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Challenges and Prospects of Skilled Labour in Quarry Operations in Nigeria

MELODI, M.M.
Department of Mining Engineering, Federal University of Technology, Akure, Nigeria

ABSTRACT: This study aims at examining the challenges and prospects of skilled labour in quarry operations in Edo State, Nigeria. Primary sources of data collection used were questionnaires which were distributed to respondents. A total of seventy (70) respondents which were made up of technical employees, supervisors and managers of each quarry were sampled for the study. The statistical tools used are descriptive statistics and Spearman's rho correlation. This study is to evaluate the challenges and prospects of skilled workers in quarry operations, determining the level of production and the benefits of using skilled workers to promote production, and recommend policies that would solve problems faced by quarry workers in quarries in the state, as well as increasing the rate of utilization of skilled workers which would help in effective production of solid mineral exploitation in the selected quarries. This study shows that majority (61.4%) of the workers lived in the community, 55.7% had a bachelor's degree. Most of the skilled workers (47.1%) were paid salaries and wages between ₦50,000 to ₦100,000 while 80.0% attested to "Distance from home to work place (quarry)" as a major challenge faced as skilled worker who always work regularly (50.0%) as supervisory workers (78.6%). Spearman's rho test of association between challenges of skilled workers and years of service in quarry operation shows that majority of the challenges relates non – significantly with year of service ($p > 0.05$). Skilled workers live far from the quarry work place, it is therefore recommended that quarry administrators provide shelters for their skilled workers to increase production and improve productivity as the time spent on trip is better utilized on production activities.

Keywords: Skilled labour, quarry operation, wage, employer, qualification, working environment

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INTRODUCTION

Globally, the quarrying industry is considered as one of the most vibrant industries that provide a huge source of revenue for every country. Technological advancement all over the world has led to an immense improvement in the way quarrying activities are carried out. Moreover, several other emerging trends such as increase in customer expectation, increase in demand for production and the need to reduce cost of production has led to the delivery of poor services by quarrying industries which in turn has been caused by poor and choice of labour (Isaac *et al*, 2015). It is clear that technological advancement will continue to play a significant role in quarrying activities, it is therefore necessary to maximize the level of skilled labour to effects quarrying activities in creating advancement in the system, as granite remained a leading mineral being explored in Nigeria (The World Bank, 2016). It is in light of this that both primary and secondary data was collected with structured interviews undertaken with all relevant institutional stakeholders in specific quarries in Akoko-Edo (Ibillo, Igarra, Ikpeshi, Auchi) area of

*Correspondence to: Melodi, M.M.; arletmelodi@yahoo.com

Edo State. However, this study reveal that quarrying as an activity has several challenges, basically in managerial and supervision of activities as regards whether or not skilled labour should be encouraged, in spite of the numerous economic and social gains the activity comes along with (Abulasisi *et al.*, (2013) and Solid Mineral Audit Report (2014)).

There has been a considerable increase in the exploration of solid minerals like dolomite, calcite, and granite in some core area of Edo State, which has drastically reduced the rate of unemployment. Quarry operation in the area has been quite effective as a matter of fact owing to the incorporation of skilled workers/labours for effective running of the operations in the quarries (Isaac, *et al* 2015). In quarries, geoscientists explore and research on the structure, composition and processes of the earth; they study the solid earth, the rocks and the processes by which they change. Geological engineers carry out geological and geotechnical studies to assess suitability of locations for civil engineering, mining and oil and gas projects; they combine geology and engineering science to designs involving rock, soil, groundwater and mineral resources. Geotechnical engineers apply the science of soil mechanics, rock mechanics, engineering geology and other related disciplines to engineering and environmental projects. These professions are employed in petroleum and mining companies, consulting geology, geophysics and engineering firms, electric utilities, governments, research and educational institutions. The geological and mineral technologist provides technical support and services in the fields of solid mineral exploration and production, geophysics, geology, mining and mining engineering, mineralogy, extractive and physical metallurgy, metallurgical engineering and environmental protection. They are employed by this mining companies, consulting geology and engineering firms, governments, educational institutions, and a variety of manufacturing, construction and utilities companies. Likes of the Drilling Engineer, Geologist, Geophysicist, Fluid Mechanics Engineer, Soil Mechanics Engineers, Rock Mechanics Engineers, Surveying Engineers, Mineral Processing Technologist, Metallurgical and Materials Engineers, Surface Mining Engineers, Tunnel Mining Engineers, Blasting Engineers, Mine Ventilation Engineers, Health and Safety Personnel, Mine Design Engineers, Mine Valuation Personnel, Economist, Secretary, Receptionist, Business Administrators etc. are all categories of skilled personnel that are ultimately able to work in the quarry (Vancouver, 2016).

Acknowledging the economic contributions of mining, however, several economies lost sight of the challenges associated with skilled workers in mining activities. As a consequence of the fore-going, research is necessary to establish the constraints to productive use of skilled labour. Thus, the general objective of this research is to analyse the challenges and prospects of skilled labour in quarry operations in selected quarries in Edo State. The specific objectives included to evaluate the level of utilization of skilled workers in quarry operations; assess the various uses of skilled workers in quarry operations and assess the challenges and prospects of using skilled workers in quarry operations.

RESEARCH METHODOLOGY

Location and Geological Settings

The location of the study area is Akoko-Edo area Igarra-Auchi, Edo State, Nigeria. It is approximately defined by the geographical coordinates of latitude N070 02’44.4" and Longitude E0060 16’11.8" (Figure 1). The observed elevation above the mean sea level is 213 m. The Igarra and Auchi formation intruded the most easterly schist belts in South-western Nigeria (Turner, 1983). This region is underlain by rocks of the Precambrian basement complex and about four major groups have been

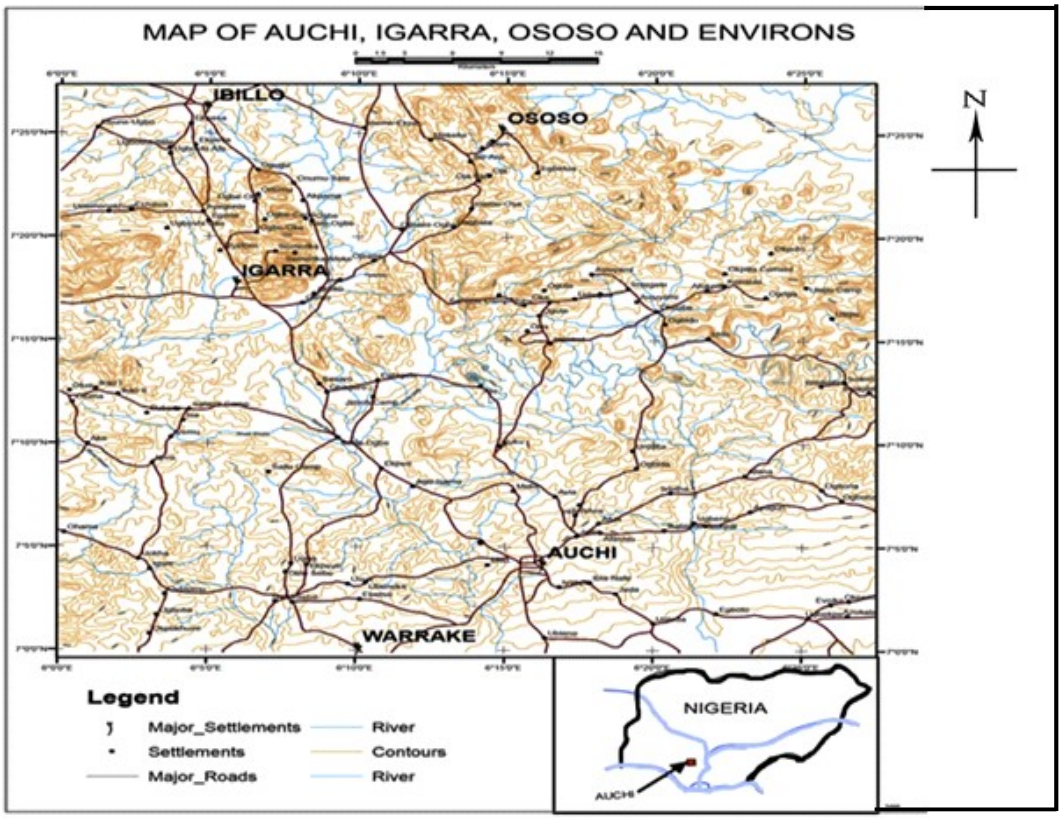

Figure 1: Location Map of Akoko-Edo (Igarra and Auchi); Source: (Abulasisi *et al.*, 2013)

observed within this area. These are the migmatite-gneiss complex, the metasediments (schists, calc-gneisses, quartzites and meta conglomerates), the porphyritic Older granite and the late, discordant, non-metamorphosed syenite dyke (Odeyemi, 1976). The Older granite has both porphyritic and non-prophyritic variety with the latter found around Dagbala, NE of Igarra. The absence of conspicuous phenocrysts in the non-porphyritic granites makes it less important for extensive mesoscopic analysis, although it contains joints, xenoliths and veins. Three main porphyritic granite bodies are found within the mapped area. These are the "Igarra plutons" which intruded metasediments, the "Sebe-Ogbe/Ake" plutons which occur about 15km S/SW of the Igarra plutons and intruded metasediments (schist, metaconglomerates and calcgneiss) and the "Ososo plutons" which are about 10 km NE of the Igarra plutons and intruded gneisses to the west and south and migmatites to the northeast. The schist and gneisses are basically foliated in the NW-SE direction with some N-S trending foliation also occurring, joints within the granites trend E-W and N-S and the veins of pegmatite, quartz and aplite took advantage of these fractures (Abulasisi *et al*, 2013).

Rocks of the Igarra area have an interesting structural profile, with the granites hosting the least of these structures when compared to the schists and other metamorphic rock types. The pluton shape and mesoscopic structures prove to be quite important to structural and tectonic analysis. Igarra area, which encompasses the study area, lies within the South-western Nigerian basement which itself is a part of the Nigerian Basement Complex. The Nigerian

Basement Complex is also a part of the Pan African mobile belt that lies between the West African craton to the east and the Congo craton to the southwest within the African continent. The Basement Complex in Igarra area consists of the following four major rock groups (Adepoju and Adekoya, 2008):

(a) Migmatites, biotite and biotite-hornblende gneisses;
(b) Low to medium grade meta sediments consisting of schists, calc-silicate gneisses, marbles, polymict metaconglomerates and quartzite;
(c) Syn- to late-tectonic porphyritic, biotite and biotite-hornblende granodiorites and adamellites, charnockites and gabbros; and
(d) Minor felsic and mafic intrusives comprising pegmatite, aplite, dolerite, lamprophyre and syenite dykes.

The study area is underlain in most parts by the meta sediments, referred to as the Igarra Schist Belt, which presumably overlies an older gneiss-migmatite basement, possibly of Liberian age (Odeyemi, 1976). The metasedimentary succession in Igarra area consists predominantly of pelitic to semi-pelitic rocks of low to medium grade metamorphism. Major rock types exposed in the area include:

(i) Pan African granites such as the Igarra batholiths and other minor intrusives including pegmatite, aplite, dolerite, lamprophyre and syenite. Small bands of green amphibolitic rocks have been observed to be interbanded with some of the aforementioned main rock units that constitute the schist belt.
(ii) quartz-biotite schist;
(iii) mica schist;
(iv) calcsilicate gneiss and marble; and
(v) metaconglomerate; all of which have been deformed in at least two episodes (Odeyemi, 1976). These supracrustal rocks and the underlying basement were subsequently intruded.

Analytical Tools

The tools used in data analysis included descriptive statistics and Spearman's rho correlation. Descriptive statistics such as table, frequency and percentage were used to summarize socio - demographic characteristics of respondents, company profile, level of utilization of skilled labour in quarry operations, sufficiency of skilled labour and equipment, operations and frequency of operations as skilled labour and challenges of using skilled labour workers. Challenges of skilled workers operation was examined across years of service of each skilled workers using Spearman's correlation.

RESULTS AND DISCUSSION

Socio-demographic Characteristics of Respondents

Table 1 shows the socio-demographic characteristics of the respondents. The table indicates that most of the respondents are males (70%) between the ages of 36 and 40 years of age (19%) and were majorly Christian (78.6%). The major ethnic group is Yoruba (50%). It was further noted that majority of the skilled workers were involved in various business (54%) units. Most of the respondents were married (47%) and has had an average working experience of 6 and 10 years (44.3%) form a greater number from the majority.

Table 1 also shows that large proportion of these workers worked in mining industries for between 6 and 10 years (40%). A proportion of 61.4% of the respondents live in the community. Majority of the workers had a Bachelor's Degree (55.7%), and were majorly ordinary workers (37.1%).

Table 2 explains that majority of the companies were established over 10 years ago (81.4%) while most quarry companies in the study area are involved in quarry operations and mineral processing.

Table 1: Socio-economic Features of Respondents (n = 70)

Characteristics	Freq.	%
Gender		
Male	49	70.0
Female	21	30.0
Age Bracket		
20 – 25	13	18.6
26 – 30	12	17.1
31 – 35	18	25.7
36 – 40	19	27.1
41 – 45	6	8.6
46 and above	2	2.9
Religion Practiced		
Christianity	55	78.6
Islam	15	21.4
Others	0	0
Ethnic Group		
Yoruba	50	71.4
Igbo	10	14.3
Hausa	5	7.1
Others	5	7.1
Other Sources of Income		
Artisan	4	5.7
Business	54	77.1
Church Clerk	2	2.9
Farming	4	5.7
Teaching	4	5.7
Transportation	2	2.9
Marital Status		
Single	21	30.0
Married	47	67.1
Divorced	1	1.4
Widowed	1	1.4
Years of Working Experience		
0 – 5 years	15	21.4
6 – 10 years	31	44.3
11 years and Above	24	34.3
Years of Experience in Industry		
1 – 5 years	24	34.3
6 – 10 years	28	40.0
11 – 15 years	8	11.4
16 – 20 years	0	0
21 – 25 years	2	2.9
26 – 30 years	8	11.4
Residency in the Community?		
Yes	43	61.4
No	27	38.6
Qualification		
SSCE	3	4.3
OND	4	5.7
HND	20	28.6
B.Sc.	39	55.7
M.Sc.	4	5.7
Others	0	0
Employment Status		
Manager	20	28.6
Supervisor	24	34.3
Ordinary worker	26	37.1

Source: Author's Survey 2016

Table 2: Company Profile (n = 70)

Characteristics	Frequency	%
Company year of establishment		
1 – 5 years ahead	1	1.4
6 – 10	12	17.1
Over 10	57	81.4
Company Group of Operation		
Quarry Operation	1	1.4
Mineral Processing	1	1.4
All of the Above	68	97.1

Source: Author's Survey 2016

Table 3: Wage ranges of Workers (n = 70)

Characteristics	Frequency	%
Do you think that productivity level is influenced by the type of labour and technology used?		
Less than ₦50,000	22	31.4
₦50,000 – 100,000	33	47.1
Above ₦100,000	15	21.4

Source: Author's Survey 2016

Level of Utilization of Skilled Labour in Quarry Operations

Table 3 illustrates a typical example of the minimum amount paid to the skilled (47.1%) worker which ranges ₦50, 000 to ₦100, 000.

As shown in Table 4, respondents (84.3%) identified that productivity is affected by the type of labour and technology used, while skilled labour was identified as the major labour type in used (61.4%). Skilled labour are always (50.0%) used against the use of skilled labour (44.3%). More so, companies investigated for this study identified that they usually reduce number of working days (51.4%) at times when they are faced with some challenges with the skilled labour.

As shown in Table 5, skilled labour were indicated to be sufficient in the quarry companies investigated for this study (72.9%) and also equipment (72.9%), with skill labour identified as more efficient (58.6%).

Operations and Frequency of Operations as Skilled Labour

Table 6 presents challenges of using skilled workers working as supervisory staff (78.6%) while some other staff also work as contract workers, drilling engineer, rock mechanics engineer, mechanical engineer, accountants, economists, marketers, computer scientists and geologists.

As indicated in Table 7, skilled workers in the study area are faced with a number of challenges which includes distance of work place from home (92.9%), terms of payment (92.9%), issues with supervisors (85.7%), language barrier (74.3%), religion barriers (57.1%), inadequate safety measures and health care faculties (87.1%), education qualification discrimination (77.1%), ethnic discrimination (65.7%), high cost of living (87.1%), unfriendly working environment (84.3%) and technical issues (77.1%).

With the vast potentials inherent in quarry operation Nigeria Extractive Industry Transparency Initiative (NEITI) (2015), there is the need for developing framework and organizational operational procedures which would enable skilled workers reside very close to site of operation.

Figure 2 shows that majority (47.1%) agreed that there is prospect for skilled workers' advancement in Nigeria.

Table 4: Major type of skills used (n = 70)

Characteristics	Frequency	%
Do you think that productivity level is influenced by the type of labour and technology used?		
Yes	59	84.3
No	11	15.7
Major type of labour used?		
Skilled	43	61.4
Unskilled	18	25.7
Both	9	12.9
If skilled, how regular is the use?		
Always	35	50.0
Seldom	19	27.1
Never	16	22.9
If unskilled, how regular is the use?		
Always	31	44.3
Seldom	5	7.1
Never	34	48.6
Company's coping strategies with problems of skilled labour?		
Reduce working days	36	51.4
Reduce working hours	17	24.3
Close manufacturing office	6	8.6
Reduce level of output	9	12.9
All of the above	2	2.9

Source: Author's Survey 2016

Table 5: Sufficiency of Skilled Labour and Equipment (n = 70)

Characteristics	Frequency	%
Availability of Sufficient Skilled Labour		
Yes	51	72.9
No	19	27.1
What skill is more efficient?		
Skilled workers	41	58.6
Skilled and Unskilled	1	1.4
Unskilled workers	28	40.0
Availability of Sufficient Equipment		
Yes	51	72.9
No	19	27.1

Source: Author's Survey 2016

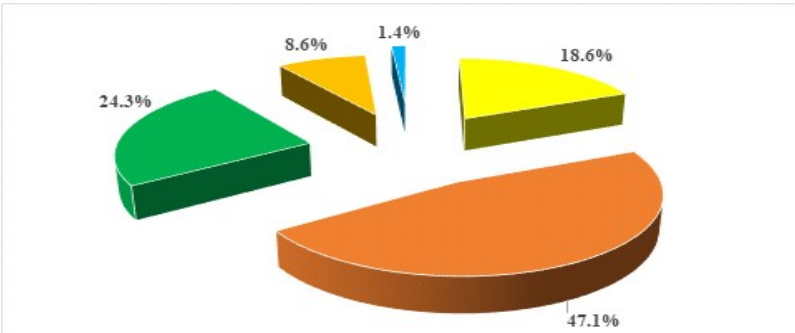

Figure 2: Prospects in skilled workers' advancement in Nigeria

Table 6: Operations and frequency of operations as skilled labour

Profession	"Yes" Freq. (%)	Always Freq. (%)	Sometimes Freq. (%)	Rarely Freq. (%)	Never Freq. (%)
Supervisory worker	55 (78.6)	43 (61.4)	5 (7.1)	7 (10.0)	15 (21.4)
Contract worker	32 (45.7)	11 (15.7)	18 (25.7)	3 (4.3)	38 (54.3)
Drilling Engineer	30 (42.9)	14 (20.0)	10 (14.3)	6 (8.6)	40 (57.1)
Rock Mechanics Engineer	21 (30.0)	7 (10.0)	8 (11.4)	6 (8.6)	49 (70.0)
Mechanical Engineer	23 (32.9)	13 (18.6)	6 (8.6)	4 (5.7)	47 (67.0)
Accountant	15 (21.4)	8 (11.4)	2 (2.9)	5 (7.1)	55 (78.6)
Economist	13 (18.6)	5 (7.1)	5 (7.1)	3 (4.3)	57 (81.4)
Marketer	16 (22.9)	7 (10.0)	5 (7.1)	4 (5.7)	54 (77.1)
Computer Scientist	10 (14.3)	6 (8.6)	1 (1.4)	3 (4.3)	60 (85.7)
Geologist	8 (11.4)	3 (4.3)	4 (5.7)	1 (1.4)	62 (88.6)

Source: Author's Survey 2016

Table 7: Challenges of Using Skilled Labour Workers

	"Yes" Freq. (%)	Always Freq. (%)	Sometimes Freq. (%)	Rarely Freq. (%)	Never Freq. (%)
Distance from home	65 (92.9)	56 (80.0)	8 (11.4)	1 (1.4)	5 (7.1)
Terms of payment	65 (92.9)	19 (27.1)	44 (62.9)	2 (2.9)	5 (7.1)
Issues with Supervisors	60 (85.7)	28 (40.0)	22 (31.4)	10 (14.3)	10 (14.3)
Language Barrier	52 (74.3)	19 (27.1)	18 (25.7)	15 (21.4)	18 (25.7)
Religion Barrier	40 (57.1)	26 (37.1)	7 (10.0)	7 (10.0)	30 (42.9)
Inadequate Safety Measures & Health Care Facilities	61 (87.1)	20 (28.6)	32 (45.7)	9 (12.9)	9 (12.9)
Qualification Discrimination	54 (77.1)	25 (35.7)	16 (22.9)	13 (18.6)	16 (22.9)
Ethnic Discrimination	46 (65.7)	17 (24.3)	18 (25.7)	11 (15.7)	24 (34.3)
High cost living	61 (87.1)	38 (54.3)	16 (22.9)	7 (10.0)	9 (12.9)
Unfriendly working Environment	59 (84.3)	23 (32.9)	18 (25.7)	18 (25.7)	11 (15.7)
Technical Issues	54 (77.1)	19 (27.1)	18 (25.7)	17 (24.3)	16 (22.9)

Source: Author's Survey 2016

Table 8 shows the result of the spearman's rho test of association between challenges of skilled workers and years of service in quarry operation. The result indicated that distance from home relates negatively, very weak and non-significantly with year of service at 5% level of significance. The result also indicated that terms of payment relates negatively, very weak and non-significantly with year of service at 5% level of significance. It further shows that issues with supervisors also relates negatively, very weak and non-significantly with year of service at 5% level of significance. The result continues showing that both language barrier and religion barrier relates negatively, very weak and non-significantly with year of service at 5% level of significance. In the case of inadequate safety measures and health care facilities the result indicates that it is negative, very weak and significant with the year of service at 5% level of significance.

The result indicated that qualification discrimination of each worker relates positively, very weak and non – significantly with year of service at 5% level of significance. In line with ethnic discrimination it indicates that its values relate negatively, very weak and non-significantly with year of service at 5% level of

significance. The table further explains that high cost of living relates positively, very weak and non-significantly with year of service at 5% level of significance. It also illustrates that unfriendly working environment relates positively, very weak and non-significantly with year of service at 5% level of significance. Finally, the result proves that the presence of technical issues in the industries relates positively, very weak and non-significantly with year of service at 5% level of significance.

Table 8: Challenges of Skilled Workers Operation across Years of Service

	Spearman's rho	P - value
Distance from home	-0.026	0.830
Terms of payment	-0.183	0.129
Issues with Supervisors	-0.109	0.369
Language Barrier	-0.062	0.612
Religion Barrier	-0.076	0.534
Inadequate Safety Measures and Health Care Facilities	-0.288	0.015
Qualification Discrimination	0.000	1.000
Ethnic Discrimination	-0.195	0.105
High cost living	0.007	0.956
Unfriendly working Environment	0.023	0.853
Lack of Technical Issues	0.037	0.758

Source: Author's Survey 2016

CONCLUSION AND RECOMMENDATIONS

Conclusion

The challenges of skilled labour in quarry operations revealed by this study include; distance from home, terms of payment, issues with supervisor, Language barrier, Religious Barrier, Inadequate safety measures and health facilities, qualification discrimination, ethnic discrimination, high cost of living, unfriendly working environment and lack of technical issues. Major explored minerals in the study area are granite while calcite, dolomite, kaolin, and marble are exploited in low non - economic quantity; these minerals are used by the companies for the production of asphalt, paints and in road construction. Most of the companies have been in production for more than ten (10) years while most skilled workers were paid a range of N50,000 and 100,000. Skilled labour operations in the quarry used for this study includes supervisors, contract workers, drilling engineer and rock mechanics engineer.

Recommendations

1. Since most skilled workers live far from the quarry work place, it is recommended that quarry company administrators should provide shelters for their skilled workers to increase production and improve productivity as the time spent on trip is better utilized on production activities.
2. There is also a need to regularly review the terms of payment of skilled workers as this tends to improve their commitment and dedication to their work.

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