International Journal of Advances in Engineering and Management (IJAEM)
Volume 3, Issue 9 Sep 2021, pp: 740-749 www.ijaem.net ISSN: 2395-5252

Performance Assessment in the Nigerian Construction Industry: A Critical View into the Causes, Effects and Remediesto Deficiencyof Qualified Professionals

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Submitted: 01-09-2021 Revised: 09-09-2021 Accepted: 12-09-2021

ABSTRACT. The engineering and other professionals in the construction industry need strategic approach that will be able to instill the technical know-how needed for emerging professionals. Efficiency within the industry is found to be affected adversely by skill deficiency thereby resulting into economic challenges in the long run. Technical internship of professionals in the construction industry has reduced drastically in recent years. This study therefore offers to assess performance of professionals within the industry through the investigation of the causes, effects, and remedies of deficiency of professionals in the industry. A structured questionnaires were administered to four hundred professionals and three hundred responses were acknowledged. Mean deviations and Spearman's rank correlation were employed for analysis. Results show that suitable expertise, advance in technology, altering ancient procedures and methods, identity problem, ageing workforce and economic factors form the leading causes of deficiency of professionals in the construction industry. The leading effects as obtained in the analysis are difficulties in proper recruiting, poor decision making, poor quality delivery, and inflated cost due to the use of expatriates. Remedies based on the study are that early education on engineering with adequate emphasis on industrial application. Also, conducive environment for the practise of professionals' expertise will go a long way to reduce shortages. Adequate job openings and fat wages for engineers and professionals in the industry is a remedy. Implementable reforms and policies for the construction sector will definitely put the sector in the right shape. Regular training and skills acquisition for practising professionals, especially current trends in engineering. Academic curriculum of higher institutions should be revised to cover the important knowledge engineering graduates need to possess to be relevant in the construction industry. Also, there is a need for reskilling of graduates who are redundant in the construction industry presently. This will improve their skills and ability thereby making the construction industry more efficient.

Keywords: Construction Industry, Professionals, Skills deficiency, Remedies

I. INTRODUCTION

Engineering skills shortage impacts productivity growth and reduces the investment of the country [1]. The current dynamic world of engineering and technology needs tactical reforms that will inculcate the responsibility of imparting skills and knowledge to up-coming professionals [2]. According to Eneh [3], the skills shortage is a key factor in joblessness. In most cases after graduating, engineering graduates wait for three to five years before securing employment due to lack of job opportunities. However, [4] reported a decline in the practice of professional apprenticeship and artisanal products and services: engineering professionals are aging and younger ones do not take over from them, causing fear and worry that professionals might be fully extinct over the next two decades. Technical skills foster economic survival and thus play a vital role in a society's growth. To support this, [5] posited that the acquisition of relevant skills enhances the

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relevance of individuals in society. According to [6] in the 41st report to parliament addressing current and future skills challenges, "…engineering skills shortage occur in instances when the number of available jobs, is greater than the number qualified candidates (either recent graduates or people with foreign credentials in that field)". Canadian construction industry productivity is impacted by engineering skills shortage and it becomes an economic issue for the country [7]. The effects of ageing population cannot be underplayed as it negatively affects the rate of labor force growth, Thereby creating a skill vacuum in various sectors [8]. Besides having the right skills to perform well in a team, lacking business communication skills is a problem the construction industry is facing [9]. Therefore, qualified employees who take the initiative in business and perform well in the market are needed by the employers to represent their companies well [10].

Professionals are now being challenged with rapid advances in technology, changing age-old processes and methods, resulting in an increasing skills gap. The manufacturing industry is currently undergoing a revolution, with many existing systems needing to be revamped or renewed. With this revolution, it is imperative that we find a solution to bridge skills gaps. Otherwise, manufacturers may find themselves outmoded, while there won't be enough labor to go around. A report by The Manufacturing Institute last year found that 4.6 million jobs will need to be filled in the sector over the next decade, and 2.5 million jobs may be left open from 2021-2030 due to a lack of trained workers.The skills gap within the manufacturing industry is not a new development, especially in recent years. It's a challenge for every engineer to work in a new area where new knowledge must be acquired. Due to the existing shortage of skilled workers, companies must internally train their employees to gain new skills for new technology. It comes as no shock that the technology used in manufacturing is constantly changing to keep up with industry needs. Machines are getting smarter and are increasingly networked with each other to pass on certain information to generate an optimal workflow. As this technology grows it may feel discouraging to professionals who were trained many years ago. Grasping these new skills will also take longer if the user isn't already used to operating modern technology. Equipment such as code writing machines, robotics and data analysis will be all but strange. Although it may seem like there is a divide between the more experienced professionals and young professionals that are just beginning their career, it is actually quite the contrary. Experience in manufacturing is a desired trait and although knowing all modern equipment may be a bonus, younger professionals may struggle with the basics. So how are we going to help bridge that gap? It must be noted that closing the skills gap isn't something that one person or one company can do alone. It will take a collective effort to address this industry-wide issue. Mechanical standard components do not require a wealth of expert knowledge from the outset - they can be easily operated with basic knowledge, which can be helpful for young professionals at the beginning of their career. However, little intricacies can be the difference to an efficient workflow: For instance, knowing which positioning tool is best for the job, how to assemble standard components together, and what material the component should be made from to lower maintenance time. There will always be a place for standard components, and by learning how to use these components, professionals can increase their skills and select the right components for the right applications. They can even go on to transfer this knowledge to build fully automated machines or production lines.

The foundation for learning engineering and other professional skills requires an understanding of basic maths and science [11]. According to [12], broadening and improving the quality of early childhood is essential for building basic skills. Different factors lead to the shortage of engineering skills in the industry and some of them are discussed below. There is a major issue with filling positions owing to a shortage of candidates with appropriate expertise and knowledge [12]. Employers find it more difficult to recruit people with technical and practical skills than any other skill [12]. Engineering skills shortage is quite clear in the current manufacturing workforce.Current manufacturing systems and methods are powered by development and creativity and are projected to continue emerging innovations, including nanotechnologies, Nano-electronics and biotechnology [13]. Engineers are constantly searching for an opportunity to understand, but also possesses an attitude of mind that predisposes people to be involved and successful in discovering new technologies [13]. The realization of the economic potential of technological breakthroughs will depend on the creation of an infrastructure to move innovations from initial ideas to the marketplace. This involves the further establishment of relations between businesses, including small companies, and academic institutions, including universities [14].Lacking experiential training opportunities for graduates

comes as a big concern and contributes significantly to the construction industry [14]. Skills in the construction industry are not adequately developed when there is no provision for experiential learning [14]. The building technologies and construction techniques are forever changing and it makes it difficult and a struggle for existing training systems to keep up with the new demands [14]. According to [15], revising training packages leads to more consistent delivery to the training system, and he addresses the key area of concerns as the following: encourage open implementation and option of training courses; encourage young people in technical training; reverse the high rate of training drop-outs; tackle the expense to small businesses while hiring apprentices; amend labour relation constraints that hinder more appropriate and timely training.Graduate professional shortage reports are common, yet competition for jobs remains fierce. The building sector considers it challenging to employ high-skilled people [16]. According to [16], it is claimed that many companies do not provide the right training opportunities to put talent in the right direction. In the present scenario, engineers ought to take a much more positive attitude to their employment. According to [17], recruiting workers for the construction sector is quite challenging: lack of expertise, recruiting costs themselves and brain loss are listed as grounds. The shortage of human resources preparation, the regional position of workers and the usage of digital technologies in the hiring process are other obstacles that employers' organisations encounter when hiring and choosing staff [17].

Emigration is the biggest worrying factor amongst others in the engineering skills crisis. Countries around the world are suffering from skill shortages. Most people are trying to improve their situations and living conditions, even if it means leaving their current environment to go seek a better one. According to Bailey [18], highly skilled individuals are contributing immensely to the society and the economy. Having to migrate forces separation from family and everything familiar, but most individuals choose to migrate because of the factors that push and pull the country down [18]. Many factors influence people to migrate, it could be political uncertainty, environmental changes, cultural and economic changes: all these factors are types of push or pull factors.Higher education is in high demand. It is also an important social and political issue in developed countries. The country's overall education program, from early childhood to upper secondary school, affects the quality, skills and behaviours of individuals who pursue higher education successfully. The industry's opinion of the academic environment is that it is not safe, not what is needed; it is "appropriate" and could do with "a breath of fresh air".Most people are not keen on working on a construction site because of the site and hard-working conditions. Many of the workers want white-collar jobs. Construction activities are always happening outdoor, workers are exposed to hot weather conditions and subjected to different working environments [18]. When buildings rise taller and bigger, the risk of injuries often rises. On-site injuries affect not just the staff on-site, it may also cause an uproar in the general public. Such incidents have tarnished the reputation of the construction industry [18].The building sector has long suffered from weak global images worldwide [18]. According to [18], the weak public reputation of the construction industry as a profession and the uncertainty of building roles, along with the belief that a construction job implies 50 percent more work to do and 50 percent less pay, is seen as a crucial cause. The sector is often concerned with low-quality jobs and poor health and welfare problems. The bad reputation of the building industry renders it less appealing for potential applicants to even find it a profession. According to [19], it is very difficult to maintain and hire professional employees owing to the bad reputation of the building industry itself.Engineering skills shortage contributes to high levels of unemployment. Engineering skills shortage impact negatively on both the public and private sector. Skill shortage affects work performance: the quality of work also deteriorates with no satisfaction, delaying companies in developing new products that increase costs. Lack of engineering skills has left most of the South African townships and squatter camps without basic services such as water, electricity and sanitation in our country. Engineering skills shortage is inhibiting the growth of the economy: economic opportunities cannot be productively viable owing to a lack of needed skills, including managerial, professional and technical skills. The long-term growth potential of every country is being consistently undermined and there seem to be no growth drivers that could lead to a sustained recovery. Other challenges that damage the economy such as political uncertainty which affects investment, inflation, a high employment rate, the trade deficit, a volatile exchange rate, crime but the biggest of them all is the skill crisis with which the country is faced. People are living in poverty and informal settlement surrounds most major cities across developing countries. The shortage of a qualified

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workforce hinders market growth and often affects the social and economic stability of the country, as investors are very hesitant to invest due to the fragility of the country's economy . The country's economic growth and infrastructure creation are hampered by a lack of technical expertise, thereby restricting the country's capacity to exploit its rich natural resources and be successful [19].The author in [20] pointed out that in most cases, project deliveries are negatively affected by the skill gap that is labour-related The infrastructure delivery is also hindered in terms of time, quality and cost because of the shortage of qualified professionals the country faces. The aim of this research paper is to perform an assessment on causes, effects and solutions to scarcity of professionals in the construction industry.

II. MATERIALS AND METHOD

The purpose of the study concept is analytical as it aims to investigate the reasons responsible for the lack of professional expertise in the building industry. The survey method has been adopted as a research strategy, while the quantitative study is the methodology for this research. Nigeria was selected as the study field due to the professionalskills shortage peculiarity in the country. A five-point Likert scale questionnaire was developed employing knowledge obtained from literature to gather data relevant to the intent of the research. To ensure the validity of the findings of this study, data was collected from relevant workforces who have first-hand experience of professional skills scarcity. These professionals include architects, quantity surveyors, engineers, construction managers and project managers in the Geo-political zones of Nigeria. Four hundred questionnaires were randomly distributed, and three hundred and fifty questionnaires were recovered and all the questionnaires recovered were considered to be suitable after being reviewed for completion. The data obtained from the questionnaire were evaluated using Spearman's rank correlation method. The assembled data was tested to check for its reliability with the aid of Cronbach's alpha test. The test returned a value of 0.802. This indicates that the collected data is reliable since Cronbach alpha test scores a set of collated data between 0 and 1, where 1 means the data has maximum consistency.

Table 1: Response Rate

Questionnaire ordered	400
Questionnaire acknowledged	350
Percentage rate of response	87.5%

Table 1 shows that 400 questionnaires were ordered and 350 were recovered. This represents a response rate of 87.5%. It suggests that majority of the questionnaire were received.

Table 2: Work Experience of Respondents

Work experience	**Frequency**	**Percentage**
Less than 10 years	79	22.57%
10 – 19 years	100	28.57%
20 – 29 years	110	31.43%
30 – 39 years	61	17.43%
TOTAL	350	100%

Table 2 shows that 22.57% of the Respondents, most of who are professionals in the built environment have less than 10 years of work experience and 28.67% have 10 to 19 years of experience. Furthermore, 31.43% of the Respondents have 20- 29 years of work experience, while 17.43% has 30- 39 years of experience. This shows that 77.43% of the respondents who are mainly professionals in the built environment have more than 10 years of experience; meaning that they possess adequate years of cognate experience.

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Table 3: Response Rate of Professionals

Professionals	Frequency	Percentage
Architects	48	13.71%
Builders	61	17.43%
Elect. Engineer	39	11.14%
Civil. Engineer	43	12.29%
Mech. Engineer	37	10.57%
Quantity surveyor	50	14.29%
Town planner	40	11.43%
Others	32	9.14%
TOTAL	350	100%

Table 3 shows that 13.71% of the Respondents were Architects, 11.14% were Electrical engineers, 17.43% were builders, 10.57% were Mechanical engineers, 12.29% were Civil engineers, 14.29% were Quantity surveyors, 11.43% were town planners and 9.14% were other profession related to the built environment. Thus, the respondents are capable of providing information for this study based on professional point of view.

Table 4: Gender Rate of Response

Gender	Frequency	Percentage
Male	215	61.43%
Female	135	38.57%
TOTAL	350	100%

Table 4 indicates that 61.43% of the respondents were male, while 38.57% of the respondents were female. This shows that the male respondents are about one and a half times the female respondents.

Table 5: Response Rate from Geo-Political Zones

Geo-political zones	Frequency	Percentage
North - East	42	12.00%
North – Central	67	19.14%
North – West	42	12.00%
South – West	72	20.57%
South – South	47	13.43%
South – East	80	22.86%
Total	350	100%

Table 5 shows that the respondents from North- East were 12%, North- Central were 19.14%, North- West were 12%, South- West were 20.57%, South- South were 13.43% and South-East were 22.86%. This shows that north- central, south- west and south-east have more respondents as shown in the Table 5.

$$S.C = 1 - \frac{\sum 6d^2}{n} \quad \text{.....(1)}$$

The spearman's coefficient is given above, where d is the deviations while n gives the number of variables considered

III. RESULTS AND DISCUSSION

The respondent data gathered were critically analysed using Likert scales and Spearman's coefficient and results shown in Tables 6 to 7. The equation (1) was employed for the ranking with the support of the weighted values obtained from the questionnaires. The variables were based on literatures and interviews. The higher the Spearman's coefficient the higher the rank hence the leading causes, effects were deduced.

Table 6: Causes of deficiency in professionals

Causes	Mean Deviations	Spearman's Rank

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		Correlation
Suitable Expertise	3.225	0.874
Advances in Technology	4.345	0.845
Altering ancient procedures and methods	5.128	0.812
Identity problem	0.567	0.785
Aging workforce	1.457	0.753
Economic factors	3.420	0.732
Employer products struggling to meet up with market demand	3.568	0.678
Rigid approach to talent attainment	2.450	0.647
Changing in skill requirements	3.456	0.645
Poor education/ training	2.554	0.624
Poor wages	3.884	0.598
Poor industry image	3.558	0.576
Geographic location of job	1.890	0.538
Absence of job security/Poor treatment/ Poor safety	0.879	0.497
Absence of worker-oriented career path	6.908	0.486

Lack of innovative technological changes	5.224	0.475
Lack of quality relevance of the training received	3.558	0.576
Difficulties in recruiting the right candidates	1.890	0.538
Emigration	2.567	0.523

Brain Drain	3.550	0.515
Poor standard of the higher education system	0.987	0.432
Poor working environment	0.787	0.396
Poor image of the construction industry	0.887	0.3897
Loss of investors and damage to the economy	0.787	0.3758
Poor quality delivery	0.654	0.3585

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Table 7: Effects of deficiency in professionals

effects	Mean Deviations	Spearman's Rank Correlation
Difficulties in recruiting	3.668	0.976
Poor decision making	2.556	0.897
Poor quality delivery	0.943	0.756
Inflated costs due to use of expatriates	4.118	0.650
Lack of innovation	3.067	0.650
Technology changes	1.465	0.553
Emigration Damage to the economy	0.997	0.538
Poor working environment	3.557	0.467
Inability to grow and expand	2.568	0.432
Loss of investors	0.886	0.378
Poor quality of workmanship	1.556	0.385
Higher project costs	2.034	0.348
engagement of unqualified builders	4.023	0.325
poor choice of structural element	5.098	0.315
non-compliance of approved drawings	1.345	0.318
	2.556	0.275
Structural design errors	2.980	0.215

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Loss of Lives	1.345	0.187
Loss of Investments	2.335	0.146
Waste of Resources, Time And Labor	1.880	0.133
Increase of Maintenance Cost	2.558	0.106
Poor quality of workmanship	3.558	0.105
Higher project costs	4.234	0.104
Engagement of unqualified builders	3.456	0.103
Poor choice of structural element	4.662	0.102

Results show that suitable expertise, advance in technology, altering ancient procedures and methods, identity problem, ageing workforce and economic factors form the leading causes of deficiency of professionals in the construction industry. The leading effects as obtained in the analysis are difficulties in proper recruiting,poor decision making, poor quality delivery, and inflated cost due to the use of expatriates.

Remedies to deficiency of professionals

Early education on engineering with adequate emphasis on industrial application is a remedy. Also, conducive environment for the practise of professionals' expertise will go a long way to reduce shortages. Adequate job openings and fat wages for engineers and professionals in the industry is a remedy. Implementable reforms and policies for the construction sector will definitely put the sector in the right shape. Regular training and skills acquisition for practising professionals, especially current trends in engineering.Academic curriculum of higher institutions should be revised to cover the important knowledge engineering graduates need to possess to be relevant in the construction industry. Also, there is a need for reskilling of graduates who are redundant in the construction industry presently. This will improve their skills and ability thereby making the construction industry more efficient.

IV. CONCLUSION

This study has critically studied the effects of professional skills shortage in the construction industry. The study employed a quantitative research methodology in which a questionnaire survey was used in gathering data from respondents. Findings from the questionnaire survey revealed that the major effects according to the respondents are difficulties in recruiting, poor decision making due to not having the right skilled people, lack of quality relevance of training received, and low employment rate. It can be concluded that engineering graduates from tertiary institutions are not employable which makes the industry lack an adequate number of skilled engineers to execute construction projects. This directly affects the capacity of the construction industry in influencing the economy of the country positively. To change the narrative, it is recommended that the academic curriculum of higher institutions be revised to cover the important knowledge engineering graduates need to possess for them to be relevant in the construction industry. Also, there is a need for reskilling of graduates who are redundant in the construction industry presently. This will improve their skills and ability thereby making the construction industry more efficient.

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