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AN ASSESSMENT OF MULTI-SKILLING IN ADDRESSING SKILLS SHORTAGE IN NIGERIAN CONSTRUCTION FIRMS

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The construction industry in Nigeria is largely driven by activities of skilled labour or craftsmen as most of the construction activities are carried out manually. However, the Nigerian building construction firms are challenged by shortage of skilled manpower. This study assessed multi-skilling practice in building construction with a view to bridge skills shortage in the building construction firms. This study identified specific skills shortage and responsible factors, assessed the practice of multi-skilling, identified the impact of multi-skilling, identified impediments and ways of enhancing multi-skilling in the building construction firms. The study utilized a population of 170 building construction firms registered in Abuja with updated remittance to the Industrial Training Fund (ITF). Simple random sampling was used in selecting 140 sampled firms. Two sets of questionnaires were administered to the most senior professional and craftsman in each of the 140 firms sampled. Data obtained was analysed with statistical tools: Means, Percentages, and standard deviation and results were presented in charts and tables. The major findings in this study revealed that respondents (professionals and craftsmen) admitted shortage of Masonry, Plumbing, and Painting skills. "Poor Apprenticeship Schemes" was unanimously agreed by respondents to be the most important factor responsible for skills shortage with mean of 3.94 and 3.74 as ranked by professionals and craftsmen respectively. The study also revealed that multi-skilling is only slightly (48%) practiced among professionals while some of the craftsmen possess and practice skills other than their traditional area of competence. The study showed that professionals and craftsmen admitted that "Work Force Saving" (Mean = 3.83 and Mean = 4.13 respectively) is the most important impact of multi-skilling. Findings on impediments to multi-skilling revealed that "high cost of training" (Mean = 3.78) and "complexity of management" (Mean = 3.51) are the major impediments. "Training and Retraining of workers" (Mean = 4.14) and 'management's decision to multi-skill" (Mean = 3.90) were ranked highest as ways of enhancing the practice of multi-skilling. The research therefore concludes that "Workforce Saving" attribute of the concept of multi-skilling is an antidote to skills shortage in the building construction industry in Nigeria. Therefore, study recommends that construction firms should adopt multi-skilling with sustainable implementation strategies in order to bridge skills shortage.

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INTRODUCTION

The construction industries in Nigeria are mainly driven by activities of skilled labour or craftsmen because most of the construction activities are carried out manually. According to Odunsami, *et, al.* (2007), the capability of the construction industry to develop, procure and deliver innovative, complex and demanding projects is driven by involvement of highly knowledgeable and skilled personnel. However, one of the major hindrances to global and local construction process has been the inadequate supply of labour or craft to drive the industry task. Bruce and Dulipovici (2010) defined skills shortages as the difficulty in finding the right people to fill the available job.

This trend requires that managers in the construction industry employ other strategies. One of the ways to address the situation might be to strategically deploy the multi-skilling approach. A multi-skilled construction trade worker is an individual who possesses or acquires a range of skills and knowledge and applies them to work tasks that may fall outside the traditional boundaries of his or her original trade. (Dada and Ekpe, 2006). The potential for multi-skilling in the construction industry is an aspect of cost reduction benefit that has been poorly utilized. (Ejohwomu, 2007) Assessment of multi-skilling practice in the building construction is however important in order to validate this claim. This study therefore, focused on the assessment of multi-skilling practice in addressing skills shortage in Nigeria's building construction firms.

Past studies have shown reflections of construction skills shortage in every part of the world. Sanni and Alabi, (2008) asserted that availability of adequate skilled workforce in the construction industry has for long been identified as being in short supply. According to Ibrahim (2010), one of the major problems facing the Nigerian construction industry is the lack of qualified craftsmen. This in turn leads to poor workmanship, low productivity, late completion, cost over overruns and high accident rates (Dantong, 2006).

More worrisome is the poor outcome of several strategies from construction industry managers and operators in addressing the problem. Most studies in this area have focused on increasing the population of the existing pool of skills rather than harnessing potentials of existing ones. (Ejohwomu, 2007).

In view of several failed efforts in research and practice directed at tackling skills shortage in the building construction industry, a study like this that aims at assessing the practice of multi-skilling with the view to bridging gap between skills supply and demand is of significance. According to Brown (2011), the declining number of entrants into construction crafts presents critical challenges for our industry today. One solution which may positively

affect many labour issues is to better utilize the skilled workers currently in the industry through the development and use of multi-skilling hence, the "Assessment of multi-skilling in addressing skills shortage in Nigeria's building construction firms".

It is expected that the study will contribute to strategies aimed at reducing skills shortage by maximally utilizing current pool of workers.

LITERATURE REVIEW

Construction Industry Skills Shortage

According to Odunsami, (2011), the stock of competent skilled construction workers has dwindled and the industry which is expected to be the highest employer of labour after agriculture is populated with largely unskilled, inefficient and dissatisfied workers who see work in the industry as a stopgap till "better things in the future." Few see their crafts as careers worth investing in.

Factors Responsible for Skills Crisis

The task of identifying the main factors for skills crisis is so daunting, previous research work and interview of industry practitioners had identified poor skills management, poor image of the industry, lack of sustained training schemes, growth of self-employment among workers, high attrition/turnover, no clear career path, poor wages, gender imbalance as some of the factors that had caused skill crisis.

Multi-Skilling the Workforce

According to Ejohwomu, (2007), multiskilling is a labour utilization strategy that is motive driven, factor influenced- regardless of any limitations and benefits inclined. A multi-skilled construction trade worker is an individual who possesses or acquires a range of skills and knowledge and applies them to work tasks that may fall outside the traditional boundaries of his or her original trade (Dada and Ekpe, 2006). Types of multi-skilling includes: vertical multi-skilling, horizontal multi-skilling and depth multi-skilling.

Vertical multi-skilling -This process is the extent to which supervisory or administrative support tasks are learned by craftsmen (Li-Cheng, (2010). For example, a meson/bricklayer becoming a foreman and takes some elements of management, e.g. work planning, quality control, work supervision etc. This could be a team leader or a member of a self-managed team (Li-Cheng, (2010). Basically, this type of multi-skilling takes place along the same career path either upwards or downwards.

Horizontal multi-skilling -This is learning skills from another discipline or function within an organisation. For example, an electrician is learning some plumbing tasks or a mason/bricklayer learning some carpentry skills (Li-Cheng, (2010).

Depth Multi-skilling -This is the acquisition and application of more complex, specific skills within the same trade or discipline, for example a building electrician acquiring specific skills, such as expertise in power

systems, telecommunication, and security systems like installation of CCTV cameras (Li-Cheng, (2010).

Multi-skilled workers are capable of working across traditionally distinct occupational boundaries because of the increasing pool of skills and concomitant loss of emphasis on job demarcation (Matias-Reche & Fuentes-Fuentes, 2006).

The impact of multi-skilling

Research results indicate that multi-skilling can reduce number of skills required, increase the productivity, quality, and continuity of work, while providing for a safer site and providing managers more flexibility in assigning tasks (Li-Cheng, 2010). The success of any construction project is also measured by the degree of compliance with stipulated time of completion (Ayegba & Edwin, 2014)). Multi-skilling process is known to have reduced number of skills demanded and also saves idle times among craftsmen onsite (Keiber, Riley &Jones 2000).

Field studies have also indicated that multi-skilling may benefit workers. Such benefits include longer employment duration, better qualifications resulting in increased employability, higher pay/remuneration and increased job satisfaction (Li-Cheng 2010). Some organizations also multi-skill to ensure that incident management is adequate and appropriate. In these situations, individuals are equipped with adequate skills and knowledge to competently handle an abnormal or emergency situation (Matias-Reche & Fuentes-Fuentes, 2006). Multi-skilling staff in emergency management shares elements of vertical and horizontal Multi-skilling, where staff may have to assume a more senior role than their status traditionally allows because of the incident scenario (Keiber et al. 2000)

Impediments to multi-skilling

One of the known criticisms of the concept of multi-skilling has been associated with the consequences of 'change' implementation and a barrier to specialisation. (Carmichael and Macleod, 2008) argued that although training workers in several jobs is a successful redress for labour market shortfalls. There have been retrospective periods when a singly skilled workforce has resisted adopting labour saving changes for fear of losing their jobs. Another impediment includes limits on skills retention and the complexity of maintaining a multi skilled workforce from management and human capital investment perspectives.

Enhancing Multi-skilling

The introduction of multiskilling within organisations is typically carried out with the aim of managing crisis generated by inadequacies of required skills, improving efficiency, reducing costs, improving quality and increasing production (Caroline and Wright, 2007). The multi-skilling process is comprised of the following elements: starting out, planning and assessment, implementation, implementation check; ongoing review and maintenance/retention.

Nwaogazie, Augustine & Henshaw (2016) identifies that it has become a norm in developed countries to have workers multi skilled in carpentry and piping, crane operating and driving. Similarly, Nwagozie et al demonstrates that workers with dual skills in carpentry and masonry, plumbing and painting, ironwork and electrical work, masonry and tiling skills significantly reduce both the number of workers needed in a project and the project labour cost in Nigeria.

RESEARCH METHODOLOGY

The research methods are blue print used to complete a study (Bhojanna, 2007). It refers to entire process employed in obtaining information and data for a successful study. This study is survey approach which involved gathering and collection of primary data. This quantitative research dwelled on obtaining responses from respondents with the use of questionnaires.
The population for this study is the 170 Abuja based building construction firms with updated remittance or contribution to the industrial training fund (ITF, 2015). The sample size was calculated using Cochran's formula for determining sample size cited in Bartlett, Kotrlik & Higgins (2001). The sample size for this study is obtained as shown;

Cochran's (1977) formula for determining sample size

$\underline{n}_0 = \frac{t^2 \text{ X } (p)(q)}{d^2}$

$\underline{n} = \frac{n0}{(1+\frac{n0}{\text{population}})}$ (correction formula for final sample size), Where t = 1.96 obtained for alpha level of 0.05 (which is usually between 0.05 and 0.01 for most educational research). Where (p)(q) = Estimate of variance = 0.25. Where "d" = acceptable margin of error for proportion being estimated = 0.050. According to Bartlett *et al.* (2001) a margin of error between 3% and 5% is acceptable for educational and social research. Population (N) = 170 (representing number of construction firms that remit to ITF in Abuja as at 2015.

$\underline{n}_0 = \frac{t^2 \text{ X } (p)(q)}{d^2} = \frac{(1.96)^2 \text{ X } (0.5 \text{ X } 0.5)}{(0.050)^2} = \frac{3.842\text{X } 0.25}{0.0025}$, $\underline{n}_0 = \frac{0.9604}{0.0025} = 384$. Therefore, $\underline{n}_0 = 384$ the value for $\underline{n}$ can be obtained as presented: $\underline{n} = \frac{n0}{(1+\frac{n0}{\text{population}})}$ (correction formula for final sample size) $\underline{n} = \frac{384}{(1+\frac{384}{170})}$, $\underline{n} = \frac{384}{1+2.26} = \frac{384}{3.26} = 117$ (actual sample size Fred, (2015) opined that sample should be increased by 15-25% in studies that require response from craftsmen/artisans because of their known reluctance to respond to questionnaires. This study added 20% of 117. $= \frac{20}{100} \text{x } \frac{117}{1} = 23.4$. no. = 140 (sample frame) construction firms. Simple random sampling technique was used to select 140 firms from the entire population

Two (2) forms of structured questionnaires were designed and distributed. The first was designed to obtain information from most senior professionals in the building construction firms, while the second was designed to obtain

response from the most senior craftsmen in the same firms. The construction crafts selected for this study were masonry, carpentering, plumbing, iron fixing and painting. These trades were considered for survey because Umar (2014) asserted that they are most common and available in every building construction activity in Nigeria. Similarly, Oseghale *et al.* (2015) described them as most dominant and popular in the building construction firms. The questionnaires were self-administered and collected from the professionals over a period of time while services of well-trained multi-lingual research assistants were employed to help some craftsmen with low level of literacy. Data obtained was analysed using statistical package for social science (SPSS). The results were presented using means and percentages in charts and tables.

RESULTS AND DISCUSSION

Demographic Data of the Respondents

Table 4-1 shows that majority (30%) of professional respondents are builders, while majority (31%) of craftsmen are masons. Most professionals have experience between 5-10 years. This shows that the respondents have good experience to respond to questions

Identification of skills shortage in the building construction firms

In Figure 4.1, professionals agreed that there is shortage of masonry (30% agreed), plumbing (42% agreed), and painting (32% strongly agreed,) skills. In Figure 4.2, 89% of craftsmen admitted there is shortage of masonry, 81% admitted there is shortage of carpentry, 60% admitted there is shortage of plumbing and 62% admitted there is shortage of painting skills.

Table 4.1: Characteristics of respondents

Respondent's Data		Professional's		Craftsmen's		
		Frequency	Percentage		Frequency	Percentage
Profession	Architect	21	16.8	Mason	37	31
	Builder	38	30.4	Carpenter	34	29
	Quantity Surveyor	34	27.2	Plumber	20	17
	Engineer	32	25.6	Iron fixer/bender	25	21
				Painter	3	3
Years of experience	0-5 years	2	1.6		15	13
	5-10 years	53	42.4		51	43
	10-15 years	45	36.0		38	32
	Above 15 years	25	20.0		15	17

Source*: Field Survey* (2017)

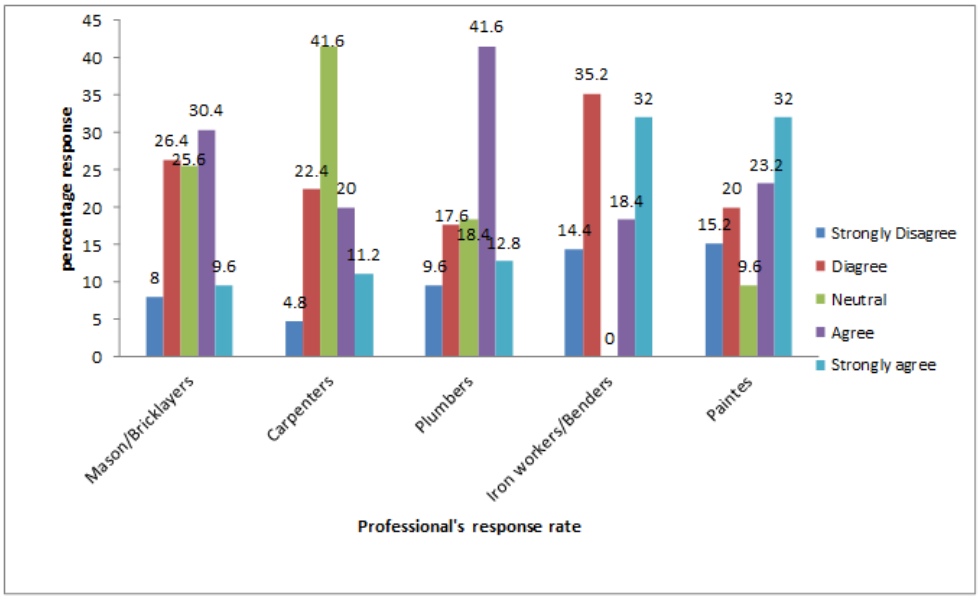

Figure 4.1 Identification of skills shortage by Professionals

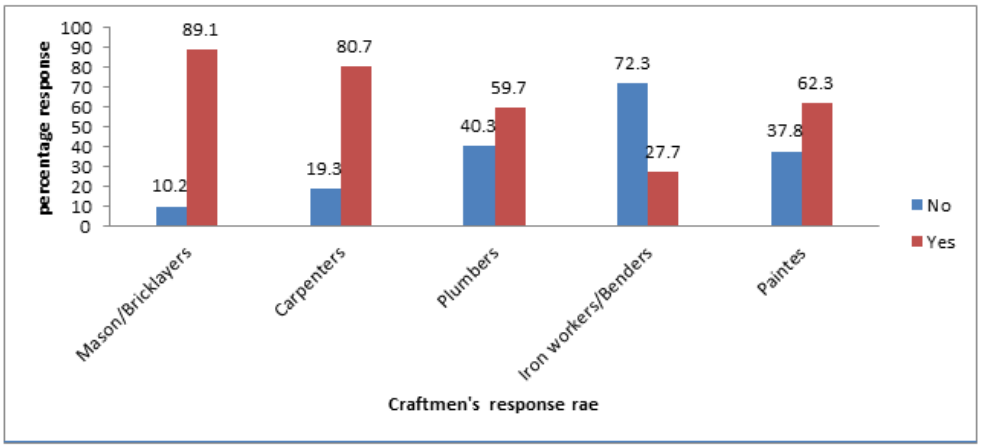

Figure 4.2 Identification of skills shortage by craftsmen

Identification of factors responsible for skills shortages by professionals and craftsmen in the building construction firms

The results in Tables 4.2 shows that "poor apprenticeship schemes" is ranked first by both professionals (mean=3.94) and craftsmen (Mean = 3.74), while "Introduction of New Technologies" is least ranked by both professionals and craftsmen with Mean = 3.22 and Mean = 2.65 respectively. It is inferred in this research that "poor apprenticeship schemes" is the most important factor responsible for skills shortage in the building construction firms.

Practice of multi-skilling in the building construction firms

The Figures 4.3 and 4.4 show the level of practice of multi-skilling in the construction industry by professionals and craftsmen. It is observed in Figure 4.3 that 48% of professionals slightly practice the concept of multi-skilling. Figure 4.4 shows other skills possessed and practiced by respondent craftsmen. Sixteen masons (43%) possess plumbing skill while four (11%) of the masons have no extra skills. Six (18%) of the carpenters possess plumbing, iron fixing, painting skills, while six (18%) of them do not have

extra skills. Eight (40%) of the plumbers possess iron fixing skills, six (30%) possess masonry skills while four (20%) have no extra skills. Seven (28%) of the iron fixers possess masonry skills, five (20%) possess plumbing skill and one (5%) do not have extra skills. Finally, one (33%) painter possess, masonry carpentry, plumbing and iron fixing skills. One (33%) do not have extra skills. The result shows that multi-skilling is not properly practiced among professionals. However, the result shows that most craftsmen possess skills other than their traditional trade.

Table 4.2: Assessment of factors responsible skills shortage

S/N	Factors responsible for skills shortage	Professionals			Craftsmen's		
		Mean	SD	Rank	Mean	SD	Rank
1	Poor apprenticeship Schemes	3.94	1.272	1st	3.74	1.053	1st
2	Poor Training and Retraining	3.88	1.293	2nd	3.73	1.125	2nd
3	Poor Funding of Vocational Centres	3.85	1.055	3rd	3.59	0.896	4th
4	Ageing Workforce	3.82	1.346	4th	3.11	1.007	14th
5	Absence of Clear Career Path	3.78	1.288	5th	3.25	0.985	10th
6	Poor Skills Management Strategies	3.74	1.218	6th	3.69	0.937	3rd
7	Casualization of Workers	3.73	1.167	7th	2.30	1.046	9th
8	Use of Labour Contractors	3.73	1.240	8th	3.37	0.758	8th
9	Quest for self-employment among craftsmen	3.65	1.252	9th	3.20	0.898	12th
10	Low Wages in the Industry	3.62	1.305	10th	3.58	0.925	5th
11	Poor Work Place Safety Measures	3.59	1.199	11th	3.22	0.993	11th
12	Few Female Entrants	3.58	1.398	12th	2.90	1.368	16th
13	Poor Image of the Industry	3.50	1.305	13th	3.45	1.071	6th
14	Very Physical Nature of Work	3.47	1.406	14th	3.17	0.905	13th
15	High Skills Turnover/Mobility	3.42	1.334	15th	3.44	0.709	7th
16	Dissatisfaction with Labour Union	3.24	1.003	16th	3.09	0.725	15th
17	Introduction of New Technologies	3.22	1.377	17th	2.65	1.030	17th

Source: Field Survey (2017)
1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree, SD = Standard deviation

Assessing the practice of multi-skilling in the building construction firms

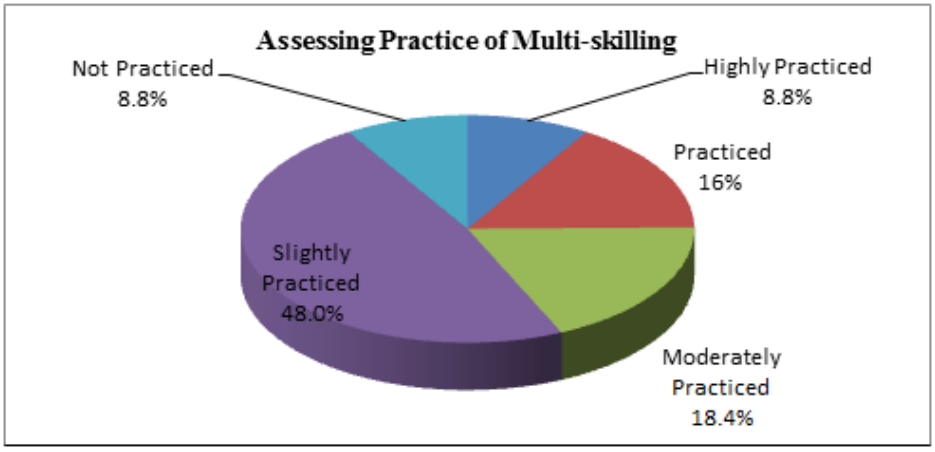

Figure 4.3: Professionals' practice of multi-skilling

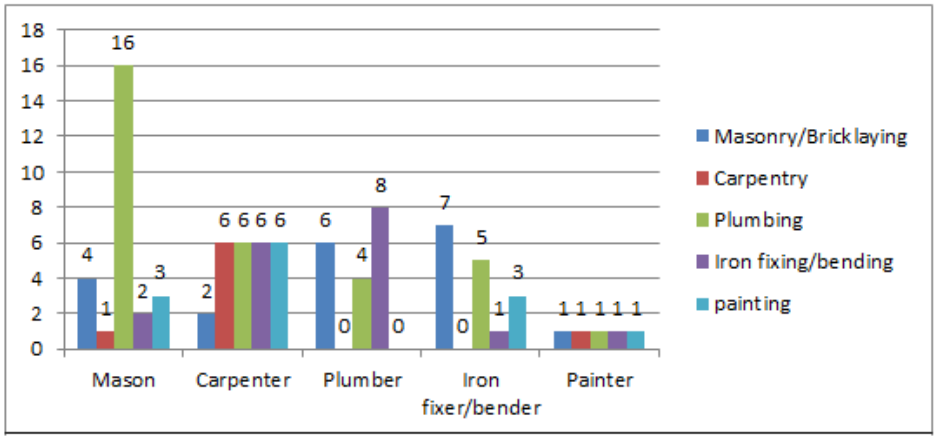

Figure 4.4 Craftsmen's practice of multi-skilling

Table 4.3 shows both professionals and craftsmen ranked "Work force savings" first with respective Mean = 3.83 and 4.13 respectively. Similarly, "hindrance to Specialisation" was least ranked by both professionals and craftsmen with respective mean of 3.57 and 2.85. It is therefore inferred in this study that workforce savings is the most significant impact of multi-skilling in the building construction firms.

Identifying the impediments to multi-skilling in building construction firms

In Table 4.4, the professionals ranked "High Cost of Training and Retraining" (Mean = 3.78) first while "Complexity of Management" (Mean =3.51) was equally ranked first by the craftsmen. It is inferred that "High Cost of Training and Retraining" and "Complexity of Management" are major impediments to practice of multi-skilling. Although multi-skilling is considered to reduce number of workers required, it is associated with high cost of training. Worthy of note, is also the complexity in managing multi-skilled workers.

Identifying the impact of multi-skilling in building construction firms

Table 4.4 Assessment of impact of the practice of multi-skilling

S/N	Impact of multi-skilling	Professional's			Craftsmen's		
		Mean	SD	Rank	Mean	SD	Rank
1	Work force saving	3.83	1.306	1st	4.13	0.911	1st
2	Time Saving	3.82	1.245	2nd	3.46	1.307	5th
3	Work force development	3.82	1.260	3rd	3.43	1.022	7th
4	Better Pay and Promotion	3.80	1.308	4th	3.56	0.860	2nd
5	Work Force Flexibility	3.78	1.323	5th	3.50	1.016	4th
6	Work Force Optimisation	3.78	1.337	6th	3.34	1.077	8th
7	Easy employment for craftsmen	3.71	1.288	7th	3.32	1.241	10th
8	Work Force efficiency	3.70	1.326	8th	3.44	1.079	6th
9	Skills Communication/Transfer	3.67	1.306	9th	3.56	1.030	3rd
10	Job Satisfaction	3.59	1.339	10th	3.34	0.985	9th
11	Hindrance to Specialisation	3.57	1.393	11th	2.85	1.176	11th

Source: Field Survey (2017)
1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree, SD = Standard deviation.

Table 4.4: Assessment of impediments to the practice of multi-skilling

S/No	Impediments to multi-skilling	Professionals'			Craftsmen's		
		Mean	SD	Rank	Mean	SD	Rank
	High Cost of Training and Retraining	3.78	1.389	1st	3.42	0.970	3rd
	Limits on Skills Retention by Worker	3.74	1.339	2nd	3.18	0.840	4th
	Resistance to Change	3.72	1.348	3rd	2.80	1.078	5th
	Complexity of Management	3.70	1.320	4th	3.51	0.882	1st
	Lack of Awareness of Multi-skilling	3.54	1.417	5th	3.43	0.869	2nd

Source: Field Survey (2017)
1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree, SD = Standard deviation.

Identifying the ways to enhance multi-skilling in building construction firms

Table 4.5 shows that the professionals ranked "Training and Retraining of Workers" (mean= 4.14) as the most significant way of enhancing multi-skilling. The least ranked is "Workers should acquire few Skills they can Retain" (Mean =3.74). Similarly, Craftsmen ranked "Management's Decision to Multi-skill" (Mean = 3.90) first as the most significant way of enhancing multi-skilling. The least ranked is "Educate Craftsmen on Benefits of Multi-skilling" with mean of 3.55. This study therefore inferred that "Training and

Retraining of Workers" and "Management's Decision to Multi-skill" are the most significant ways of enhancing the practice of multi-skilling. This reveals that multi-skilling adoption can only be a success if there is a conscious decision made by management to adopt it. This decision must be supported by sustainable training programs for the workers.

Table 4.5: Assessment of ways of enhancing the practice of multi-skilling

		Professional's			Craftsmen's		
S/No	Ways of the Enhancing Multi-skilling	Mean	SD	Rank	Mean	SD	Rank
1	Training and Retraining of Workers	4.14	1.300	1st	3.64	0.927	5th
2	Ensure Implementation Checks and Review	4.12	1.261	2nd	3.76	0.861	3rd
3	Educate Craftsmen on Benefits of Multi-skilling	4.11	1.259	3rd	3.55	0.810	6th
4	Good Implementation Strategies	4.04	1.352	4th	3.54	1.156	7th
5	Good Pay and Promotion for Craftsmen	4.02	1.347	5th	3.70	0.953	4th
6	Managements' Decision to Multi-skill	3.98	1.414	6th	3.90	0.906	1st
7	Craftsmen Retention	3.98	1.286	7th	3.51	0.919	8th
8	Create Career Path for Multi-skilled Workers	3.98	1.304	8th	3.29	0.924	10th
9	Adequate Training for Managers	3.96	1.450	9th	3.88	0.865	2nd
10	Workers Should Acquire Few Skills they can Retain	3.74	1.288	10th	3.46	0.919	9th

Source: Field Survey (2017)
1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree,.

CONCLUSION

The study concludes that there is shortage of Masonry, plumbing and painting skills in the building construction firms. Poor apprenticeship Schemes is majorly responsible for the shortage of skills in the building construction industry. The study also concludes that 'Workforce Saving' is the most important impact of the practice of multi-skilling in building construction firms. It is also concluded that 'High Cost of Training and Retraining' and 'Complexity of management" are the major impediments to multi-skilling in the building construction firms. The study recommends that building construction firms and other industry stake holders should make decision to multi-skill in order to explore the workforce saving impact of multi-skilling. This must be pursued by investing more in strengthening skill training and retraining mechanisms, specifically good apprenticeship schemes in order to boost skill supply to the industry.

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