A

TECHNICAL REPORT

ON

STUDENT INDUSTRIAL WORK EXPERIENCE SCHEME (SIWES)

UNDERTAKEN

AT

Internet eXchange Point of Nigeria

(IXPN)

BY

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SUBMITTED TO

THE DEPARTMENT OF COMPUTER SCIENCES,

FACULTY OF NATURAL AND APPLIED SCIENCES

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REPORT OVERVIEW

This report is based on the brief history, objectives and vision of Internet eXchange Point of Nigeria and SIWES. It is based on the different activities carried out and the equipment used. Chapter four gives the summary of the activities done; it gives useful recommendation to Internet eXchange Point of Nigeria and SIWES. The report stated the objectives of SIWES which is to provide an avenue for students in institution of higher learning to acquire industrial skills and experience in their approved course of study and also to prepare students for industrial work situations which they are likely to meet after graduation.

CERTIFICATION PAGE

I Mohammed Samir with matric number **20/03CYB013** certify that this SIWES report was prepared with utmost sincerity and was based on the events and experience of my SIWES program. A program which was at **(Internet eXchange point of Nigeria at 8th Floor, NCR Building, 6th Broad Street, Marina, Lagos state)**, through the period of (1st of May to 27th of October), 2023.

_____ _____

Student Signature and Date

_____ _____

SIWES Coordinator Signature and Date

DEDICATION

I would relish to dedicate this report to Almighty Allah my creator, my strong pillar, my source of inspiration, wisdom, knowledge and understanding. Who has been my ultimate source of bliss, vigor, sapience, good health and sustenance for visually perceiving me through and for the prosperous completion of my Siwes programme in one piece.

This work is also dedicated to my parent **Alhaji and Alhaja IPOSU**, who have always loved me unconditionally and whose good examples have taught me to work hard for the things that I aspire to achieve. I am truly thankful for having you in my life.

It is withal dedicated to new horizon computer learning center for all the care, attention and understanding throughout the duration of my industrial training in their reputable organization.

DECLARATION

I hereby declare/ascertain that this report was compiled by me **IPOSU ABDULRAHMAN AYODEJI** and entails what I have done during my SIWES Industrial Training at Internet eXchange Point of Nigeria (IXPN). I withal declare that this report or its content has not been anteriorly submitted to this or any other institution of learning for the purport of consummating the requisites for the award of any degree. All citations and sources of information's and research are pellucidly acknowledged by betoken of references.

ACKNOWLEDGEMENT

First and foremost, praises and thanks to the God, the Almighty, for His showers of blessings throughout my research work to complete the research successfully.

I am extremely grateful to my parents for their love, prayers, caring and sacrifices for educating and preparing me for my future.

I acknowledge **Mr. David** for his moral and intellectual support during the course of SIWES.

I acknowledge **Mr. Emmanuel Olowogboye** for putting through when I had challenges in one task or the other.

I also like to specifically thank my Dean, the Dean of Natural and Applied Sciences, The Head of Department, General SIWES Director, SIWES Coordinator, my Level Adviser and my lecturers for the cognizance of Computer Science for all they have imparted in me.

Finally, and without hesitation, I express my sincere appreciation to all my training colleagues, friends and everyone who directly or indirectly helped me throughout my training period.

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CHAPTER ONE

1.1 About Industrial Training (IT)

Industrial Training Fund (ITF) was established in 1971, it has operated consistently and painstakingly with the context of its enabling laws, i.e., Decree 47 of 1971. The objective for which the fund was established has been pursued vigorously and efficaciously. In the three decades of its existence, the ITF has not only raised training consciousness in the economy, but has also helped in generating a corps of skilled indigenous manpower which has been manning and managing various sectors of the national economy. Over the years, pursuant to its statutory responsibility, the ITF has expanded its structure, developed training programs, and reviewed its strategies, operations and services in order to meet the expanding and changing demands for skilled manpower in the economy.

Beginning as a parastatal "B" in 1971, headed by a Director-General as the chief executive under the aegis of the Ministry of Industry. The Fund has a thirteen (13) member Governing council and operates with six (6) Departments and three (3) units at the headquarters, 27 Area offices, 2 skills Training centre, and a centre for Industrial Training excellence. As part of its responsibilities, the ITF provides Direct Training, Vocational and Apprentice Training, Research and consultancy service, Reimbursement of up to 60% Levy paid by employers of labour registered with it and administers the Student Industrial Work experience Scheme (SIWES). It also provides human resource development information and training technology service to Industry and commerce to enhance their manpower capacity and in-house training delivery effort. The main thrust of ITF programs and services is to stimulate human performance, improve productivity and induce value-added production in Industry and commerce. Through its SIWES and Vocational Apprentice Training programs, the fund also builds capacity for graduates and youth self-employment in the context of small scale Industrialization in the economy.

1.2 VISION STATEMENT:

To be the foremost skills training and development organization in Nigeria and one of the best in the world.

1.3 MISSION STATEMENT:

To set and regulate training standards and offer direct training intervention in Industry and commercial skills training and development using a corps of highly competent professional staff, modern techniques and technology.

1.4 Historical Background of SIWES.

The students' Industrial Work Experience Scheme (SIWES) is a skill development program initiated by the Industrial Training Fund (ITF), in 1973 to bridge the gap between theory and practice among students of engineering and technology in institutions of higher learning in Nigeria. It provides for on-the-job practical experience for students as they are exposed to work methods and techniques in handling equipment's and machineries that may not be available in their institutions. Started in 1974, with 748 students from 11 institutions of higher learning participating, by1978, the scope of participation in the scheme had increased to about 5000 students from 32 institutions. The Industrial Training Fund however withdrew from the management of the scheme in 1979 owing to problems of organizational logistics and the increased financial burden associated with the rapid expansion of SIWES (ITF, 2003). Consequently, the Federal Government funded the scheme through the National Universities Commission (NUC) and the National Board for Technical Education (NBTE) who managed SIWES for five years (1979-1984).The supervising agencies (NUC and NBTE) operated the scheme in conjunction with their respective institutions during this period. The scheme was subsequently reviewed by the Federal Government resulting in a Decree No 16 of August, 1985 which required that "all students enrolled in specialized engineering, technical, business, applied sciences, and applied arts should have supervised industrial attachment as part of their studies". In the same vein, the ITF was directed by the Federal Government to take charge and resume responsibility for the management of SIWES in collaboration with the supervising agencies i.e. National Universities Commission (NUC),the National Board for Technical Education (NBTE) and the National Commission for Colleges of Education (NCCE).

Following the resumption of management of SIWES by the ITF IN 1984, the scheme has witnessed rapid expansion. Between 1895 and 1995, the number of institutions and students participating in SIWES rose to 141 and 57,433 respectively. Between 1995 and

2003, a total of 176 institutions and 535,210 students participated in the scheme. In 2008 alone, the number of institutions which participated in SIWES rose to 204 while the number of students from these institutions who participated in the scheme was 210,390.

Presently, participation in the scheme is limited to science, engineering and technology program in Universities and Polytechnics while in Colleges of Education NCE programs in Technical Education, Agriculture, Business, Creative Arts and Design, Computer Studies and Home Economics are eligible.

The scheme was designed to expose students to the industrial environment and enable them develop occupational competencies so that they can contribute their quota to national economic and technological development after graduation.

Objectives of SIWES

- Provide an avenue for students in institutions of higher learning to acquire industrial skills and experience during their courses of study.
- Prepare students for industrial work situations that they are likely to meet after graduation.
- Expose students to work methods and techniques in handling equipment and machinery that may not be available in their institutions.
- Make the transition from school to the world of work easier and enhance students' contacts for later job placements.
- Provide students with the opportunities to apply their educational knowledge in real work situations, thereby bridging the gap between theory and practice.
- Enlist and strengthen employers' involvement in the entire educational process through SIWES.
- Opportunity for students to blend theoretical knowledge acquired in the class room with practical hands-on application of knowledge required to perform work in industry.

- Exposure of students to the environment in which they will eventually work, thereby enabling them to see how their future professions are organized in practice.
- Minimization of the bewilderment experienced by students, particularly those from a non-technological background, pursuing courses in sciences, engineering and technology with regard to different equipment, processes, tools etc. available in industry.
- Enabling SET students appreciate work methods and gain experience in handling equipment and machinery which may not be available in their institutions.
- Preparing students to contribute to the productivity of their employers and national development immediately after graduation.
- Provision of an enabling environment where students can develop and enhance personal attributes such as critical thinking, creativity, initiative, resourcefulness, leadership, time management, presentation skills and interpersonal skills amongst others.
- Preparing students for empowerment and making the transition from school to the world of work easier after graduation.
- Enhancing students' contacts with potential employers while on training.
- Enabling students bridge the gap between the knowledge acquired in institutions and the relevant production skills (RPSs) required in work organizations.
- Making SET students appreciate the role of their professions as the creators of change and wealth and indispensable contributors to growing the economy and national development.

CHAPTER TWO

2.0 BRIEF HISTORY OF Internet eXchange Point of Nigeria (IXPN)

November – President Olusegun Obasanjo directed the Nigerian Communications Commission (NCC) to ensure that the nation gets its own Internet Exchange Point (IXP) as soon as possible. An IXP setup committee was constituted to work with the various structures that were in place. The committee members were made up of the following: Ndukwe Kalu (ISPAN), Ike Nnamani (Medallion Communications), Tosin Oni (InterConnect Nigeria, ICN), Femi Adelamo (Emperion WA), O.T Abiodun (NITEL), Abubakar Yakubu (NCC) and Chris Agha (NCC), including Sam Adeleke of Digitek Teevee Ltd. as the consultant to NCC on the IXPN setup and under the supervision of Engr. Bashiru Gwandu, an Executive Commissioner with the Engineering and Standards Department, NCC.

2006- The Birth of Internet eXchange Point of Nigeria (IXPN)

The Board of the Nigerian Communications Commission (NCC), under the leadership of Dr. Bashir Gwandu the then acting Executive Vice Chairman' approved a proposal to partly fund the setting-up of Internet eXchange Points (IXPs) in Nigeria, with a collaboration between NCC and ISPAN. IXPN will operate from NECOM House (Marina, Lagos) as its main location; with sub-locations at Victoria Island, Ikeja, Port Harcourt, Abuja, Enugu, Kano & Maiduguri.

2.1 OBJECTIVES OF Internet eXchange Point of Nigeria (IXPN)

IXPN is expected to yield the following results:

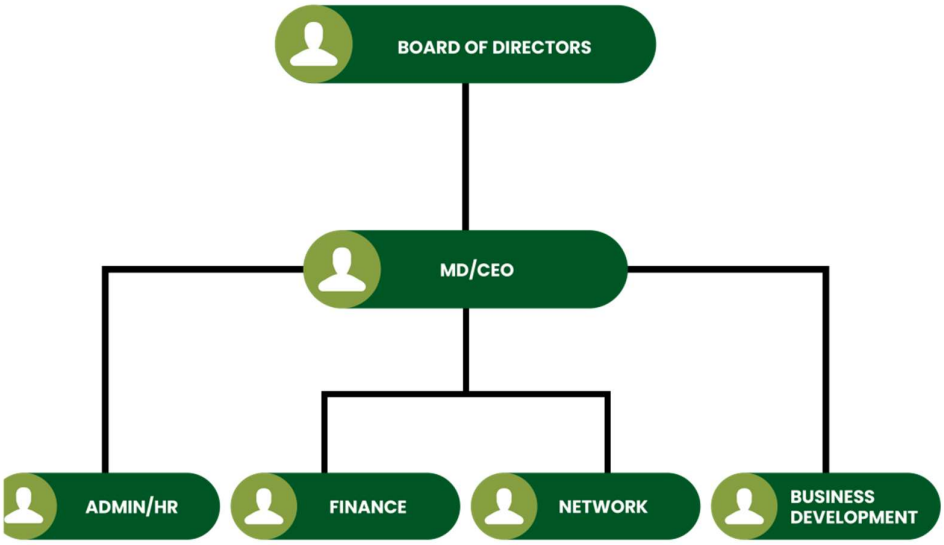
- Immediate drop in connectivity costs as well as cost savings in millions of dollars in offshore internet bandwidth payments.
- Improved security profile of Nigerian internet traffic by ensuring that only international traffic leaves Nigeria.
- Immediate drop in latency from 900 milliseconds to 30 milliseconds for local content.

- Increased e-commerce activities, leading to a reduction in cash transactions.
- Serve as the central point for connecting Higher Educational Institutions (HEIs) towards the development of National Research and Educational Network (NREN).

2.1 ORGANIZATIONAL STRUCTURE OF Internet eXchange Point of Nigeria (IXPN)

Internet eXchange Point of Nigeria (IXPN) consists of five major departments with the director overseeing all the departments. IXPN is overseen by the IXPN Board comprising the MD/CEO and ten directors. The board is responsible for control of proper management of the IXPN. The Current composition of the board, in which it has listed below the eleven members including the IXPN MD/CEO, is made up of selected people from the IXPN setup committee and other stakeholders.

2.2 ORGANOGRAM OF THE ORGANIZATION Internet eXchange Point of Nigeria (IXPN)



2.3 DEPARTMENTS OF Internet eXchange Point of Nigeria (IXPN)

1. Admin/HR
2. Finance Department
3. Networking Department
4. Business Development Department

5. **2.3.1 FUNCTIONS OF THE ADMIN/HR DEPARTMENT**

1. **Policy Development:** Admin/HR personnel may be involved in developing and implementing HR policies and procedures that govern the operations of the IXP
2. **Employee Relations:** Admin/HR professionals play a crucial role in managing employee relations, addressing grievances, and fostering a positive work environment.
3. **Promote Diversity and Inclusion:** Implement strategies to promote diversity and inclusion within the IXP, recognizing the benefits of a diverse workforce.

2.3.2 FUNCTIONS OF THE FINANCE DEPARTMENT

1. It ensures students are adept in the creation of Structural designs in fields such as engineering and Architecture
2. Financial Governance: Advises the board of directors and executive management on financial matters, helping make informed decisions.
3. Cost Management: Manages operational costs efficiently to maximize the IXPN's financial sustainability.
4. Cost Management: Manages operational costs efficiently to maximize the IXPN's financial sustainability.

2.3.3 FUNCTIONS OF THE NETWORKING DEPARTMENT

1. **Network Management:** The Networking Department is responsible for the design, deployment, and maintenance of the IXP's network infrastructure
2. **Monitoring and Reporting:** Continuous monitoring of the IXP's network infrastructure is essential to identify and address issues promptly.

3. **BGP Routing:** Border Gateway Protocol (BGP) is used to exchange routing information among the participants of the IXP.

2.3.4 FUNCTIONS OF THE BUSINESS DEVELOPMENT DEPARTMENT

1. **Membership Acquisition:** The Business Department is responsible for attracting new members to the IXP.
2. **Revenue Generation:** The Business Department is tasked with generating revenue for the IXP.
3. **Membership Retention:** Retaining existing members is equally important.
4. **Marketing and Promotion:** To increase the visibility and awareness of the IXP, the Business Department conducts marketing and promotional activities.

CHAPTER THREE

ACTIVITIES CARRIED OF DURING THE SIWES TRAININGS

During the course of my Siwes training I learnt the 3 different aspects of computer science they are

1. Monitoring the exchange network using various monitoring tools i.e., PRTG, Smokeping, looking Glass,
2. Installation and Setup Hardware components i.e., Routers, Switches and Servers
3. Learnt Networking introduction to BGP (Border Gateway Protocol),

NETWORK MONITORING

As an intern working in Internet Exchange Point Nigeria (IXPN), I play a crucial role in ensuring the smooth operation of the exchange point and the networks that connect to it.

1. **Traffic Analysis:** Monitor traffic patterns to understand how much data is passing through the IXP, the types of traffic and peak usage times.
2. **Security Monitoring:** Keep an eye on security-related events like intrusion attempts, unusual access patterns, and unauthorized devices connected to the IXP.
3. **Latency and Packet Loss:** Monitor latency and packet loss across the network to ensure that data is transferred with minimal delay and without data loss.
4. **Network Capacity Planning:** Use monitoring data to assess network capacity and plan for future growth. Ensure that the IXP can handle increasing traffic demands.

HARDWARE SETUP AND INSTALLATION

As an intern at an Internet Exchange Point (IXP), your role may involve assisting with the hardware setup and installation process.

1. **Understand the IXP Infrastructure**: Before you start working on the hardware setup, it's essential to have a solid understanding of the IXP's infrastructure.
2. **Rack Installation:** Many of the hardware components in an IXP are mounted in racks.
3. **Cable Management**: Neat and organized cable management is crucial to prevent cable clutter, reduce the risk of errors, and simplify maintenance.
4. **Network Configuration:** Depending on your level of expertise, you may be involved in configuring network devices such as routers and switches.

BASIC OF NETWORKING TRAINING

As an intern learning about the basics of networking in an Internet Exchange Point (IXP), you will gain valuable insights into the fundamental concepts and practices that underpin the functioning of the internet.

1. **Introduction to IXP**: Begin with an overview of what an IXP is and its role in the internet ecosystem.
2. **Network Topology:** Learn about various network topologies commonly used in IXPs, such as the mesh and fabric architectures.
3. **Peering and Transit:** Explore the concepts of peering and transit arrangements in the context of IXPs.
4. **Traffic Engineering:** Explore the principles of traffic engineering and its importance in optimizing network performance.

5.1 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Indeed, the Six-month industrial attachment exposed me to the practical application of Cyber Security.

With all activities I'd involved myself during the course of the training I was able to assume that a computer scientists can very well apply the classroom knowledge, skills and technologies for various day to day activities such as building website, designing flyers and handbills, networking and other practical application.

I learnt how to market my skills to earn stipends and this is called Technopreneuship

5.2 PROBLEMS ENCOUNTERED DURING THE COURSE OF THE INDUSTRIAL TRAINING

- The Six month assigned for Student Industrial Work experience Scheme is too short to amass all the necessary experience in the institute.
- Problem of transport, feeding and accommodation which makes it difficult during the course of the program.
- Lack of stipends from both government and the establishment to boost the morale of the students during the industrial training.
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5.3 RECOMMENDATIONS

- The NUC, NBTE, and other bodies involves in directing the affairs of Students' Industrial Work Experience Scheme should endeavor to extend the three months period assigned for Industrial training of students to enhance the acquisition of basic industrial skills, knowledge and the experience.
- The organization and the federal government should provide a good means of transportation and accommodation to the students to make work easier
- The organization and the federal government should encourage students on industrial training by giving them stipends during the course of the training.
- Finally, it is gratifying that the programmed is designed to enhance our practical experience. Towards this end, I humbly recommend that the programme should be continued promptly.