

# FEDERAL REPUBLIC OF NIGERIA



## EXECUTIVE SUMMARY SKILL NEEDS ASSESMENT IN NIGERIA



**A Study**

**By**

**THE INDUSTRIAL TRAINING FUND**

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# EXECUTIVE SUMMARY

## ASSESSMENT OF SKILL NEEDS IN NIGERIA

### 1.1 Introduction

It is of great concern that in spite of the existence of numerous Skill Acquisition Centres, the introduction of Technical Vocational Education and Training (TVET) and other educational reforms, and the implementation of various economic development programmes by successive administrations and other stakeholders in Nigeria, skill level of citizens remain low. Skill shortages and skill scarcity persist as reported by Nweke (2006) and Omu (2008). Yet, it is worthy of note that skills required for optimum and efficient performance in the economy are broad and in a wide range of operational areas. Therefore, shortages, scarcities, deficiencies or gaps in any skill area would have serious impact on the economy and by extension, the drive for national development.

The growing problems of unemployment among Nigerians, as well as low level possession of employable skills, have been matters of serious concern to all, especially Employers of Labour. According to the Governor of the Central Bank of Nigeria, Sanusi Lamido Sanusi, the percentage of the unemployed in Nigeria is about 41.6% (Ike, 2011).

The apparent conflict between skills required and skills available for employment have also been noted by Employers of Labour in Nigeria. Engungwu (2009), while reflecting on this problem stressed the need to maintain a proper balance between demand and supply of Vocational Trades that are required for employment and those available for employment.

In spite of proliferation of Higher Institutions in Nigeria, Critical Skills, inadequate number and quality of relevant skilled manpower for operation in Industry is still being experienced. Reports on the inability of some graduates to perform simple tasks and the low quality of work performed by most Craftsperson, Technicians and Artisans and the strident complaints by members of the Organized Private Sector over the unavailability of skilled workforce, lends credence to this fact (Omu, 2008). The National Policy on Education (2009), confirms that some Employers of Labour consider graduates of Technical Institutions as unproductive unless they are given further training.

It appears that there is insufficient empirical evidence to serve as basis for adequate planning, by both formal and informal Organizations, in support of the implementation of TVET and other skill acquisition efforts. This is evident in the absence of a comprehensive database on Skill Needs, Scarce Vocational Trades and Skills in the economy. It would, therefore, appear that Skill Acquisition Centres have been haphazardly established without empirical data on scarce and required skills to grow the economy.

Issues of Skill deficiencies, Skill scarcity and Skill shortages should be of major concern to any progressive nation. For a developing nation that aspires to be one of the 20 strongest economies in the world by year 2020, the need for adequate number of relevant skilled manpower must be taken very seriously.

The present Study, therefore, seeks to examine status of Skill development in the Nigerian economy with a view to determining Skill Needs of the economy.

## **1.2 Purpose of the Study**

The aim of the Study was to assess the nature and extent of skill needs in Nigeria. Specific objectives, therefore, were to:

- I. Identify Vocational Trades in Nigeria;
- II. Identify Vocational Trades in demand in the six geo-political zones of Nigeria;
- III. Identify scarce Vocational Trades in the six geo-political zones;
- IV. Identify emerging Vocational Trades in Nigeria;
- V. Identify available skills and critical skills in Nigeria;
- VI. Determine the most important factor responsible for dearth of critical skills in the Nigerian economy;
- VII. Identify actions to address dearth of critical skills in Nigeria; and
- VIII. Recommend appropriate strategies to develop Critical Skills to meet the need in the economy.

## **1.3 Research Questions**

The following Research Questions were formulated to facilitate the Study:

- I. What are the Vocational Trades in Nigeria?
- II. What are the Vocational Trades in demand in the six geo-political zones?
- III. What are the scarce Vocational Trades in the six geo-political zones?
- IV. What are the emerging Vocational Trades in Nigeria?

- V. What are the available skills and critical skills in Nigeria?
- VI. What are the factors responsible for scarce Vocational Trades in Nigeria?
- VII. What actions should be taken to address these Factors?
- VIII. What appropriate strategies should be adopted to develop critical skills required for the economy?

#### **1.4 Significance of the Study**

Considering the importance of having adequate number and mix of skilled manpower for a functioning economy, it is expected that findings of this Study will be of immense benefit to Stakeholders.

The findings will:

- i. Serve as a basis for Government to address skill shortages and scarcity. This is with a view to improving the performance and productivity of its workforce.
- ii. Highlight relevant Vocational Trades and Skills predominant and those critical in each geo-political Zone. This could facilitate efforts geared towards skill mapping according to geo-political zones for future reference and planning.
- iii. Serve as a guide for the establishment of Skill Acquisition Centres based on needs of each geo-political zone.
- iv. Provide relevant data required by stakeholders involved in skill development as well as end users of skilled manpower on issues and challenges associated with Human Capital Development.
- v. Enhance collaboration between umbrella organisations of the Organised Private Sector (OPS) and educational Institutions on a sustainable basis for synchronizing their curricula with the needs of Industry. This is with a view to addressing the problem of skill shortages and scarcity on a long-term basis.
- vi. Be beneficial to Heads of various Organisations because challenges of skill shortage and scarcity will draw their attention to the need to train and retrain their staff to narrow existing gaps in Knowledge, Skills and Competence.
- vii. Assist Planners and Administrators in Education to collaborate with Employers of Labour in designing Curricula that will meet Skill Needs of Industry.

- viii. Assist Development Planners to act proactively in anticipating what skills will be required in the future to support Strategic and Social Development Initiatives.
- ix. Facilitate the realization of Government's Transformation Agenda of creating jobs for the unemployed as it will aid the development and adoption of new initiatives to meet the needs of Industry. This is expected to usher in creation of a Local Technical Skills-base that is prepared to take on the challenges of the 21<sup>st</sup> century.

## **2.1 Methodology**

This section deals with methods employed in carrying out the study.

## **2.2 Research Design**

A Cross-Sectional Survey Design was used. This is a design that involves collection and analysis of data from a target group that is considered to be representative of the entire Population. Generalization of findings from this group is then made on the entire Population.

## **2.3 Population, Sample and Sampling Technique**

Population of study consisted of: Human Resource and Personnel Managers, Head, Engineering and Technical Departments of Industrial and Service Sector and Vocational Skills Development Officers of National Directorate of Employment (NDE). Two-thirds (i.e. 67%) of the total number of States in each of the geo-political zones of Nigeria was selected, thus, four (4) States were selected from each Zone. This gave a total of twenty-four (24) States and the FCT. Furthermore, a multi-stage cluster sampling procedure was adopted. The six geo-political zones constituted the basis for the cluster sampling.

## **2.4 Instrument for Data Collection**

The instrument used in gathering data for the Study was the Questionnaire. There were three sets of Questionnaires for the different categories of respondents. They are:

1. Assessment of Skill Needs in Nigeria Questionnaire for Human Resource Managers (ASNNQHRM).
2. Assessment of Skill Needs in Nigeria Questionnaire for Head of Engineering and Technical Departments (ASNNQHETD).
3. Assessment of Skill Needs in Nigeria Questionnaire for Vocational Skills Officers (ASNNQVSDO).

The Questionnaires had the following layout:

**Section A:** This contained background information of respondents.

**Section B:** This contained questions on Vocational Trade in the economy and associated Skill requirement.

## **2.5 Methods of Data Analysis and Interpretation**

Data analysis was based on Research questions. Data collected were in raw form before they were compiled, tallied and coded on computer sheets. All completed questionnaires were also manually edited to detect skips, check errors and accuracy of data entry. Questions on demand, supply and scarcity of Vocational Trades which provided quantitative information in the questionnaires were coded for data capturing using the Micro-Soft Excel spreadsheet and Statistical Product and Service Solutions (SPSS). Similarly, questions on factors responsible and actions for addressing dearth of critical skills which provided qualitative information were subjected to content analysis. Simple Means and Percentages were used to analyse data collected.

### 3.1 Results

#### 3.1.1 Vocational Trades by Category

This Section presents identified Vocational Trades by various categories of the economy at Table 1.

**Table 1: Vocational Trades by Category**

S/N	CATEGORY	VOCATIONAL TRADE
1	<b>Agriculture</b>	Apiculture, Brewing Cellar Works, Farm Implement Fabrication, Hatchery, Horticulture and Milling
2	<b>Automotive</b>	Articulated Vehicle Driving, Auto Air Condition Maintenance and Repairs, Auto Mechanical Maintenance and Repairs, Automotive or Pump Maintenance and Repairs, Autotronics or Mechatronics, Battery charging, Bicycle Maintenance and Repairs, Diesel Engine Mechanical Maintenance and Repairs, Diesel Engine Operation, Metal Fabrication, Motorcycle Assembling, Paint Mixing, Panel Beating, Pneumatic System Maintenance and Repairs, Spray Painting, Tractor mechanical Maintenance and Repairs, Transmission Re-building, Upholstery, Vulcanizing, Welding, Wheel balancing & Alignment
3	<b>Construction</b>	Architectural Draughtsmanship, Batch Plant Operation, Blasting, Carpentry, Furniture and Joinery, Crane Mechanical Maintenance and Repairs, Crane Operation, Excavation, Interlocking Floor Tiles Laying, Iron Bending, Land Scrapping, Land Surveying, Masonry, Pipefitting, Plumbing, Roofing, Scaffolding, Wood Machining
4	<b>Fashion Design</b>	Knitting, Tailoring
5	<b>Film Industry</b>	Film Editing
6	<b>Fire Service</b>	Fire Defence System Maintenance and Repairs, Fire-fighting
7	<b>Hair Design</b>	Barbing, Hair Dressing
8	<b>Hotel, Catering and Tourism</b>	Baking, Catering, Chef, Cookery, Pottery, Wood Carving, Woods Works and Modelling
9	<b>Information and Communication Technology</b>	Automated Teller Machine (ATM) Maintenance and Repairs, Computer Hardware Maintenance and Repairs, Computer Network Maintenance and Repairs, Computer Operation, Electronic Fitting, Electronic Maintenance and Repairs, G.S.M Handset Repairs, Radio or Telex Operation, Satellite Installation, Satellite Maintenance and Repairs, Solar Energy Systems

S/N	CATEGORY	VOCATIONAL TRADE
		Maintenance and Repairs, Telecommunication Electronic Maintenance and Repairs, Transmission Rebuilding
10	<b>Leather Works</b>	Leather Works, Shoe Making, Shoe Cobbling
11	<b>Manufacturing (Operation Related)</b>	Access Control Maintenance and Repairs, Air Compressor Maintenance and Repairs, Air Condition and Refrigeration Maintenance and Repairs, Billet Cutting, Blacksmithing, Blow Moulding, Boiler Maintenance and Repairs, Boiler Operation, Bulk Plant Operation, Chiller Repairs and Installation, CNC Machine Operation, Collision Repairs and Refinishing, Compressor Operation, Cooling System Maintenance and Repairs, Derrick handling, Diagnostic Equipment Maintenance and Repairs, Dozer Operation, Electric Inverter Maintenance and Repairs, Electrical Installation and Repairs, Electrical Motor Winding, Extruding, Fabrication, Fitter Machining, Fitter Maintenance and Repairs, Fitting, Fork Lift Operation, Gas Power House Maintenance and Repairs, Generator Maintenance and Repairs, Generator Operation, Goldsmithing, Heating ventilation and Air-condition Maintenance and Repairs, Heavy Duty Equipment Operation, Individual Section (IS) Machine Operation, Industrial Electrical Maintenance and Repairs, Injection Moulding, Instrumentation, IS Machine Maintenance and Repairs, Laboratory Instrument Maintenance and Repairs, Lift Maintenance and Repairs, Locksmithing, Loom Operation, Machining, Metal Fabrication, Metal Machining, Metal Sheet Works, Metallurgy, Mould Making and Design, Moulds Designing, Pay-loader Operation, Plant Maintenance, Plant Operation, Post Tensioning, Power Plant Operators, Power System Electrical Maintenance and Repairs, Rotary Equipment Maintenance and Repairs, Rotogravure Operation, Steel Melting, Tapping, Tinkering, Turning
12	<b>Oil and Gas</b>	Argon Precision Welding, Arc Welding, Argon Welding, Cargo Plant Handling, Diving (under water), Heavy duty Equipment Maintenance and Repairs, Heavy duty Equipment Operation, Motor manning (Rig Operation), Oil and Gas Fishing, Rig Maintenance and Repairs, Rigging, Roustabout, Speed Boat Operation, Turbine Maintenance and Repairs
13	<b>Painting and Decoration</b>	Aided Design & Drafting (Auto-CAD), Interior Decoration, Piling Machine Operations, Plaster of Paris Making, Tile and Pave-lock Laying

S/N	CATEGORY	VOCATIONAL TRADE
14	Photography	Motion Picture Camera Maintenance and Repairs, Photography, Videography
15	Printing	Book Binding, Graphic Art & Painting, Graphic Designing, Kord Machine Operation, Lithography, Press Brake Maintenance and Repairs, Printing, Screen Printing, Sign Writing
16	Quarry	Blasting, Chalk Production, Crushing Maintenance and Repairs, Drilling, Grit Blasting

### 3.1.2 Scarce Vocational Trades by Geo-Political Zones

This Section presents Scarce Vocational Trades by Geo-Political zone at Table 2.

**Table 2: Scarce Vocational Trades by Geo-Political Zones**

S/N	Geo-Political Zone	Vocational Trades
1	North-West	1 Chef
		2 Cookery
		3 Electronic Maintenance and Repairs
		4 Loom Operation
		5 Metal Fabrication
		6 Computer Maintenance and Repairs
		7 Catering
		8 Crane Operation
		9 Billet Cutting
		10 Extruding
		11 Generator Maintenance and Repairs
		12 Melting
		13 Motion Picture Camera Maintenance and Repairs
		14 Satellite Maintenance and Repairs
2	North East	1 Audio Visual Aid Maintenance and Repairs
		2 Fitting
		3 Machining
		4 Welding
		5 Carpentry
		6 Air Condition & Refrigeration Maintenance and Repairs
		7 Forklift Operation
		8 Auto Electrical Maintenance and Repairs
		9 Panel beating
3	North Central	1 Auto Air Condition Maintenance and Repairs

S/N	Geo-Political Zone	Vocational Trades
		2 Wood Carving
		3 Designing of Moulding
		4 Electronic Maintenance and Repairs
		5 Printing
		6 Heavy duty Machine Operation
		7 Crane Operation
		8 Tractor Maintenance and Repairs
		9 Plant Operation
		10 Film Editing
		11 Cold Room Maintenance and Repairs
		12 Graphic Designing and Sign Writing
		13 Iron Bending
		14 Spray Painting
		15 Tiling
		16 Plant Maintenance and Repairs
4	<b>South-West</b>	1 Diagnostic Equipment Maintenance and Repairs
		2 Drilling
		3 Gas Power House Maintenance and Repairs
		4 Rotogravure Operation
		5 Transmission Rebuilding
		6 Collision Repairs & Refinishing
		7 Graphic Designing
		8 Mobile Crane Operation
		9 Power System Electrical Maintenance and Repairs
		10 Fire Fighting
		11 Turning
		12 Plant Operation
		13 Wheel Balancing & Alignment
		14 Automotive Maintenance and Repairs
		15 Crane Maintenance and Repairs
		16 Electronic Maintenance and Repairs
		17 Printing Machine Operation
		18 Tiling
		19 Graphic Art & Painting
		20 Printing
		21 Plant Maintenance and Repairs
		22 Auto Mechanical Maintenance and Repairs
		23 Boiler Maintenance and Repairs
		24 Turbine Maintenance and Repairs
		25 CNC Machine Maintenance and Repairs
		26 Locksmithing
		27 Motorcycle Assembling
		28 Tricycle Assembling
		29 Tricycle Maintenance and Repairs
		30 Electric Motor winding
		31 Instrumentation

<b>S/N</b>	<b>Geo-Political Zone</b>	<b>Vocational Trades</b>
		32 Access Control Maintenance and Repairs
		33 Air Compressor Maintenance and Repairs
		34 Automated Teller Machine (ATM) Maintenance and Repairs
		35 Bulldozer Operation
		36 Cooling System Maintenance and Repairs
		37 Diesel Generator Operation
		38 Fire Defence System Maintenance and Repairs
		39 Furniture & Woodwork
		40 Generator Maintenance and Repairs
		41 Heavy Duty Generator Maintenance and Repairs
		42 Metal Fabrication
		43 Post Tension Maintenance and Repairs
		44 Crane Operation
		45 Boiler Operation
		46 Draughtsmanship
		47 Excavator Operation
		48 Pneumatic System Maintenance and Repairs
		49 Telecommunication Maintenance and Repairs
		50 Forklift Operation
		51 Computer Aided Designing & Drafting
5	<b>South-East</b>	1 Batch Plant Operation
		2 Computer Hardware Maintenance and Repairs
		3 IS Machine Maintenance and Repairs
		4 IS Machine Operation
		5 Pay loader Operation
		6 Graphic Art
		7 Kord Machine Operation
		8 Lithography
		9 Electrician (coil rewinding)
		10 Auto Electrical Maintenance and Repairs
		11 Metal Fabrication
		12 Carpentry
		13 Machining
		14 Fitting
		15 Masonry
		16 Baking
		17 Milling
		18 Forklift Operation
6	<b>South-South</b>	1 Metal Machining
		2 Heating Ventilation and Air Condition Maintenance and Repairs
		3 Drilling
		4 Oil & Gas Fishing
		5 Sheet Fabrication
		6 Telecommunication Maintenance and Repairs
		7 Audio Visual Maintenance and Repairs

S/N	Geo-Political Zone	Vocational Trades
		8 Caterpillar Diesel Engine Maintenance and Repairs
		9 Heavy Plant Maintenance and Repairs
		10 Power Electrical Maintenance and Repairs
		11 Tapping
		12 Palm tree harvesting
		13 Tiling
		14 Generator Maintenance and Repairs
		15 Auto motion Maintenance and Repairs
		16 Cabinet Making
		17 Coded Structural Welding
		18 Heavy Duty Equipment Operation
		19 Iron Bending
		20 Air condition and Refrigeration Maintenance and Repairs
		21 Masonry
		22 Computer Operation
		23 Tailor
		24 Land Scapping
		25 Offshore Crane Operation
		26 Turbine Maintenance and Repairs
		27 Welding(Arc, Argon)
		28 Upholstery
		29 Articulated Vehicle Driving
		30 Auto-cad Maintenance and Repairs
		31 Calibration
		32 Carpentry & Joinery
		33 Catering
		34 Draughtsmanship
		35 Joining
		36 Leather works
		37 Offshore Radio or Telex Operation
		38 Plant Operation
		39 VSAT Installation
		40 Heavy Duty Maintenance and Repairs
		41 Generator Operation
		42 Metalling
		43 Motorman (Rig Operation)
		44 Rig Electrical Maintenance and Repairs
		45 Rig Mechanical Maintenance and Repairs

### 3.1.3 Emerging Vocational Trades in the Economy

This Section presents Emerging Vocational Trades in the Economy. A total of sixteen (16) Vocational Trades were identified and the result is presented at Table 3.

**Table 3: Emerging Vocational Trades by Category**

<b>S/N</b>	<b>CATEGORY</b>	<b>VOCATIONAL TRADE</b>
1	<b>Automotive</b>	Electric Train Maintenance and Repairs
		Mechatronics
		Gas Generator Mechanics
2	<b>Construction</b>	Plaster of Paris Installation
3	<b>ICT</b>	Optic fibre Maintenance and Repairs
		Cell Phone repairs
		Remote Sensing Technology
		Satellite Maintenance and Repairs
		Computer Based Technical Operations
4	<b>Oil and Gas</b>	Argon Welding
		Coded pipe Welding
		Coded Structure Welding
		Tungsten Inert Gas Welding
		Metal Inert Gas Welding
		Precision Welding
5	<b>Photography</b>	Digital Photography

### 3.1.4 Critical Skills in the Nigerian Economy

This Section presents Critical Skills associated with identified Scarce Vocational Trades in the economy. Skill describes necessary competency required to perform tasks associated with a Vocational Trade. The result is presented at Table 4.

**TABLE 4: Scarce Trade and Critical Skills**

S/N	CATEGORY	SCARCE TRADE	CRITICAL SKILLS
1.	Agriculture	Milling	Ability to: 1. Pull chain to open slide gate on storage bin and drop grain onto conveyor for transfer to machine.
2.	Automotive	Articulated Vehicle Driving	Ability to: 1. Carry out equipment inspections and fault finding. 2. Carry out routine operational servicing, lubrication and housekeeping tasks.
		Auto Electrical Maintenance and Repairs	Ability to: 1. Use test instruments to diagnose breakdown.
		Auto motion Maintenance and Repairs	Ability to: 1. Inspect defective equipment and diagnoses malfunctions, using motor analysers, pressure gauges, chassis charts, and factory manuals. 2. Carry out maintenance on Programming Logic Control Unit (PLC) machine.
		Automotive Technicians or Pump Maintenance and Repairs	Ability to: 1. Grind and reset valves, using valve-grinding machine.

<b>S/N</b>	<b>CATEGORY</b>	<b>SCARCE TRADE</b>	<b>CRITICAL SKILLS</b>
	Automotive Cont'd...	Diesel Generator Operation	Ability to: 1. Fabricate special tools, rigging equipment, and replacement parts for equipment. 2. Install wiring between machinery, switchboards, and control panels.
		Electric Motor winding	Ability to: 1. Test windings for motor-housing clearance, grounds, and short circuits, using clearance gauge, growler, spring-steel blade, telephone receiver, insulation tester, and Resistance Bridge. 2. File burrs from core slots, using hand file, portable power file, and scraper.
		Motorcycle Assembling	Ability to: 1. Bolt fork, motor, transmission, rear and front wheels, chain drives, handlebars, lights, seats, and other parts to frame, using hand tools or power tools. 2. Turn gas or spark handle controls, and adjustment screws on distributor and carburettor to set spark and gas feed.
		Panel beating	Ability to: 1. Straighten bent automobile frames, using pneumatic frame straightening machine. 2. File, grind, and sand repaired surfaces, using power tools and hand tools.
		Pneumatic System Maintenance and Repairs	Ability to: 1. Disassemble motor and repair or replace defective gears, pistons, connecting rods, and other parts, using taps, files, reamers, wrenches, and other hand tools.
		Spray Painting	Ability to: 1. Select and mix coating liquid to produce desired colour, according to specifications, using paddle or mechanical mixer. 2. Turn sprayer valves and nozzle to regulate width and pressure of spray according to knowledge of painting technique.

S/N	CATEGORY	SCARCE TRADE	CRITICAL SKILLS
	Automotive Cont'd...	Tractor mechanical Maintenance and Repairs	Ability to: 1. Inspect parts for damage, and verify dimensions and clearances of parts for conformance to factory specifications, using gauges, such as callipers, and micrometres.
		Transmission Re- building	Ability to: 1. Read inspection cards to determine defects in vehicle components.
		Wheel Balancing & Alignment	Ability to: 1. Place wheel on balancing machine to determine where counterweights must be added to balance wheel
		Welding	Ability to: 2. Use blowtorch to make and repair lead lining, pipes, floors and other lead fixtures
3.	Construction	Batch Plant Operation	Ability to: 1. Set controls on instrument panel regulating equipment which automatically discharges ingredients onto scales and weighs and blends ingredients in specified ratios. 2. Observe control panel instruments to monitor operations and manually overrides controls in case of malfunction.
		Cabinet Making	Ability to: 1. Study blueprints or drawings of articles to be constructed or repaired. 2. Trim component parts of joints to ensure snug fit, using hand tools, such as planes, chisels, or wood file. 3. Glue, fit, and clamp parts and subassembly together to form complete unit, using clamps or clamping machine. 4. Dip, brush, or spray assembled articles with protective or decorative materials, such as stain, varnish, or paint.

<b>S/N</b>	<b>CATEGORY</b>	<b>SCARCE TRADE</b>	<b>CRITICAL SKILLS</b>
	Construction Cont'd	Crane Mechanical Maintenance and Repairs	Ability to: <ol style="list-style-type: none"> <li>1. Overhaul and test machines or equipment to ensure operating efficiency.</li> <li>2. Measure, examine, or test completed units to check for defects and ensure conformance to specifications, using precision instruments, such as micrometers.</li> </ol>
		Computer Aided Designing & Drafting	Ability to: <ol style="list-style-type: none"> <li>1. Analyses building codes, by-laws, space and site requirements, and other technical documents and reports to determine their effect on architectural designs</li> <li>2. Lay out and plans interior room arrangements for commercial buildings using computer-assisted drafting (CAD) equipment and software.</li> </ol>
		Carpentry	Ability to: <ol style="list-style-type: none"> <li>1. Cut or saw boards, timbers, or plywood to required size, using handsaw, power saw, or woodworking machine.</li> <li>2. Assemble and fasten material together to construct wood or metal framework of structure, using bolts, nails, or screws.</li> <li>3. Bore bolt holes in timber, masonry or concrete walls, using power drill</li> </ol>
		Draughtsmanship	Ability to: <ol style="list-style-type: none"> <li>1. Employ structural reinforcing steel, concrete, masonry, wood, and other structural materials.</li> </ol>
		Electric Motor winding	Ability to: <ol style="list-style-type: none"> <li>3. Test windings for motor-housing clearance, grounds, and short circuits, using clearance gauge, growler, spring-steel blade, telephone receiver, insulation tester, and Resistance Bridge.</li> <li>4. File burrs from core slots, using hand file, portable power file, and scraper.</li> </ol>
		Excavation	Ability to: <ol style="list-style-type: none"> <li>1. Interpret drawings, calculate earth quantities, levels, slopes and widths of excavations.</li> </ol>

S/N	CATEGORY	SCARCE TRADE	CRITICAL SKILLS
	Construction Cont'd	Furniture & Woodwork	Ability to: 1. Select finish ingredients and mixes them by hand or machine to obtain specified colour or shade or to match existing finish.
		Iron Bending	Ability to: 1. Bend tubing by hand to conform to outline on cardboard or hammers tubing around forming blocks, using mallet. 2. Assemble and test preform metal tubing for use in hydraulic, fuel, and water systems of aircraft and spacecraft.
		Landscaping	Ability to: 1. Develop landscaping plans. 2. Prepare site plans, working drawings, specifications, and cost estimates for land development, showing ground contours, vegetation, locations of structures, and such facilities as roads, walks, parking areas, fences, walls, and utilities, coordinating arrangement of existing and proposed land features and structures.
		Masonry	Ability to: 1. Spread soft bed of mortar that serves as base and binder for block, using trowel. 2. Determine vertical and horizontal alignment of courses, using plumb bob, gauge line (tightly stretched cord), and level.
		Mobile Crane Operation	Ability to: 1. Move levers and pedals to rotate crane on chassis, to raise and lower crane boom, and to raise and lower load line.
		Welding	Ability to: 1. Use blowtorch to make and repair lead lining,

<b>S/N</b>	<b>CATEGORY</b>	<b>SCARCE TRADE</b>	<b>CRITICAL SKILLS</b>
			pipes, floors and other lead fixtures
4.	Fire Service	Fire Defense System Maintenance and Repairs	Ability to: 1. Replace worn or damaged parts, using hand tools.
		Fire-Fighting	Ability to: 1. Create openings in buildings for ventilation or entrance, using axe, chisel, crowbar, electric saw, core cutter, and other power equipment. 2. Inspect buildings for fire hazards and compliance with fire prevention ordinances.
5.	Hotel, Catering and Tourism	Catering	Ability to: 1. Investigate and resolve food quality and service complaints.
		Chef	Ability to: 1. Select and develop recipes based on type of food to be prepared and apply personal knowledge and experience in food preparation. 2. Cut, trim, and bone meats and poultry for cooking.
		Baking	Ability to: 1. Observe colour of products being baked and turns thermostat or other controls to adjust oven temperature.
6.	ICT	Computer Operation	Ability to: 1. Monitor the system for equipment failure or errors in performance. 2. Watch gauges, dial, or other indicators to make sure a machine is working properly.
		Computer Hardware Maintenance and Repairs	Ability to: 1. Help programmers and systems analysts test and debug new programs. 2. Respond to program error messages by finding and correcting problems or terminating the program.
		Electric Motor winding	Ability to: 1. Test windings for motor-housing clearance, grounds, and short circuits, using clearance gauge, growler, spring-steel blade, telephone receiver, insulation

			tester, and Resistance Bridge. 2. File burrs from core slots, using hand file, portable power file, and scraper.
<b>S/N</b>	<b>CATEGORY</b>	<b>SCARCE TRADE</b>	<b>CRITICAL SKILLS</b>
	ICT Cont'd...	Satellite Maintenance and Repairs	Ability to: 1. Conduct tests to determine whether equipment software or procedures are operating as expected.
		Telecommunication Maintenance and Repairs	Ability to: 1. Install new equipment and upgrades. 2. Conduct performance and diagnostic testing of telecommunications equipment.
7.	Leather works	Leather works	Ability to: 1. Mark holes in article, using template and marking pencil. 2. Rub finished article with damp cloth to clean leather and rubs paste wax on surface, using cloth, to produce shine.
8.	Manufacturing	Access Control Maintenance and Repairs	Ability to: 1. Manage applications, systems, network user administration, system security, authentication, user id and password. 2. Manage security services involving network, firewalls, web servers, DNS administration, LDAP and relational data base systems.
		Air Compressor Maintenance and Repairs	Ability to: 1. Follow wiring diagrams and use hand tools
		Air Condition & Refrigeration Maintenance and Repairs	Ability to: 1. Prepare unit design layout and detail drawing for fabricating parts and assembling system. 2. Assemble system using hand tools and power tools. 3. Conduct operational tests under specified conditions and troubleshoot.
		Billet Cutting	Ability to: 1. Immerse filled basket in chemical and rinsing solutions to clean grease, dirt, scale, and other foreign matter from components, using crane. 2. Connect sealed fuel element valve to pump and activates pump to create

			vacuum in fuel element to prevent oxidation of element during extrusion process.
<b>S/N</b>	<b>CATEGORY</b>	<b>SCARCE TRADE</b>	<b>CRITICAL SKILLS</b>
	Manufacturing Cont'd...	Boiler Operation	Ability to:  1. Observe boiler and auxiliary units to detect malfunctions and make repairs, such as changing burners and tightening pipes and fittings
		Boiler Maintenance and Repairs	Ability to:  1. Inspect and repair boiler fittings, such as safety valves, regulators, automatic-control mechanisms, and water columns, and auxiliary machines, such as pumps, draft fans, stokers, and burners.
		Computer Numerical Control (CNC) Machine Operation	Ability to:  1. Operate computer to lay out graphic display of parts to be machined in optimum arrangement (nest) and generate control media for numerical-control drilling, routing, and cutting machines.
		Cooling System Maintenance and Repairs	Ability to:  1. Observe temperature, pressure and ampere readings for system and equipment and adjusts controls or overrides automatic controls to obtain specified operation of equipment.
		Diagnostic Equipment Maintenance and Repairs	Ability to:  1. Select equipment for use in ultrasound setup according to specifications of examination.
		Electric Motor winding	Ability to:  1. Test windings for motor-housing clearance, grounds, and short circuits, using clearance gauge, growler, spring-steel blade, telephone receiver, insulation tester, and Resistance Bridge.

			2. File burrs from core slots, using hand file, portable power file, and scraper.
<b>S/N</b>	<b>CATEGORY</b>	<b>SCARCE TRADE</b>	<b>CRITICAL SKILLS</b>
	Manufacturing Cont'd...	Electronics Fitting	Ability to:  1. Connect component lead wires to printed circuit or routes and connects wires between individual component leads and other components, connectors, terminals, and contact points, using soldering, welding, thermo compression, or related bonding procedures and equipment. 2. Install finished assemblies or subassemblies in cases and cabinets. 3. Perform intermediate assembly tasks, such as potting, encapsulating, sanding, cleaning, epoxy bonding, curing, stamping, etching, impregnating, and colour coding parts and assemblies.
		Extruding	Ability to:  1. Examine extruded product for defects, such as wrinkles, bubbles, and splits. 2. Measure extruded articles for conformance to specifications, using micrometres, callipers, and gauges.
		Fabrication	Ability to:  1. Operate machines, such as arbour presses, riveting press, brazing machine, and resistance-welding machines, to complete assembly.
		Fitting	Ability to:  1. Locate and mark centrelines and reference points onto floor or face block and transposes them to work piece, using tape, chains, plumb bob, and squares. 2. Remove high spots and cuts bevels, using hand files, portable grinders, and cutting torch.
		Forklift Operation	Ability to: 1. Position forks, lifting platform, or other lifting device under, over, or around

			loaded pallets, skids, boxes, products, or materials or hooks tow trucks to trailer hitch, and transports load to designated area.
<b>S/N</b>	<b>CATEGORY</b>	<b>SCARCE TRADE</b>	<b>CRITICAL SKILLS</b>
	Manufacturing Cont'd...	Gas Power House Maintenance and Repairs	Ability to:  1. Lubricate automatic recording instruments, change recording charts, and refill ink containers. 2. Remove instruments from panel boards for repairs, and reinstall them when repairs are completed, using hand tools
		Generator Operation	Ability to:  1. Record data, such as temperature of equipment, hours of operation, fuel consumed temperature or pressure, water levels, analysis of flue gases, voltage load, and generator balance.
		Generator Maintenance and Repairs	Ability to:  1. Fabricate special tools, rigging equipment, and replacement parts for equipment
		Heating Ventilation and Air Condition Maintenance and Repairs	Ability to:  1. Fabricate, assemble, and install ductwork and chassis parts, using portable metalworking tools and welding equipment. 2. Inject small amount of refrigerant into compressor to test systems, and adds Freon gas to build up prescribed operating pressure.
		Heavy Duty Equipment Operation	Ability to:  1. Turn valves to control air and water output of compressors and pumps. 2. Repair and maintain equipment.
		Heavy Duty Equipment Maintenance and Repairs	Ability to:  1. Replace defective engines and subassemblies, such as transmissions. 2. Weld broken parts and structural members.

		Instrumentation	Ability to: 1. Calibrate instruments or test equipment according to established standards.
<b>S/N</b>	<b>CATEGORY</b>	<b>SCARCE TRADE</b>	<b>CRITICAL SKILLS</b>
	Manufacturing Cont'd...	IS Machine Operation	Ability to: 1. Adjust feed guides, cutting disks, and punch rams according to work order specifications. 2. Mount roll of paper on machine, using electric hoist. 3. Adjust feed guides, cutting disks, and punch rams according to work order specifications.
		Loom Operation	Ability to: 1. Operate battery of looms to weave yarn into cloth: Observes cloth being woven to detect weaving defects.
		Machining	Ability to: 1. Study blueprints, sketches, machine parts or specifications to determine type and dimensions of metal stock required. 2. Measure, marks, and scribes dimensions and reference points on metal stock surfaces, using such measuring and marking devices as calibrated ruler, micrometer, calliper, and scribe.
		Pay loader Operation	Ability to: 1. Move levers, depress foot pedals, and turn dials to operate power machinery, such as power shovels, stripping shovels, scraper loaders, or backhoes. 2. Create and maintain inclines and ramps, and handle slides, mud, and pit cleanings and maintenance. 3. Measure and verify levels of rock or gravel, bases, or other excavated material.
		Plant Maintenance and Repairs	Ability to: 1. Listen for unusual sounds from machines or equipment to detect malfunction.

			2. Lay out, assemble, install, and maintain pipe systems and related hydraulic and pneumatic equipment, and repairs and replaces gauges, valves, pressure regulators, and related.
<b>S/N</b>	<b>CATEGORY</b>	<b>SCARCE TRADE</b>	<b>CRITICAL SKILLS</b>
	Manufacturing Cont'd...	Plant Operation	Ability to: 1. Observe gauges, dials, and operation of machinery to ensure conformance to processing specifications. 2. Repair machinery, using hand tools, power tools, and welding equipment.
		Power System Electrical Maintenance and Repairs	Ability to: 1. Repair and replace equipment, such as relays, switches, supervisory controls, and indicating and recording instruments. 2. Test and repair switchboard and equipment, circuitry, interpreting wiring diagrams to trace and connect numerous wires carrying current for independent functions
		Rotogravure Operation	Ability to: 1. Thread web (roll) of paper or other printing stock through press, adjusting guides and tension bars. 2. Set focus of electronic scanners on guideline of paper (for multi-colour printing) to automatically control colour registration.
		Tapping	Ability to: 1. Tend one or more automatic machines to head, trim, roll-thread, slot, or tap metal stock to produce nuts, bolts, or other fasteners.
		Turning	Ability to: 2. Slide article over pipe and push end of article through pipe, using rod
		Welding	Ability to: 1. Use blowtorch to make and repair lead lining, pipes, floors and other lead fixtures

9.	Oil and Gas	Arch Welding	Ability to: 1. Obtain specified electrode and inserts electrode into portable holder or threads consumable electrode wire through portable welding gun. 2. Weld in flat, horizontal, vertical, or overhead positions.
<b>S/N</b>	<b>CATEGORY</b>	<b>SCARCE TRADE</b>	<b>CRITICAL SKILLS</b>
	Oil and Gas Cont'd...	Drilling	Ability to: 1. Replace broken or worn parts, using hand tools, and lubricates equipment.
		Forklift Operation	Ability to: 1. Position forks, lifting platform, or other lifting device under, over, or around loaded pallets, skids, boxes, products, or materials or hooks tow trucks to trailer hitch, and transports load to designated area.
		Heavy Duty Equipment Operation	Ability to: 1. Turn valves to control air and water output of compressors and pumps. 2. Repair and maintain equipment.
		Heavy Duty Equipment Maintenance and Repairs	Ability to: 1. Replace defective engines and subassemblies, such as transmissions. 2. Weld broken parts and structural members.
		Motorman (Rig Operation)	Ability to: 1. Lower special tools into well to fish for broken rods and tubing and to scrape paraffin and incrustations from casing or tubing. 2. Test pipe for leaks, using hydraulic-testing equipment.
		Offshore Radio or Telex Operation	Ability to: 1. Conduct routine tests and repairs transmitting equipment, using electronic testing equipment, hand tools, and power tools, to maintain communication system in operative condition.
		Offshore Rig Mechanical Maintenance and Repairs	Ability to: 1. Cut and weld metals to repair broken metal parts, fabricate new parts, or assemble new equipment. 2. Study blueprints or manufacturers manuals to determine correct installation

			or operation of machinery.
		Turbine Mechanical Maintenance and Repairs	Ability to: 1. Troubleshoot and maintain automated control and PLC systems. 2. Troubleshoot and maintain Supervisory Control and Data Acquisition (SCADA) systems.
<b>S/N</b>	<b>CATEGORY</b>	<b>SCARCE TRADE</b>	<b>CRITICAL SKILLS</b>
10.	Photography	Motion Picture Camera Repair	Ability to: 1. Fabricate and modify parts, using bench lathe, grinder, and drill press. 2. Calibrate operation of shutter, diaphragm, and lens carriers with dial settings, using electronic or stroboscopic timing instruments
11.	Printing	Graphic Art & Painting	Ability to: 1. Set up and operate various types of cameras to produce plastic or paper plates, or negatives for later use in preparation of aluminium plates for reproduction in offset lithographic process. 2. Operate offset-duplicating machine or small printing press to reproduce single or multicolour copies of line, drawings, graphs, or similar materials.
		Graphic Artist	Ability to: 1. Determine style, technique, and medium best suited to produce desired effects and conform to reproduction requirements.
		Graphic Designing	Ability to: 1. Draw and Prepare final layouts for printing.
		Kord Machine Operation	Ability to: 1. Measure from edge of page, using scale, and type's instructions on keyboard of computer, push buttons to activate computer program, or manually set cutting guides, clamps, and knives, using wrench, to cut paper or spine to

			prescribed dimensions.
		Lithography	Ability to: 1. Place colour filters between lens and film to produce four-colour separations 2. Immerse film in series of chemical baths to develop image on film and hang film on rack to dry for manual method of processing film.
<b>S/N</b>	<b>CATEGORY</b>	<b>SCARCE TRADE</b>	<b>CRITICAL SKILLS</b>
	Printing Cont'd...	Printing	Ability to: 1. Turn screws to align register marks on printing rollers with register marks on machine, using allen wrench. 2. Scan cloth leaving machine for printing defects, such as smudges, variations in colour shades, and designs that are out of register (alignment). 3. Realign printing rollers and adjusts position of blanket or back gray cloth to absorb excess colour from printing rollers.
		Rotogravure Operation	Ability to: 1. Thread web (roll) of paper or other printing stock through press, adjusting guides and tension bars. 2. Set focus of electronic scanners on guideline of paper (for multi-colour printing) to automatically control colour registration.
		Audio Visual Maintenance and Repairs	Ability to: 1. Coordinate equipment operation with material presented, according to notations in script or instructions of speaker.
		Calibration Maintenance and Repairs	Ability to: 1. Select and install accessories, such as adapters, indicating gauges, or holding devices on test or calibration fixture.



### **3.1.5 Factors Responsible for Dearth of Critical Skills**

Causal factors of Scarce Skills as mentioned by respondents during the survey are:

- Poor remuneration of Craftspersons
- High Cost of training for acquisition of skills
- Inadequate number of Vocational Training Centres
- Lack of awareness of the importance of Skills Acquisition and Emerging Trades
- Lack of interest and patience to learn trades
- Inadequate provision of Facilities in TVET Programmes
- No proper Guidance and Counselling for youths
- Over emphasis on certificates rather than skills
- Wide gap between theory and practice in TVET
- Poor Funding of Vocational and Technical Programmes
- Epileptic power supply
- Rural Urban drift
- Unstable Educational and Training Curriculum
- Desire for white collar jobs by youths
- Workforce Attrition
- Dichotomy between HND and Degree Holders

### **3.1.6 Actions Recommended for Addressing Dearth of Critical Skills**

The following actions are recommended by respondents for addressing dearth of Critical Skills:

- Technical, Vocational Education and Training should be emphasised by Government, Stakeholders in the Educational Sector and Human Resource Development Agencies.
- Establishment of more Skill Acquisition Centres with good facilities by Human Resource Development Agencies such as the Industrial Training Fund and other Stakeholders.
- Infrastructural Facilities and relevant Equipment should be provided for all levels of Education government and other Stakeholders.
- Employment to Technical Trade Areas should be based on skills possessed rather than paper qualification by Employers of Labour.
- Increased funding for TVET by Government and all Stakeholders.

- Vocational Training Curriculum should be reviewed by relevant Government Agencies and
- Stakeholders of TVET should emphasis more of practical than theory.

#### 4.1 Recommendations

A Study of this magnitude must proffer some strategic yet, practical recommendations, because of the essence of Critical Skills to economic and national development. This is more so in view of the global trend in Science and Technology and complex societal needs which, demand new strategies to harness potentials of the citizenry. Furthermore, Nigeria can no longer afford to put the issue of Critical Skills in the back burner of development planning. Instead, concerted efforts are required for executing a well-planned programme of intervention. Thus, the following recommendations and strategies for implementation are made:

4.1.1 Federal and State Governments should review, standardize and expand Curricula of Vocational Training Schools and Skill Acquisition Centres in Nigeria to **reinforce** identified scarce trades and Critical Skills.

To actualize this, relevant Professional Bodies and Agencies, such as the Nigeria Association of Teachers of Technology (NATT), National Business and Technical Education Board (NABTEB), Industrial Training Fund (ITF), National Board for Technology Incubation (NBTI), National Directorate of Employment (NDE) and Small and Medium Enterprise Development Agency of Nigeria (SMEDAN) should collaborate with Teachers and Instructors in Vocational Training Schools, Skills Acquisition Centres and Higher Institutions to review, standardize and mainstream TVET curricula throughout the education system.

4.1.2 Federal Government should establish more Technical Schools in the various geo-political zones. Such schools should concentrate on trades in demand and those emerging in the zones. Similarly, the ITF and other relevant Agencies and stakeholders should establish more Skills Acquisition Centres in different geo-political zones. Such Centres should concentrate on Trades in demand, and those emerging in the zones as identified in the Study.

To facilitate this, the Honourable Minister of Education should propose to the Federal Government to mandate the Educational Trust Fund (ETF) to provide take-off grants for the establishment of Skill Acquisition Centres by relevant Agencies.

- 4.1.3 Government should promote and strengthen Research and Development (R&D) activities by providing research grants on regular basis to relevant Agencies and Institutions. Government should also pursue Legislation for the recognition of NABTEB Certificate for graduates of Technical Secondary Schools for admission into the Polytechnic without having to go through the regular Universal Tertiary Matriculation Examination (UTME). Furthermore, the Federal Ministry of Industry, Trade and Investment should make budgetary provisions for the establishment of Skills Acquisition Centres.

Government Agencies, such as the National Planning Commission (NPC), National Research Institutes (NRIS), Nigerian Institute of Social and Economic Research (NISER), Industrial Training Fund (ITF) and National Bureau of Statistics (NBS), should strengthen Research and Development by making reasonable budgetary provisions for studies on skill shortages, skill gaps and skill requirements in specific sectors of the economy. Furthermore, structures and processes for translating research findings into actions should be established.

- 4.1.4 Government should review the existing Educational System of 1-6-3-3-4 (1=Pre-primary, 6=Primary, 3=Junior Secondary, 3=Senior Secondary, 4=Tertiary) to adopt the 1-6-5-1-4 (1=Pre-primary, 6=Primary, 5=Secondary, 1=Compulsory Vocational Training, 4=Tertiary).

To realize this, all national bodies responsible for educational policy formulation and implementation should collectively re-design the education system such that after Secondary School education, students will be required to undergo a one-year compulsory Vocational Training in designated Skills Acquisition Centres before tertiary education.

- 4.1.5 Federal Ministries of Education and Information and Communication, in collaboration with National Orientation Agency (NOA) and Professional Associations, should enlighten and sensitize the public on the

importance of Technical, Vocational, Education and Training (TVET) as a veritable tool for National Development and the need for individuals to acquire employable skills.

To facilitate this, Jingles, Seminars and Workshops should be organised by Ministries, Agencies and Professional Bodies to sensitize the Public on the importance of Technical, Vocational, Education and Training (TVET) and the need for acquisition of employable skills.

4.1.6 Government should establish a Vocational Skills Development Loan Scheme (VSDLS) to encourage individuals that rely on Vocational Trades as their source of livelihood. The scheme should be managed by Bank of Industry (BOI) and funds should be disbursed through Microfinance institutions.

With these recommendations, it is expected that the process of up-Skilling Scarce Skills will be fast-tracked. This will contribute immensely towards actualizing the Transformation Agenda of Government and realizing Vision 20:2020.