. We have discovered that they do not have practical skills. They have also a complex and liking for 'white collar' office jobs".*

*(Employer, Manufacturing Establishment, 2012).*

Stakeholders in the manufacturing sector indicate that,

*“Graduates from local universities are not to the required level in terms of skills. They have good general academic knowledge and prefer Liberal professionals to technical ones. We get almost 100% of applications from university graduates with liberal professions. This attitude of white-collar jobs needs to be tacked in a comprehensive way. We employ a few graduates as technical people. But after a few months or one year they quit and join government institutions, where the do not have to work in a factory or assemble line but in an office”*

(CEO, Manufacturing Sector) .

Textile and clothing could be a very important sector in Rwanda and could create more jobs and contribute towards alleviation of poverty. But there is one established business venture in Rwanda, with important departments like:

- i. Weaving
- ii. Spinning
- iii. Processing/Dying
- iv. Garment making
- v. Engineering

There exist limited skilled people in textile industry. This is because there are no training institutions in Rwanda and the EAC region. However, Moi University in Kenya has established a Faculty of Textiles.

*“Therefore we rely on internal training – facility based training. We identify interested young people and sometimes we get them from PSF and then we take them though training. Since there are no training college, we usually have not less 200 young people passing here as interns for three months. We identify good and committed ones and employ” (CEO, 2012).*

For Rwanda to have a pool of human stock for the manufacturing sector, at the mid-level technical and management level, training institutions like KIST, which is expected to be center of excellence for science & technology, should focus on one or two major sub sectors like Food processing and could create a four-year, practice-based food-processing course leading to a bachelor's degree that includes a major in a particular subsector.

To provide the required practical training and work experience, KIST could establish properly equipped specialist food-processing teaching laboratories. Students would acquire technical, management, and business experience through participation in self-financing production units that process dairy, meat, fruit, vegetables, and cereals. This group of units would be financially autonomous and act as a technology demonstration center for the Rwanda food-processing industry. The accounts of each unit should be accessible to commercial food-processing enterprises to assess the cost-effectiveness of technologies and practices used (Watkins and Verma, 2008).

KIST and NUR could also provide in-service training by establishing evening courses and part-time programs in food-processing whose curriculum and delivery is defined by the needs of industry, and by the proposed Rwanda Food-Processing Association and commerce and regulatory bodies. For higher-level management, a one-year,

government-subsidized graduate apprenticeship (with continuing tutorial involvement) could be set up, nationally or regionally. This apprenticeship could become the basis for a one-year master's degree in the management of food processing industries. The master's program could include enterprise and finance modules, given jointly with the School of Finance and Banking (SFB). In addition, specialist postgraduate studies related to the food-processing industry could be encouraged, making use of scholarships from donor countries (Watkins and Verma, 2008).

## **5.2 Recommendations**

The findings of the skills survey indicate that there is need for concerted, coordinated and comprehensive efforts, strategy and investment to enhance skills development for the manufacturing sector across Rwanda. Comprehensive and urgent efforts are needed to provide skilled personnel to drive and sustain manufacturing industry as articulated in Rwanda Vision 2020. The following recommendations are put forth with this objective in mind.

In the short term (6-12 months)

### **1) Establishment of Sectors Skills Councils (SSC's)**

The Sector Skill Councils are national partnership organizations that will bring together all the stakeholders – industry, labour and the training providers, for the common purpose of workforce development within the industry sectors. The sectors will be key in developing qualifications standards to ensure that the quality of trainees in technical schools, higher learning institutions and professional development stages is relevant and globally competitive. The SSC's will also be the center mechanism for coordinating school to industry linkages that provide work based experiential learning for skills development.

### **2) Enhance technical and qualitative skills among employees in the Manufacturing Establishment**

Employees who responded to the survey indicated that they would like to be trained to enhance their capacities in 'soft' skills. Training programme should target the following areas: Communication skills, Leadership skills, Risk Management skills, Result Orientation skills, Business planning and development skills, and Innovations & Managing change skills.

### **3) Promoting University-Industry Linkage in Rwanda**

Creation and promotion of university-industry linkages for innovations and training should be initiated and supported. There is need for a national forum on university-industry linkage in Rwanda to discuss how to operationalise this important partnership.

Establish a fund for internships/attachments and innovations in the country. Such funds should be accessed in a competitive manner by innovators and top-experts in the manufacturing sector. Such a facility is to be used mentor young innovators' curiosity and interest, as it happens in Uganda, Kenya, Egypt, South

Africa, where private companies are funding training and incubation facilities at various training institutions mainly universities.

#### **4) Launching and Managing a National Science Congress and Competition**

Ministry of Education (MINEDUC), Local Government and industry players should organize National Science Congresses and Competitions from the districts to promote innovations and critical thinking in the energy sector and other related areas. The target should be both school primary and secondary students as well as young people in the **SMEs** establishment in manufacturing sectors. Each year the congress should identify an innovative manufacturing projects from the district and fund it for further research and market development. This is a perfect strategy of nurturing talent, innovation and knowledge transfer.

#### **5) Developing a National Internship Policy**

There are many uncoordinated internship/attachment programmes in the public, private and civil society sectors. As a matter of urgency, develop a focused Rwanda Internship Policy within the next 12 months. This will stream line internship programmes and make students/trainees gain from them.

#### **6) Public Education on LMIS**

Most manufacturing training institutions seem not to be aware of RDB Labor Market Information System (LMIS) in Rwanda. RDB-Manufacturing section and HCID should launch and conduct public education targeting training institution and SME. The media, radio and TV in particular, need to be used for briefings, debates, and dissemination of information on:

- Awareness of creation of functional LMIS system
- Accessing and use of RDB-Manufacturing and LMIS system
- Interactive sessions with the private establishments representatives and students and young professionals on topic labor market issues
- Having an LMIS and Manufacturing once a month and a national day once a year. There is need to launch a LMIS day once in three months and have a national LMIS day once a year.

#### **In the medium and long term (13 months to five years)**

##### **1) Promoting PPP for internships and attachment programmes:**

Public-Private Partnership needs to be enhanced in Rwanda to promote attachment/internship for trainees and graduates. The strategies for this include following options:

- The Government should consider motivating private companies to participate in internship through industrial levies and/or tax rebates as it happens in Kenya.
- Establish and mobilize partners to establish Internship Fund establishments should apply for such funds on the basis of trainees they have offered internship.

- Explore with relevant stakeholders in the public and private sectors the possibility of establishing a training college in textiles in Kigali. This can act as a center of excellence in the region.
- Start a facility for theoretical instruction, source 4-5 qualified lecturers, motivate and retain them.
- Established companies like Utexrwa can enter into agreements with institutions to provide facility for practical instructions.
- Expanding the awareness and Capacities of TVET institutions (IPRC and selected VTC) since the TVET system is not only facing challenges of poor perception by the public but also the need to enhance quality of its training programmes in IPRCs and VTCs.
- There is need for attracting and retaining additional qualified professional and technical staff. The terms and conditions of service and remuneration of TVET tutors need to be made competitive.

The first step is to establish a comprehensive and fast-track professional training to upgrade the qualifications of the many existing staff that are in need of additional training. There are cost effective training programmes in the EAC region, which could be explored. Another alternative is to approach friendly countries to bring training to Rwanda under a subsidized arrangement.