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An Overview of the Occupational Safety and Health Systems of Nigeria, UK, USA, Australia and China: Nigeria Being the Reference Case Study

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Abstract This paper reviews the Occupational Safety and Health (OSH) frameworks of Nigeria, UK, USA, Australia and China considering Nigeria as a representative developing country. The study looks at each of the five OSH regulatory and enforcement models against a range of performance themes with a view to uncovering strategic lessons for Nigeria and other developing nations. The study identifies some of the potential drivers behind the developments of the different OSH management frameworks. These drivers include robustness of the OSH laws, efficiency of the judicial system, degree of independence of the OSH enforcement agency, adequacy of financial budgets, good workforce-inspector ratio, accident history and activities of the civil/human right groups. Even though Nigeria is used as a reference case study, the observations and conclusions drawn are generic and applicable to typical developing countries. The paper may also be found beneficial by researchers looking to have a high level view of the OSH management frameworks of Nigeria, UK, USA, Australia and China. Although Nigeria is working to implement a new and more comprehensive OSH law, i.e. the Labour, Safety, Health and Welfare (LSHW) Bill (2012), this paper does not assess Nigeria's current OSH standing against the provisions of LSHW Bill which is yet to be rolled out. (The second part of this bipartite series will address some of the key structural and potential implementation issues surrounding LSHW Bill).

Keywords: *occupational safety & health; regulation & enforcement; legislation; developing countries; workforce; accidents*

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1. Introduction

Modern economies are largely driven by agriculture, manufacturing and/or service activities. Regardless of the governing factors, national economic growth and development on the basis of weak OSH regulatory regime is an invitation for accidents. According to the International Labour Organization (ILO), on an average, work-related accidents and illnesses kill more than 4 people in every single minute; and, during the same period, more than 600 people sustain various work-related injuries across the world [1]. Work-related accidents and illnesses cost the world about U.S $2.8 trillion annually [2].

Current, large enough and coherent OSH databanks are hard to come by in Nigeria [3,4]. A study by Hämäläinen [5], extracts shown in Figure 1, puts the annual work-related death rate of Nigeria at about 24 fatalities per 100,000 employees, which is one of the highest in the world. This is based on the data available in 2003. However, a recent study, though riddled with data limitation, suggests that work-related fatalities are on the increase in Nigeria between 2003 and 2012. This conclusion is based on actual field data reported to the ID – FMLP [6].

Nonetheless, unlike the situation in Nigeria, workplaces in some of these countries have become safer over the years. For instance, while UK had 0.8 work-related annual fatal accident rate (per 100,000 full-time work equivalent) in 2003, the rate dropped to about 0.74 by 2011[7]; U.S had 5.0 in 2003 and 3.5 by 2011 [8]. No doubt, Nigeria and other developing countries could gain from the vast experiences of those countries that have hugely invested and developed OSH management systems over several decades of hard work. This will not only save the developing countries vast financial resources, it will also accelerate the OSH development process. This study seeks to bring closer some of the OSH development experiences of those advanced economies. The study methodology is highlighted in the following section.

2. Methodology

The study proceeds by reviewing and discussing the OSH management framework of each of United Kingdom, United States of America, Australia, China and Nigeria.

The OSH regulatory framework for each country is reviewed against a number of topics grouped under the following broad themes:

- Main OSH legislations in each country, statutorily designated OSH competent authority & management Structure;
- Adopted enforcement model - centralised or otherwise and degree of executive & financial independence conferred to the OSH competent authority;
- Nuclear safety regulation mandate - whether part of OSH focal authority's responsibilities or delegated to a separate Government agency;
- Important OSH incident reporting legislations and available functional platform(s)
- Implied cost of OSH management per 100,000 employees incurred by the central regulatory and enforcement agency per year;
- A brief overview of the earlier efforts/undertakings that have significant impacts on the current worker safety and health provisions.

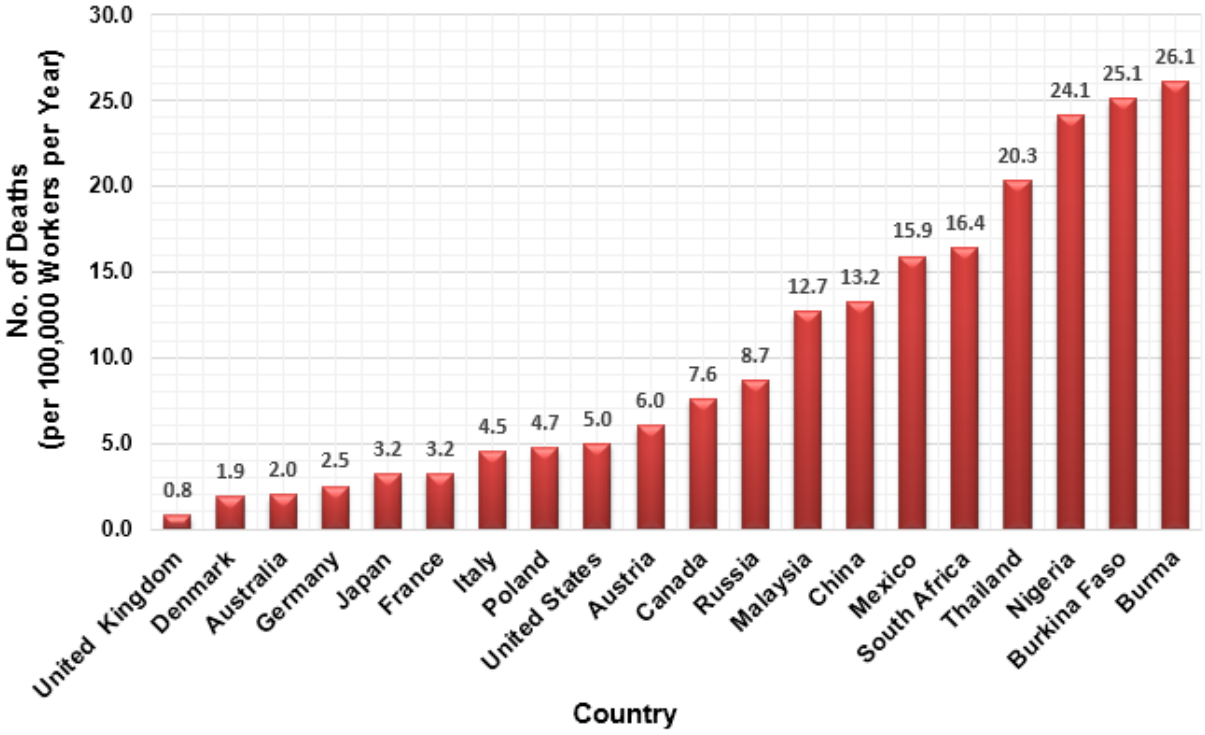

Figure 1. Work-related fatality rate for 20 countries in 2003, data extracted from [5]

Both general and specific notes observed are then discussed making close reference to Nigeria. The study closes with conclusions and a list of references for further reading.

3. OSH Regulatory Frameworks of Some Selected Countries

3.1. United Kingdom

In the United Kingdom, Health and Safety at Work Act of 1974 (Chapter 37) is the key legislation governing the OSH management. This Act establishes the Health and Safety Executive (HSE) [9,10]. HSE is the focal OSH regulatory authority overseeing England, Scotland and Wales. The Health and Safety Executive Northern Ireland (HSENI), is responsible for HSE management in the Northern Ireland [11].

In terms of structure, currently, HSE has a management board comprising of a Secretary and eight Directors, each managing a specific unit. The Board itself is under the purview of a Chief Executive officer. HSE used to have a separate Governing Board called Health Safety Commission (HSC). HSC comprises of non-executive members headed by a Chair person. HSC provides broad OSH policies and guidance and also checkmates activities of the HSE. HSE and HSC merged in 2008 to form a single body- HSE [11,12]. In addition, HSE is also supported by a research based agency called the Health and Safety Laboratory (HSL). On behalf of the HSE, HSL provides workplace health and safety research, training and consultancy services to industries, commerce sectors, Government and professional bodies [13].

HSE is a Non-Departmental Public Body (NDPB) with a crown status which means that it is largely self-determining. In terms of budgets, UK HSE is funded mainly by the Department for Work and Pensions, grants-in-aid and incomes from major hazard sites [14]. HSE reports to the Secretary of State for Work and Pensions. The Secretary of State is supposed to have limited powers over HSE (Since it is an NDPB) especially in terms of OSH law enforcement [15,16]. This arrangement is meant to confer some degree of executive independence to HSE which is good for proper OSH management.

On the other hand, HSE does not directly enforce OSH laws across all workplaces in the UK. For instance, the mandate for UK civil nuclear safety regulation is given to the Office for Nuclear Regulation (ONR) which is an independent statutory corporation. ONR was established

by the Nuclear Installations Act of 1959. Like HSE, ONR reports to the Department for Work and Pensions. ONR works closely with the Department of Energy and Climate Change, among others [15]. Also, enforcement of OSH regulations at certain local business outfits such as shops, hotels and restaurants is the direct responsibility of the local authorities rather than HSE. Similarly, certain Government agencies are responsible for safety and health administration in some specific cases, e.g. Road traffic issues and Waste disposal are the responsibilities of Police and Environmental agency respectively [17].

A major step towards OSH database building was taken in 1980 with the enactment of the Notification of Accidents and Dangerous Occurrences Regulations (NADDOR) (S.I. 1980/637) which was subsequently replaced by Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR) in 1995. Some of the main official OSH data sources are: Health and Safety Online (HandS-On), HSELINE database and the Labour Force Survey (LFS) data [11].

For the 2013/14 fiscal year, the estimated HSE operating cost is $238.4m per year (this does not include running costs of ONR) [18] and the total workforce of the UK (comprising England, Scotland, Wales and Northern Ireland) is estimated at 33.1m in March, 2014. Excluding Northern Ireland, the total workforce of Great Britain (GB) alone is about 32.2m [19]. Hence, it can be shown that the implied cost of OSH maintenance incurred by HSE per 100,000 employees is about U.S $0.741m per year (assuming U.S $1 = GB £0.65), see subsection 4.2.1 for additional notes.

Some of the early historical events standing as pillars for the current UK regulatory regime are: the establishment of the Robert Owen's Grand National Consolidated Trades Union in 1834 [20]; enactment of the Workmen's Compensation Act in 1897 [21] and the Factories Act in 1961 (c. 34) [22]. Among others, these historic events play important roles in shaping UK's workplace in terms of employee safety, health and welfare.

3.2. United States of America

Occupational Safety and Health Act of 1970 is the main legal basis for administration of OSH in the United States of America. This Act establishes the Occupational Safety and Health Administration (OSHA) [23]. OSHA is the competent statutory authority with mandate to enforce OSH regulations in the U.S. Principally, OSHA is complemented by a research based body called National Institute for Occupational Safety (NIOSH); Mine Safety & Health Administration (MSHA) and Occupational Safety and Health Review Commission (OSHRC). OSHRC entertains appeals made by duty holders against enforcement actions [24]. MSHA is established by the Federal Mine Safety & Health Act of 1977 and is responsible for mines safety in the U.S [25].

OSHA is headed by an Assistant Secretary (A.S) and reports to the Secretary of Labour who heads the U.S Department of Labour. Two Deputy Assistant Secretaries support the A.S with management of various Directorates. A chief of Staff, Senior Policy Advisor and Communication Officer also report directly to the A.S [26]. Thus, although OSHA's budget is appropriated by the U.S congress [27], with this arrangement in which OSHA boss is under the purview of the Secretary of labour as an Assistant, OSH matters are likely to be influenced considerably by the Secretary of Labour.

U.S civilian nuclear safety management mandate is vested on the U.S. Nuclear Regulatory Commission (NRC) which was established by the Energy Reorganization Act of 1974. Functionally, NRC is an independent body headed by a five-member commission. The U.S President appoints one of the five commissioners to serve as the Chairperson of the Commission [28].

In terms of OSH data gathering, a notable and relatively more sustainable data collation effort began in 1970, this was based on the "Recording and Reporting of Occupational Injuries and Illnesses" under the Williams-Steiger Occupational Safety and Health Act (29 CFR Part 1904). Some of the important U.S official OSH data sources are: OSHA Data Initiative (ODI) and the National Census Database [24].

For the 2014 fiscal year, the estimated OSHA operating cost is $552.2m [29] and the total U.S labour force is about 156m [30]. Hence, the implied cost of OSH maintenance incurred by OSHA per 100,000 employees is about $0.354m per year.

A number of historic events took place and culminate in the current OSH management landscape. These include the establishment of National Labour Union in 1866 [31]; enactment of the Massachusetts Factory Act in 1877 [32] which is the first U.S factory inspection law. The first legal provision covering federal employees was articulated in the Federal Employers' Liability Law of 1906 [33]. These events play significant roles in consolidating employees' rights in terms of OSH, collective bargaining and general welfare.

3.3. Australia

Safe Work Australia Act of 2008 is the basis for OSH regulation in Australia [34].This Act establishes the Safe Work Australia (SWA) which is the focal statutory body in charge of OSH matters. However, SWA, which came into force in 2009, does not directly enforce OSH regulations in Australia. OSH enforcement is carried out by individual states and territories in Australia [35]. SWA comprises of an executive agency which is headed by a Chief Executive Officer (CEO) and a Governing Board headed by an independent Chairperson. The Governing Board oversees the activities of the agency and is also vested with the responsibility for making broad national regulations and policies on OSH [36].

According to section 70 of the Safe Work Australia Act of 2008, the CEO is mandated to prepare and submit annual report to the Minister, Safe Work Australia and the Ministerial Council. In addition, section 46 of the Public Governance, Performance and Accountability Act of 2013 requires the CEO to submit both performance and financial statements to the Minister for Employment and Workplace Relations annually [34,37]. Funding is mainly from the statutory contributions made by Commonwealth (central Government), states and the territories of Australia. SWA is a portfolio agency and must submit its budget statements to the Department of Employment which will then be forwarded to the Minister's Office for comment and/or clearance [36].

In Australia, nuclear safety and radiation protection is the statutory responsibility of Australian Radiation Protection and Nuclear Safety Agency (ARPANSA). ARPANSA was established by the ARPANSA Acts No. 133 - 135 in 1998, among others [38]. The CEO of ARPANSA reports to the Department of Health and Ageing which is headed by a Minister [39].

The revised Model Work Health and Safety Act of 2011 makes it incumbent upon employers to report certain incidents. Statistics section of the SWA is a major source of official OSH data which also provides links to a number of related external sources including the Australian Bureau of Statistics [34].

For the 2013/14 fiscal year, the estimated operating cost of the SWA is $23.4m (per year) [40] and the total labour force of Australia is about 12.4m [30]. Hence, the implied cost of OSH maintenance incurred by the SWA per 100,000 employees is about $0.189m per year (assuming U.S $ 1= AU $ 1.30).

Earlier events with significant impact on the OSH and general employee welfare in Australia include the Victoria's first Factory Act which was passed in 1874 [41] and Brewers Maltsters & Aerated Waters & Cordial Makers Association, founded in 1903 which is the first federal trade union in Australia [41]. By 1926, the Workers Compensation Act was passed which established the first specialised workers' compensation tribunal in Australia as well as the Workers' Compensation Commission, among others [42]. These antecedents appear to have profound impacts on the current OSH administration standard across Australia.

3.4. China

The main legal basis for OSH regulation is the Law of the People's Republic of China on Work Safety (Presidential Order No.70 of 2002) [43]. However, OSH regulation in China is also hinged on the national laws made by the People's Congress and administrative regulations promulgated by the China State Council [44].

State Administration of Work Safety (SAWS), which was established in 2005, is the national agency coordinating OSH related matters and facilitating international engagements with bodies such as International Labour Organization (ILO) [35]. Principal auxiliary bodies include the Ministry of Health of the People's Republic of China (MHPRC), Ministry of Environmental Protection (MEP) and Administration of Quality Supervision, Inspection and Quarantine (AQSIQ) [45,46].

The CEO of SAWS, reports to the Director of the State Council Work Safety Committee (SCWSC). The Director Supervises and coordinates OSH regulatory and enforcement agencies across China. SAWS is complemented by other heads of agencies such as the Executive vice Minister for Ministry of Public Security and the Vice Secretary General of the State Council [47]. The State Council is headed by a Premier (sometimes referred to as Prime Minster) who occupies the highest administrative office in China. Director of SCWSC is one of the vice premiers [47]. SAWS is largely state funded with some income generation from enforcements and investments, among others [43].

In China, the National Nuclear Safety Administration (NNSA), which was established in 1984, is responsible for civilian nuclear and radiation hazard protection across the country. More specific functions of the NNSA were however defined by subsequent promulgations such as the Safety Regulation for Civilian Nuclear Installations (HAF001, NNSA, 1986) and the Regulations on the control of nuclear materials (HAF0600, 15 June 1987). NNSA is under the Ministry of Environmental Protection [48,49].

SAWS proposed a data gathering platform called the Occupational Accidents Statistics and Reporting System (OASRS) to National Bureau of Statistics (NBS) which was approved by the latter in 2010. The Accident Inquiry System (AIS), also managed by SAWS, is another important official accident database in China. NBS itself is another valuable official OSH information source. Others are Chemical Accident Cases (CAC) and the Daily Accidents Information (DAI), owned by China Chemical Safety Association (CCSA) and the National Registration Centre for Chemicals (NRCC) respectively [50].

The total labour force of China is about 801m [30] in 2014. However, the total operating costs of the China SAWS could not be accessed at the time of preparing this paper.

In terms of historical antecedents, All-China Federation of Trade Unions (ACFTU), founded in 1925, is the dominant Chinese trade union body [51]. The Work injury insurance compensation law was enacted in 1951, which covers 3 categories of compensations: Medical & rehabilitation, Disability and Death [43]. Labour Law of the People's Republic of China [42,52] was enacted in 1994 and became effective in 1995. These historic events contribute significantly in defining the current workplace atmosphere in China.

3.5. Nigeria

Currently, OSH management in Nigeria is largely based on the Factories Act (1958, 1987 & CAP.126 L.F.N.1990, CAP. F1 L.F.N.2004) which appears to be quite inadequate in terms of coverage, empowerment, independence and currency. The very few complementary OSH related regulations are distributed across various legal documents [53,54]. In principle, the Inspectorate Division of Ministry of Labour and Productivity (ID - FMLP) is vested with the responsibility of OSH management, which so far has not been effective [55].

Nigerian Nuclear Regulatory Authority (NNRA) is responsible for nuclear safety and radiation protection. NNRA was established by the Nuclear Safety and Radiation Protection Act of 1995 and became functional in 2001 [56]. NNRA is currently under the administrative purview of Ministry of Petroleum Resources.

The requirement for duty holders to report OSH related incidents is stipulated in the Factories Acts (1958, 1987 & 1990). However, enforcement has been poor so far. This failure has been attributed to some structural deficiencies associated with the Factories law. For instance, duty holders who fail to report specified OSH incidents are liable to a fine no more than N1000 (Factories Act (1990), Section 51(4)) [57,58], which is equivalent to about $6.25 (assuming U.S $1.0 = NG ₦160). An important goal of sanctions, which include correction and deterrence, is defeated here.

In terms of data gathering, currently, there is no reliable online central OSH database in Nigeria [4]. Nevertheless, the Health Management Information System in Nigeria and the National Bureau of Statistics are valuable sources of generic demographic data.

For the 2014 fiscal year, the estimated operating cost of the NG ID is $5.0m per year , which errs on the side of caution, (see subsection 4.2.1 for additional notes on basis of the estimate). For the same year (2014), the total labour force of Nigeria is about 55m [30]. Hence the implied cost of OSH maintenance incurred by the NG ID per 100,000 employees is about $0.009m per year.

Nigerian Civil Service Union (NCSU) is among the major earlier efforts seeking to entrench the principles of collective bargain and worker welfare in Nigeria. NCSU, which was limited to public servants only, was legally recognised in1938 by the Trade Union Ordinance [59]. A number of legal apparatuses were promulgated in the last half of the 20th century, such as the Factories Act (1958, 1987 & CAP.126 L.F.N.1990, CAP. F1 L.F.N.2004); the Labour Act (1974 & 1990) [42,58] and the Workmen's Compensation Act (No.17, 1987, Cap. W6 LFN, 2004, 2010) [60]. These key developments, among others, define the current OSH outlook in Nigeria.

While the above sections highlight some of the major characteristics of OSH systems in the five case study countries; the following sections bring to focus, compare and contrast some of the key notes observed in the course this study. Close reference is made to Nigeria's OSH system throughout the discussions.

4. Discussions

4.1. General Comparative Notes - reference to Nigeria

From the above review, it can be noted that different countries devolve various degree of independence to their respective OSH focal authorities. For instance, in the UK, although the HSE reports to the Secretary of State in charge of the Department for Work and Pensions, it is designated as a non-departmental public body (NDPB). UK's laws grant NDPBs some degree of independence due the sensitive nature of their responsibilities. This provision gives the HSE some buffer against political interference. The arrangement is slightly different in the U.S where the OSHA appears to be more closely tied and responsive to the directives of the Secretary of Labour who is in turn answerable to the President. In this respect, the arrangement in Australia is similar to that in the U.S where the CEO of the SWA reports to the Minister for Employment and Workplace Relations. According to Sections 11, 45 and 46 of the SWA Act (2008) [36], the CEO/Chair is appointed by the Minister and may be given certain directions by the Minister which must be complied with. This could potentially undermine the independence of the SWA chair to some extent. On the other hand, the China's SAWS is non- ministerial, reporting to the State Council Work Safety Committee (SCWSC) through a director; in principle, this resembles the setting in the UK.

Regarding the Nuclear and Radiation Safety Managements, each of UK, U.S, China, Australia and Nigeria delegates such functions to separate agencies rather than keep them under the purview of the central OSH regulatory body. However, in the UK the HSE and the ONR appear to work very intimately and interactively. The ONR Chair is a Board member of the Health and Safety Commission (HSC) which was coalesced into the HSE in 2008; this development brings the duo even closer. Generally, the HSE appears to maintain particularly strong ties with other OSH management stakeholders across UK. Similarly, the U.S Nuclear Regulatory Agency (NRC) is clearly designated as an independent body. However, unlike the UK and U.S where the nuclear regulatory authorities are functionally independent; in China, the equivalent body, NNSA sits under the ministry of environmental protection; ARPANSA of Australia sits under the Department of Health and Ageing and in Nigeria, NNRA is placed under the Ministry of Petroleum Resources (MPR). Unfortunately, the petroleum sector, which is under the purview of the MPR, is the single largest importer of radionuclide materials in Nigeria [61]. Thus placing NNRA under the purview of MPR may hinder NNRA to some extent especially since the budget of NNRA sits in the general annual budgetary proposal which MPR forwards to National assembly for appropriation. This seemingly subtle link has the potential to hinder NNRA in discharging its mandates; as the saying goes, one may not bite the finger that feeds him.

Currently, OSH regulation and enforcement in Nigeria remains the responsibility of the Inspectorate Division of the Federal Ministry of Labour (ID - FMLP). The ID – FMLP is complemented by a number of loosely coordinated Government Agencies, Professional Bodies, Civil Society Groups, Employers' Associations and individual Experts/Consultants undertaking different aspects of OSH at various levels. On the other hand, HSE, OSHA, SWA and SAWS are the respective central authorities in the UK, U.S, Australia and China. Nigeria and many other developing countries are striving to achieve this or similar arrangement which features a more centralised, overarching and empowered OSH regulatory and enforcement agency.

In addition, the study also observes a number of specific issues which are worth further elaboration. The following subsections are used to discuss, compare and contrast these key issues at greater lengths.

4.2. Specific Comparative Notes - Reference to Nigeria

4.2.1. Financial Issues

In terms of scope and budget allocation, it appears that the Inspectorate Division, which is under the Federal Ministry of Labour and Productivity, Nigeria, is grossly underfunded. To put this into perspective, UK HSE (excluding N/Ireland) has 2,621 employees and incurs an annual operating cost of over £150m (>$230m) as at 2014 [18]. On the other hand, for the same fiscal year, the total annual budgetary allocation of the entire Ministry of Labour headquarters, which comprises the Inspectorate Division (ID) and about 5 other departments, stood at about N2.4bn ($15.0m) [62]. Even if it is assumed that the ID takes a third of this amount (which is unlikely), annual budget of ID will be about $5.0m. Coarse estimates and comparison of the central OSH regulatory bodies' implied

financial investment per 100,000 employees per year can be made for the countries knowing their respective workforce sizes. Assuming that the HSE (UK), OSHA (U.S), SWA (Australia) SAWS (China) and ID (Nigeria) are responsible for OSH of all the workers in their respective countries; Table 1 shows the OSH management budgets committed by each of these central authorities.

Table 1. Implied expenditures on 100,000 workers per year incurred by focal OSH regulatory authorities (U.S$ 1= NG ₦160 = GB £0.65 = AU $1.30), 2014

Competent OSH Regulatory Agency	Estimated Running cost ($/year)	National Labour Force	OSH Budget per 100,000 workers ($/year)	Comparative Factor
HSE[1], UK (GB Only)	238,487,650 [18]	32,192,000 [19]	740,828.9	81.9
OSHA, U.S	552,247,000 [29]	156,000,000 [30]	354,004.5	39.1
SWA, Australia	23,364,110 [40]	12,370,000 [30]	188,877.2	20.9
SAWS, China	Inaccessible	801,600,000 [30]	-	-
ID, Nigeria	5,000,000 [62]	54,970,000 [30]	9,042.7	1.0

[1]HSE does not cover Northern Ireland. Total workforce of the UK (comprising of England, Scotland, Wales and Northern Ireland) is estimated at 33,051,000 in March, 2014 [19].

It is important to note that budgets allocated to other agencies handling some aspects of OSH such as the Nuclear Safety, OSH related *R & D*, Police maintenance, Road Safety, healthcare costs, employee compensations and other forms of worker benefits and cares have not been accounted for in estimating the implied annual budget per 100,000 employees. In addition, the National Labour Force figures used for the estimations comprise of both employed and unemployed people aged 15 and above [30]. Strictly speaking, part of the labour force that is without work but available for and seeking employment needs to be subtracted across the board. Reference to the period 2010 - 2014, this is less than 8% for each of the countries under review [63] which suggests that the Comparative Factor would not change significantly even if the deductions were made. The estimates are purely based on the running costs incurred by the central OSH agency which also assumes that all the workers in each of the study countries are under the purview of the central OSH regulatory body. For instance, what this means is, UK HSE spends about 80 times the amount Nigerian ID invests in OSH management per annum (indicated in Table 1).

4.2.2. Impacts of Litigation Delays on OSH Regulation

According to a study, the average litigation lifecycle of a case in Nigerian courts is more than 5 years [64]. To illustrate further, a high level comparison between the OSHRC (U.S) and NICN (Nigeria) decision frequency for the period 1993 – 2015 is given in Figure 2, the data sets were extracted from [65,66]:

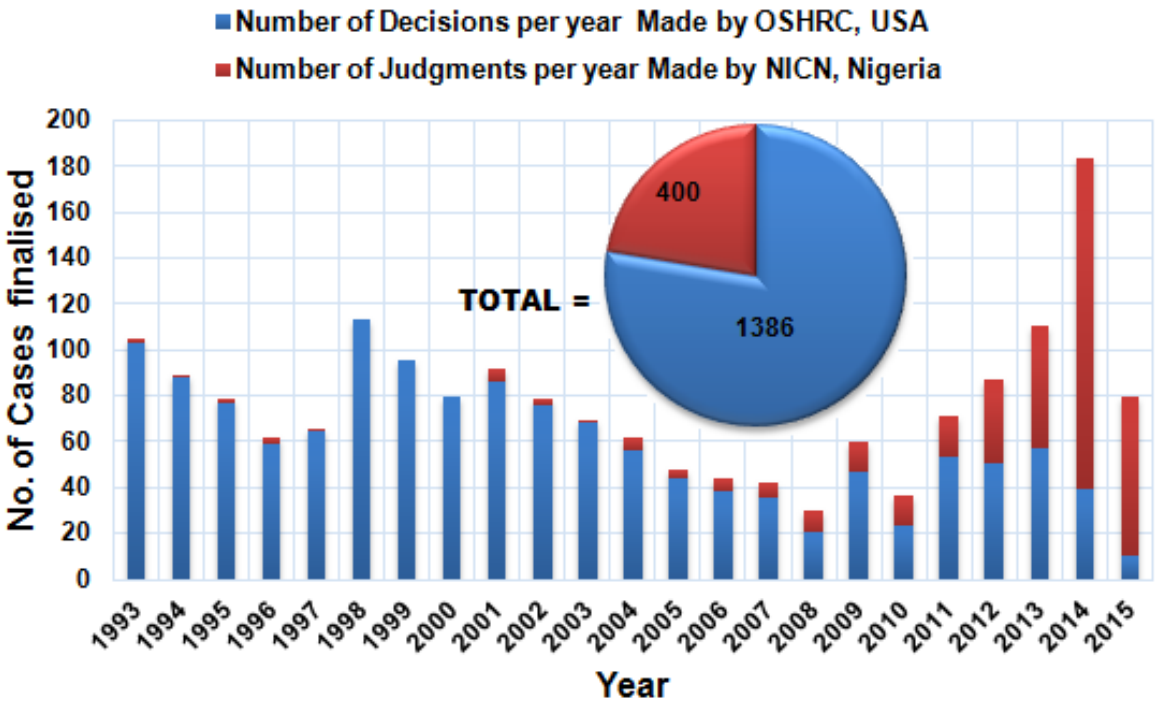

Figure 2. National Industrial Court of Nigeria (NICN) *vs*. The U.S Occupational Safety and Health Review Commission (OSHRC) in terms of number of finalized litigations between 1993 and 2015 (based on the extracted data sets from [65,66])

On average, OSHRC finalises 60 cases per year as opposed to 17 judgments per year handed by NICN. This is before the kick-off of the new OSH regulatory regime which will certainly turn out more OSH related cases. Large volumes of OSH related appeals should be expected especially within the take-off years. Giving the current capacity of NICN and the scope of the new OSH regulatory system which is quite wide, NICN is very likely to be overwhelmed by a series of contested OSH enforcements and citations. Unless duly addressed, this

grey area may lend itself to some defaulters who may use it to frustrate the OSH regulatory efforts. The same weakness is being used effectively to frustrate the efforts of similar bodies such as Economic and Financial Crimes Commission (EFCC); lesson must be leant.

4.2.3. Lack of Technical Safety and Risk Specialists

Success of the OSH regulatory agencies requires a skilled and big enough multidisciplinary workforce who should collectively muster a carefully balanced mix of technical, administrative, fiscal and HR management expertise. Sourcing and financing such workforce could be quite challenging; especially those technical experts whose careers are built around major hazard workplaces. Compounding the problem, the duty holders tend to attract this class of experts with better remunerations. More often than not, OSH regulation and enforcement requires the authorities to have sound technical skills in order to properly discharge their functions. Such functions include: developing or adopting OSH standards and codes of practices; review of engineering design documentations for certification/approval; inspection of major hazard businesses/installations and accidents/incidents investigations, to mention a few. No doubt, lack of enough technical resources is a major challenge to confront new OSH regulatory regimes.

In terms of the exact number of inspectors required for efficiency, so far, there is no hard and fast rule. However, efficiency-based estimates of the number of inspectors required by an OSH management authority would depend on factors such as: number of workplaces under the purview of the OSH regulatory agency, physical sizes of the registered workplaces, geographical distribution of the workplaces, nature of the hazards to be managed and total workforce of that country that are under the OSH regulatory body. According to the International Labour Organization (ILO), currently, Number of Workers per Inspector (NoWPI), is the commonest index used to compare inspection sufficiency across countries [67]. Based on that index, ILO recommends that NoWPI should approach 10,000/1 in industrial market based economies and 40,000/1 in less developed countries. Hence, considering these two extremes, in the case of Nigeria with an active labour force of about 55 million (in 2014) [30]; it can be shown that the recommended number of inspectors falls between 1,300 and 5,500. It is important to note that this is the recommended number of inspectors only and does not include other categories of staff such as specialist staff, contingent staff, apprentices, etc. For instance, as at 31st of March, 2014, UK HSE (including its Lab and the Office for Nuclear Regulation) has a total of 3,081 staff members out of which 1,396 are inspectors representing about 45% of the total labour force of the HSE [18].

5. Conclusions

Success of OSH regulatory and enforcement framework may be measured in terms of its ability to reduce human vulnerability (fatalities, injuries & Loss Time Injuries (LTIs)), Environmental damage and Commercial losses to a tolerable level and without entailing disproportionate costs. Some of the key drivers for such success observed are highlighted below:

- **Adequacy of the OSH Law(s)**

Extant OSH law(s) must be encompassing, comprehensive and enforceable. The legal framework should spell out commensurate penalties to defaulters and grant the inspectors adequate but controlled powers to enforce its provisions. To avoid jurisdictional conflicts among related agencies, the law should also clearly define the scope of the OSH management authority.

- **Efficiency of the judicial system**

In practice, citation contests and disputes between OSH Regulatory Authorities and the duty holders are not completely avoidable; hence efficient system must be put in place to address those issues. For instance, the U.S OSHA Act of 1970 establishes not just OSHA (the central regulatory body) and NIOSH, it also establishes an independent and dedicated arbitrating body called the Occupational Safety and Health Review Commission (OSHRC). OSHRC is given the jurisdiction to entertain contested OSH penalties and citation disputes. Whereas, in Nigeria, the National Industrial Court Act of 2006 establishes National Industrial Court of Nigeria (NICN) and gives it very similar jurisdiction to that of the U.S OSHRC [65]. The approach is slightly different in the UK, Australia and China where no such dedicated body is specifically associated with the central OSH regulatory system. Directing OSH related cases to a single specialised court has its pros and cons. Used carefully, the approach could significantly reduce the usual ligation delays seen in regular courts, which is good for the OSH regulatory purposes. However, left with no commensurate capability in terms of staffing, funding or otherwise, it could stand as one of the weakest links in the OSH regulation process with huge negative consequence on the entire regulatory regime.

- **Degree of independence of the OSH regulatory agency**

The regulatory and enforcement agency must be shielded from unnecessary political interferences. This can be achieved by designating the enforcement agency as a Non-Departmental or Non-Ministerial body. This arrangement gives the supervising Minister or Secretary of State (who is typically a political appointee) limited stake in the affairs of the OSH management agency.

- **Structure and placement of the regulatory and enforcement body(ies)**

Centralising OSH management activities and placing the agency under the right ministry is very important. For instance, Nigerian Nuclear Regulatory Authority (NNRA) is currently placed under the Ministry of Petroleum Resources (MPR). However, MPR is one of the largest importers of radionuclide materials in Nigeria. There is the legitimate concern that placing NNRA under the administrative purview of MPR may to some extent affect the regulatory and enforcement functions of NNRA, directly or indirectly.

- **Adequacy of budgetary allocation**

Financial budgets of the OSH management agency must reflect its scope and statutory exigencies. In particular, size of the budget must be proportional to the number of workplaces under the purview of the OSH regulatory agency, physical sizes of the registered workplaces, geographical distribution of the workplaces, nature of the hazards to be managed and percentage of the

workforce of that country that are under the OSH regulatory body.

- **Accident history and Government sensitivity**

Occurrences of catastrophic accidents have been the drivers for the development of OSH regulatory frameworks in many countries. However, with the sheer size and documentation of accident/disaster experiences across the world, there is no basis whatsoever for developing countries to be reactive to accidents especially in this era of advanced computing and information dissemination technologies.

- **Good workforce-inspector ratio**

Ideally, the required workforce-inspector ratio for a given country should reflect the OSH peculiarities of that country; which means that any generic index should be considered as a guide and applied with some caution. Based on the International Labour Organization (ILO) guidelines, this study establishes that the recommended number of inspectors for Nigeria, with a labour force of about 55m (2014), falls in the range 1,300 - 5,500. It is important to note that this is the recommended number of inspectors only and does not include other categories of staff such as specialist staff, contingent staff, apprentices, etc. For instance, as at 31st of March, 2014, UK HSE (including its Lab and the Office for Nuclear Regulation) has a total of 3,081 staff members out of which 1,396 are inspectors representing about 45% of the total labour force of the HSE.

- **Activities of the civil society/human right groups**

Civil societies and human right groups have also contributed immensely to the development of OSH regulations and enforcement in the countries reviewed. A number of accidents where investigated and appropriate sanctions imposed as a result of sustained pressures from civil society/human right organizations.

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