# MULTI-SKILLING BARRIERS IN THE CONSTRUCTION INDUSTRY IN NORTH-WESTERN NIGERIA

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The need to improve productivity and cost effectiveness has made some companies to adopt a multi-skilling labour strategy where workers can work across their traditional occupational boundaries. The study assessed the problems and barriers of multiskilling using a cross-sectional survey of construction workers in some selected cities in north-western Nigeria. Descriptive statistics was used in the analysis. Results show that lack of training and limit on human skill retention by workers are among the major barriers of multi-skilling. It was concluded that multi-skilling can lead to improved productivity and cost effectiveness if these barriers are minimised. It was recommended that construction companies should provide adequate training for their workers so that they can be multi-skilled.

Keywords: construction industry, multi-skilling, productivity

## INTRODUCTION

Two of the most critical challenges facing the construction industry are the limited availability of skilled labour and the increasing need for productivity and cost effectiveness (Hegazy et al. 2000). One potential solution already being used by some companies is multiskilling (Dada and Ekpe, 2006). It is argued that if labour workers are properly trained to fit into a variety of roles in the construction processes (that is, to become multiskilled), it will increase their skill repertoire and enable them to acquire the capacity to work across traditionally distinct occupational boundaries (Cordery, 1989). A multiskilled 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. In a construction context, this does not necessarily mean that a worker obtains or possesses mastery level skills in multiple trade areas. However, based on the flexible application of skills the worker already possesses or is willing to acquire, the worker can be an effective and productive contributor to the work output of several traditional trade disciplines (Construction Industry Institute (CII), 1998).

Research results have indicated that multiskilling can increase the productivity, quality, and continuity of work, while providing for a safer site and providing managers more flexibility in assigning tasks (Williamson 1992; Cross 1996; Burleson

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et al. 1998). Field studies have also indicated that multiskilling may benefit workers. Such benefits include longer employment duration, better qualifications resulting in increased employability, and increased job satisfaction (Stanley 1997; Rodriguez 1998; Carley 1999).

Despite these reported benefits, Dada and Ekpe (2006 ) have identified some barriers to the use of multiskilling in the construction industry, such as lack of training, resistance to change and difficulty in meeting licensing requirements. Other barriers included limit on human skill retention and pride of craft association. The purpose of this paper was to critically examine the barriers to effective use of multiskilling strategy in north-western Nigeria. It is believed that uncovering these barriers would increase current understanding and provide a useful guide to managers in formulating appropriate policies of utilising current workforce more effectively in order to boost productivity.

# LITERATURE REVIEW

## The Concept of Multiskilling in the Construction Industry

The construction industry is unique in the way it manages and organizes human resources. Unlike manufacturing or process industries, each construction project is different in terms of staffing, organization, strategy and management. Projects vary greatly - from small office renovations to large complex construction works. Each project requires a different labour force and as the work on site proceeds, the various work teams that have gradually been integrated during the course of work have to break up and re-adjust themselves in different groups on different sites (Odusami, Oyediran and Oseni, 2007). Consequently, every project presents its own challenges and requires a unique complement of tradespeople during various construction phases (Dada and Ekpe, 2006).

Construction industry analysts and practitioners have focused their attention on skilled labour availability for many years now. Falling numbers of new trade entrants and low construction unemployment rates increasingly indicate that there are not enough skilled workers to meet rising demand. Part of the problem in meeting demand is the unstable and short-duration job assignments. New entrants into the work force are seeking better job stability. It is believed that the solution to the skilled labour shortage is to look for ways to better utilize the skilled workers already in the industry and to improve job stability. Multiskilled labour utilization strategies have been successfully implemented in many industries and many countries. In these instances, a multiskilled work force has been identified as a contributing factor to economic development, improved international competitiveness, and increased profitability (CII, 1998).

A multiskilled workforce is one in which the workers possess a range of skills that allow them to participate in more than one work process (Lill, 2008). Because craft boundaries are blurred using multiskilling, a multiskilled workforce can be organized in such a way that workers are employed for longer durations at the site while the total project hiring requirements are reduced. A worker may be selected to participate in any activity in which he or she is proficient and may be rotated to another activity, if

necessary, rather than being replaced by an additional worker (Gomar et.al., 2002). Multiskilling is therefore the acquisition of skills, knowledge, competency, and experience which enable an individual to perform tasks outside the immediate job requirements, thereby providing the organisation with a flexible and adaptable worker, and a pool of skilled human resources (Davids, 2004).

**Dimensions of multiskilling**

According to Anderson, (2010), multiskilling can be considered in terms of three dimensions;

1. ***Vertical multiskilling*** – this is where the employee takes on supervisory or administrative tasks such as overseeing or leading a self-managed team. This has the potential of empowering an employee with managerial aspirations and demonstrates a greater level of trust in the individual.

2. ***Horizontal multiskilling*** – this is where the employee takes on another task at the same level of his or her original task. For instance, a block/brick layer taking on the work of a plasterer.

3. ***Depth multiskilling*** – where a set of complex skills are acquired within the same job function in order to offer a better overall service.

It is worth noting that there is no universal 'best practice' in multiskilling, since the type of job being performed, the individual employee and the organisational structure of the company will determine what is best. In most cases, the ideal solution will be a combination of all three dimensions (Andersen, 2010).

**Advantages to the employer**

The main benefits of multiskilling to the employer are lower costs and increased flexibility. Personnel costs probably constitute the most cited and well-documented arguments in favour of multiskilling (Andersen, 2010). Overall personnel costs are reduced through layoffs due to better utilisation of existing personnel and lower temporary personnel recruitment costs, as employees will be better able to stand in for each other (Andersen, 2010). One documented benefit is that flexibility results in increased client satisfaction and enhanced work quality (Haas et al., 2001). The ability of multiskilled employees to perform a larger portion of the work has led to an observed increase in productivity by decreasing idle time and transition time between job areas or work groups (CII, 1998). Multiskilling provides an environment where duration in employee assignment increases and therefore individual break-in periods are reduced. Project site safety is improved due to increased employment duration on the site. Previous studies have shown that most accidents occur in the first months on a new site (Burleson et al., 1998).

Additional benefits include higher income and increased employability of the workforce. To take full advantage of these benefits, the workforce strategy and the

planning and scheduling processes of a construction project must be adapted to use multiskilling effectively and efficiently (Haas et al., 2001).

**Advantages to the employee**

From the employee's perspective, the main benefits are better use of skills, increased job variety, higher pay and increased job motivation (CII, 1998). The employees may receive higher pay as a result of the company's increased productivity and higher profit on multiskill contracts. Employee promotion prospects often improve as the employee receives more training and often supervisory and management training where vertical multiskilling is introduced (Andersen, 2010).

Haas et al. (2001) argues that organisational changes are inevitable when multiskilling is introduced. Some employees will see colleagues lose their jobs; new jobs and job titles will be introduced; and employees will be assigned to work with new colleagues. Interestingly, multiskilling may even be demanded by employees in the future. Today, work is central to employees' professional and personal identity and multiskilling is one way of improving the status of a job and hence quality of life. The current challenge is to make employees feel emotionally attached to the job as much as to the company, and multiskilling does just that (Andersen, 2010).

**Limitations of multiskilling**

De Vero and Martins (2010) assert that, from productivity perspective, specialised workers have a productivity advantage over multiskilled workers because their expert knowledge in a given skill makes them better at adapting to changing demand. That is, specialisation gives workers deep expertise that enables them to innovate and rapidly tailor products and services to the changing specifications demanded by clients. This ability to innovate, deriving from intensively specialising in one area, is lacking in multiskilled workers who are "jacks of all trades and masters of none."

Training costs may likely outweigh the benefits of the increased flexibility provided through multiskills. Without proper training, quality will decrease, thus reducing client's satisfaction. The employees are also likely to experience reduced job satisfaction if they are asked to do jobs without having the requisite skills (Andersen, 2010).

Organisational changes are equally inevitable when multiskilling is introduced. To utilise a multiskilled labour strategy, employers will have to alter their screening and hiring, compensation, staffing, and project management practices. In some sectors, owner practices that are designed around traditional craft definitions will have to be modified to fully utilise a multiskilling labour strategy (CII, 1998). A robust and efficient planning, organising and coordination is thus required if the strategy is to succeed.

# RESEARCH METHODS

**Research setting and procedure**

In line with Kamya et al.'s (2010) assertion that analytical surveys are recommended for descriptive studies that involved establishing the opinions of respondents, a crosssectional survey using structured questionnaire was used to generate data for the study as it provided information fairly quickly and relatively cheaply. The questionnaire was developed using measurement scales derived from previous empirical studies which were modified to suite the study location. This is in harmony with Osuagwa (2006) who supports adapting previous scales considering their wide item scales reliability and validity. Through personal consultations with experts, the contents of the questionnaire were validated. A pilot survey was conducted in order to test the validity and reliability of the instrument (Polit et al., 2001). A second version of the questionnaire was thereafter presented to the experts for further validation before it was eventually administered in the study area. The questionnaire consisted of two parts. The first part asked for general information about the respondents and their organisations. In the second part, each respondent was asked to rate the 16 barriers to, and the 13 effects of multiskilling strategy identified from the literature.

On a four-point Likert type scale of 1 – 4 (Wang and Huang, 2006) - "1" not important to "4" very important, the respondents were asked to rate the barriers and the effects of multiskilling according to their own judgment and local working experience. Although numerous studies have used Likert scales with more than four points, some earlier studies such as Garland (1991) have provided conflicting reasons for including or omitting a mid-point. Against the inclusion of a mid-point, Garland (1991) argued that a respondent's desire to please the researcher or appear helpful might lead them away from giving what they perceive to be a socially unacceptable answer. A Relative Importance Index (RII) (Lim and Alum, 1995) was calculated for each item in order to establish the relative importance of the variable using the formula below.

$$\text{RII} = \frac{3n1+2n2+1n3+0n4}{4N}$$

where n1= number of respondents for 'very important';

n2 = number of respondents for 'important'; n3 = numberof respondents for 'fairly important'; n4 = number of respondents for 'not important';

N = Total number of respondents.

In order to ensure homogeneity of response, the construction firms surveyed were classified into categories (Category A, Category B, Category C and Category D) in accordance with the Federal Ministry of Works' classification with respect to the size of contract (in Naira) they can handle (Adamu et al., 2011). A stratified random sampling technique was then used to select 180 firms out of a numerical list of 200 firms that have their registered offices in some selected states of north-western Nigeria and Abuja (the federal capital territory). The population for the study was site workers (masons, carpenters, iron-benders, tilers and electricians) and the management staff of

the selected companies. Research assistants were employed to distribute the questionnaires and assist the craftsmen on site to interpret the questionnaires.

## DATA PRESENTATION AND ANALYSIS

Descriptive method of analysis was adopted in analysing the data collected from the questionnaire survey. The Relative Importance Index (RII) was used in determining the rank of each item. The rankings were further used to cross compare the relative importance of the items as perceived by the two groups of respondents (site workers and management staff). Table 1 shows the general distribution of the questionnaires.
Table 1: Questionnaire distribution and response

| Distribution | Category D | | Category C | | Category B | | Total | % |
|---|---|---|---|---|---|---|---|---|
| | Artisans | Mgt staff | Artisans | Mgt staff | Artisans | Mgt staff | | |
| Number administered | 40 | 30 | 40 | 20 | 30 | 20 | 180 | 100 |
| Number returned | 36 (90%) | 20 (67%) | 33(87%) | 13 (65%) | 25 (83%) | 10 (50%) | 137 | 76 |
| Number unreturned | 4 (10%) | 10 (33%) | 7 (13%) | 7(13%) | 5 (17%) | 10 (50%) | 43 | 24 |

Table 1 shows that out of the 180 questionnaires administered (110 for artisans and 70 for management staff), 137 (76%) were fully completed and returned. A categorywise breakdown of the respondents shows that 56 belong to Category D firms, 46 belong to Category C firms, while 35 belong to Category B. None of the respondents belong to Category A. The aggregate response rate of the artisans is 94(85%) while that of the management staff is 43(61%). This response rate was considered adequate for the analysis based on the assertion by Moser and Kalton (1971) that the result of a survey could be considered as biased and of little value if the return rate was lower than 30–40%. The reason for the fairly high response rate is not unconnected with the method of administering the questionnaires. All the questionnaires were administered in person by the research assistants engaged for the study.

*Table 2: Educational qualification of respondents*

| MANAGEMENT STAFF | | | ARTISANS | | |
|---|---|---|---|---|---|
| Educational qualification | Frequency | Percentage | Educational qualification | Frequency | Percentage |
| Ordinary National Diploma (OND) Higher National | 13 | 30 | Vocational/Technical education | 20 | 21 |
| Diploma (HND)/Bachelor's degree Postgraduate | 17 | 40 | Secondary education | 25 | 27 |
| qualification (PGD, M.Sc, PhD, etc) | 3 | 7 | Trade Test | 8 | 8 |
| Not indicated | 10 | 23 | Primary education | 26 | 28 |

| | | | | | |
|---|---|---|---|---|---|
| - | - | - | None | 15 | 16 |
| Total | 43 | 100 | | 94 | 100 |

Table 2 shows the educational qualification of the respondents. Forty percent of the management staff have either a bachelor's degree or HND, 30% have OND, and 7% have a postgraduate qualification. Ten respondents did not indicate their qualification. Similarly, 21% of the artisans surveyed have a vocational/technical certificate, 8% have a trade test certificate, another 27% have secondary school certificate, while 28% have primary school certificate. Sixteen percent do not have any educational qualification. The low rate of educational qualification reported for the artisans may be attributed to the low level of literacy in north-western Nigeria.

Table 3: Working experience

| | MANAGEMENT STAFF | | ARTISANS | |
|---|---|---|---|---|
| Years of experience | Frequency | Percentage | Frequency | Percentage |
| 1-5 years | 5 | 12 | 8 | 9 |
| 6-10 years | 15 | 35 | 23 | 24 |
| 11-15 years | 11 | 25 | 20 | 21 |
| 16-20 years | 9 | 21 | 28 | 30 |
| Above 20 years | 3 | 7 | 15 | 16 |
| Total | 43 | 100 | 94 | 100 |

Table 3 shows the general working experience of the respondents. Out of the 43 management staff, 15, equivalent to 35% have 6-10 years working experience, 25% have 11-15 years working experience, and another 21% have 16-20 years working experience, while 7% have above 20 years working experience. Only 5 respondents (12%) have 1-5 years working experience. This signifies that all the management staff have the requisite experience to respond to the questions.

Similarly, out of the 94 artisans surveyed, 30% have 16-20 years working experience, 24% have 6-10 years working experience, 21% have 11-15 years working experience, while 16% have more than 20 years working experience. This equally shows that majority of the artisans have experience in construction works.

Table 4: Designation/trade of respondents

| MANAGEMENT STAFF | | | ARTISANS | | |
|---|---|---|---|---|---|
| Designation | Frequency | Percentage | Trade | Frequency | Percentage |
| Quantity surveyor | 5 | 12 | Masonry | 25 | 27 |
| Technical officer/technician | 12 | 28 | Carpentry | 20 | 21 |
| Engineer | 13 | 30 | Iron bending | 12 | 13 |
| Architect | 9 | 21 | Tiling | 5 | 5 |

| | | | | | |
|---|---|---|---|---|---|
| Project/construction Manager | 2 | 4 | plumbing | 5 | 5 |
| Plant manager | 2 | 5 | Electrical | 12 | 13 |
| - | - | - | plastering | 15 | 16 |
| Total | 43 | 100 | | 94 | 100 |

Table 4 shows the designation/trade of the respondents. A breakdown of the management staff surveyed indicates that 13 of the respondents are engineers, 12 are technical officers/technicians, 9 are architects, and another 5 are quantity surveyors. Similarly, the survey of the artisans indicates that 25 are masons, 20 are carpenters, 15 are plasterers, 12 are electricians while 5 are plumbers. Others include 12 iron-benders and 5 tilers. This indicates a fairly wide spread in the distribution of the questionnaires within the management staff and the common trades in the study area.

Table 5: Barriers to multiskilling strategy

| S/N | Barriers | Management staff (N = 43) | | | Artisans (N = 94) | | | Average RII of both groups | |
|---|---|---|---|---|---|---|---|---|---|
| | | Mean | R I I | Rank | Mean | R I I | Rank | R I I | Overall Rank |
| 1 | Lack of adequate training | 3.51 | 0.634 | 1 | 3.62 | 0.652 | 1 | 0.643 | 1 |
| 2 | Resistance to change | 2.93 | 0.482 | 5 | 2.65 | 0.412 | 7 | 0.447 | 5 |
| 3 | Licensing requirement | 2.93 | 0.483 | 4 | 2.50 | 0.375 | 10 | 0.429 | 8 |
| 4 | Limit on human skill retention | 3.19 | 0.547 | 2 | 2.88 | 0.472 | 3 | 0.509 | 2 |
| 5 | Pride of craft association 6 High training cost | 2.60 | 0.401 | 9 | 2.85 | 0.463 | 5 | 0.432 | 7 |
| 7 | Jurisdictional disputes between different crafts unions | 3.17 | 0.529 | 3 | 3.13 | 0.352 | 12 | 0.441 | 6 |
| 8 | Unsuitable for complex tasks | 2.26 | 0.320 | 11 | 2.60 | 0.399 | 8 | 0.360 | 11 |
| | | 2.91 | 0.477 | 6 | 3.12 | 0.428 | 6 | 0.453 | 4 |
| 9 | Difficulty in developing multiskilled craft tests | 2.14 | 0.285 | 13 | 1.74 | 0.186 | 14 | 0.236 | 14 |
| 10 | Difficulty in developing suitable compensation policies to match the level of skills acquired | 2.65 | 0.413 | 7 | 2.98 | 0.495 | 2 | 0.454 | 3 |
| 11 | Difficulty in recruiting and accessing adequate information regarding the skills of workers | 2.63 | 0.407 | 8 | 2.51 | 0.378 | 9 | 0.393 | 10 |
| 12 | The need to change organisational structure of company to accommodate multiskilling strategy | 2.28 | 0.321 | 10 | 1.21 | 0.319 | 13 | 0.320 | 12 |
| 13 | Difficulty in modifying already established single skilled labour management policies to accommodate multiskilling strategy | 2.84 | 0.171 | 16 | 2.43 | 0.356 | 11 | 0.264 | 13 |
| 14 | The need for change in project and company systems to support multiskilling as a competitive strategy | 1.95 | 0.238 | 15 | 1.66 | 0.165 | 16 | 0.202 | 16 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 15 | Difficulty in assigning workers to appropriate tasks and organizing effective crews | 2.30 | 0.318 | 12 | 2.49 | 0.471 | 4 15 | 0.395 | 9 15 |
| 16 | Complexity of maintaining a multiskilled workforce | 2.05 | 0.262 | 14 | 1.70 | 0.176 | | 0.219 | |

Table 5 presents the analysis of the barriers to multiskilling strategy as perceived by both groups (management staff and artisans). Starting with the response of management staff, the table shows that the biggest barrier to the strategy is "lack of adequate training" with a rank of 1 and Relative Importance Index (RII) of 0.634. This is followed by "limit to human skill retention" with a rank of 2 and an RII of 0.547, followed by "high cost of training" with an RII of 0.529 and a rank of 3. However, the lowest ranked barriers are "the need for change in project and company systems to support multiskilling as a competitive strategy" and "Difficulty in modifying already established single skilled labour management policies to accommodate multiskilling strategy" with ranks of 15 and 16 respectively.

Similarly, the responses of the artisan (Table 5) show that "lack of adequate training" has been found to be the biggest barrier to multiskilling with a rank of 1 and an RII of 0.652, followed by "difficulty in developing suitable compensation policies to match the level of skills acquired" with an RII of 0.495. This is followed by "limit to human skill retention" and "difficulty in assigning workers to appropriate tasks and organizing effective crews" with ranks of 3 and 4 respectively. The lowest ranked barriers are

"complexity of maintaining a multiskilled workforce" and "the need for change in project and company systems to support multiskilling as a competitive strategy" with ranks of 15 and 16 respectively.

However, the overall ranking of the barriers shows that "lack of adequate training of workers" is the biggest barrier with a rank of 1. Reasons for this could be the high cost of providing training and the high mobility of construction workers as a result of unattractive image, unsafe work place, irregularity of the workload, lack of respect and opportunities for training (Lill, 2008). The second ranked barrier is "limit to human skill retention" and the third is "difficulty in developing suitable compensation policies to match the level of skills acquired".

It is worth noting that the two groups have different opinions on the importance of some of the barriers to multiskilling. For instance, item 10 in Table 5 (difficulty in developing suitable compensation policies to match the level of skills acquired) is ranked 7$^{th}$ by the management (which may mean fairly important), but the same item is ranked 2$^{nd}$ (very important) by the artisans. This shows that artisans place high premium on compensation policies as it determines their increased wage earning potential. Similarly, item 6 (high training cost) is ranked 3$^{rd}$ by the management but 12$^{th}$ by the artisans. This is not surprising because high training cost implies more expenses for the organisation. Therefore management will be more interested in matters that have financial implication like training than the artisans. However, it is believed that the cost of multiskill training can be offset by a reduction in the per worker training costs as workers carry many fundamental skills from their primary craft into secondary skill areas (CII, 1998). Again, item 3 (licensing requirement) is ranked 4$^{th}$ by management staff, but 10$^{th}$ by the artisans. This suggests that management are more conscious of licensing requirements than the workers. This may influence their decision on the extent to which they will adopt the strategy. Table 6 shows the perception of the management staff and artisans on the effects of multiskilling. According to the management staff, "improved employability of workers" ranked 1$^{st}$ with an RII of 0. 465, followed by "increased training cost of workers" with an RII of 0.390. The third ranked effect is "enhancement of productivity" with an RII of 0.378. On the other hand, the artisans are of the opinion that the biggest effect of multiskilling is it "hinders specialisation".

This is followed by "enhancement of productivity" with a rank of 2 and an RII of 0.460. "Increased training cost" was ranked 3$^{rd}$ with an RII of 0.431. "Layoffs due to better utilisation of existing personnel" and "reduction of efficiency" are ranked 12$^{th}$ and 13$^{th}$ respectively.

However, in the overall ranking, "improved employability of workers" is ranked 1$^{st}$.

This result is justified because with multiskilling, workers are trained to perform multiple tasks which guarantees steady employment through many phases of a project, thus resulting in less time spent unemployed (CII, 1998). The second effect is "hindered specialisation". This is not unexpected because specialisation is only

achieved when same operation is frequently repeated. The third ranked effect is "enhanced productivity". This is equally justified because multiskilling promotes flexibility in labour allocation; i.e., workers will be able to quickly switch from one job to another, thereby enabling large portion of work to be performed by one crew.

This has been observed to increase productivity by decreasing idle time and transition time between job areas or work groups (Burleson et al., 1998).

| S/N | Effects | Management staff (N = 43) | | | Artisans (N = 94) | | | Average RII of both groups | |
|---|---|---|---|---|---|---|---|---|---|
| | | Mean | R I I | Rank | Mean | R I I | Rank | R I I | Overall RANK |
| 1 | Hinders specialization | 2.488 | 0.372 | 5 | 2.87 | 0.468 | 1 | 0.420 | 2 |
| 2 | Improves employability of workers | 2.860 | 0.465 | 1 | 2.68 | 0.420 | 7 | 0.443 | 1 |
| 3 | Enhances productivity | 2.512 | 0.378 | 3 | 2.84 | 0.460 | 2 | 0.419 | 3 |
| 4 | Reduces idle time of workers | 2.349 | 0.337 | 8 | 2.71 | 0.428 | 4 | 0.383 | 6 |
| 5 | Makes workers more useful | 2.512 | 0.377 | 4 | 2.54 | 0.386 | 9 | 0.382 | 7 |
| 6 | Reduces efficiency | 2.256 | 0.302 | 11 | 2.12 | 0.279 | 13 | 0.291 | 12 |
| 7 | Disruption of work flow due to constant movement of workers from one trade to another | 1.791 | 0.285 | 12 | 2.62 | 0.378 | 10 | 0.332 | 11 |
| 8 | Enhances better understanding of integrated construction activities | 2.651 | 0.338 | 7 | 2.681 | 0.426 | 5 | 0.381 | 8 |
| 9 | Project site safety is improved due to increased employment duration on the site | 2.418 | 0.355 | 6 | 2.691 | 0.423 | 6 | 0.389 | 5 |
| 10 | Creates role conflict between workers | 2.302 | 0.320 | 10 | 2.660 | 0.415 | 8 | 0.368 | 9 |
| 11 | Layoffs due to better utilisation of existing personnel | 1.953 | 0.238 | 13 | 2.298 | 0.324 | 12 | 0.281 | 13 |
| 12 | Increased job satisfaction and motivation | 2.349 | 0.336 | 9 | 2.404 | 0.351 | 11 | 0.344 | 10 |
| 13 | Increased training cost of workers | 2.558 | 0.390 | 2 | 2.723 | 0.431 | 3 | 0.411 | 4 |

Table 6: Effects of multiskilling

## DISCUSSION OF RESULTS

This section discusses the major findings from the results shown in Tables 5 and 6. In line with Pareto rule that the highest ranked have the greatest influence (Alinaitwe, et al., 2007), discussion is made on the five highest ranked barriers and effects within the overall ranking. According to the overall RII ranking, the five highest ranked barriers are; lack of adequate training, limit on human skill retention, difficulty in developing

suitable compensation policies to match the level of skills acquired; unsuitability of multiskilling for complex works and resistance to change.

Lack of adequate training of the workers has been found to be the biggest barrier to multiskilling. This agrees with the assertion of Dada and Ekpe (2006) that lack of training hampers the utilisation of multiskilling. Reasons for this apathy to additional training can be attributed to the high cost of training and increasing use of labour-only subcontractors which has reduced the commitment and investment in training (Alinaitwe, 2008). Growth in self-employment is also another reason, as it is very rare that a formal training is provided by the self-employed themselves because of insufficient facilities, funds or will for training (Crowley et al., 1997). In addition, Kazaz et al. (2008) opine that since workforce in construction is generally highly mobile, contractors are often reticent to invest capital to train those who may soon be someone else's employees. This finding is not at all surprising because many

employers of labour in the construction industry are yet to fully adopt the concept of multiskilling (Ejowhomu et al., 2006), and do not therefore equate its' benefits to the importance of providing additional training to workers. The implication of this is that, the construction workforce's average capability level will not develop and the productivity, quality and continuity of work will suffer as workers may not be able to stand-in for their colleagues because of incompetence.

The second ranked barrier is limit on human skill retention. This finding is supported by the assertion that endless mastering of additional skills cannot be reasonable and might lead to negative results, because of deterioration in infrequently used skills (CII, 1998; Clarke and Wall, 2000). This suggests that additional skills beyond a certain limit add little value. This view is equally shared by Hegazy et al. (2000) that after two or three skills are obtained, the extra benefit is marginal. The implication is, for multiskilling to be gainfully adopted, an optimum number of skills that a worker can acquire at any time must be identified, if not for anything but to avoid the situation of a worker becoming "jack of all trades, master of one specialised job" (Andersen, 2010).

The third ranked barrier is difficulty in developing suitable compensation policies to match the level of skills acquired. This is not surprising because current compensation/management policies are mostly designed around traditional craft definitions of single skill workers. A work force paradigm shift by the employers that will alter the hiring, compensation and project management practices is required throughout the industry in order to utilise this labour strategy (CII, 1998). Unfortunately, however, there is resistance to change in labour strategy (CII,1998; Dada and Ekpe 2006) in the industry. This implies that, organisations are not keen to change their compensation policies in order to adequately reward multiskilled workers based on their level of skills. This is a set back to the strategy, since according to Gomar et al. (2002), workers will be willing to learn additional skills if they are compensated for the work by additional pay, benefits, challenging work assignments, and more responsibility. Moreover, remuneration is seen as a key motivational factor that influences an individual's attitude to work (Kazaz, et al., 2008). Any deviation from the expected increase in remuneration may be a de-motivator to the worker. This agrees

with the expectancy theory which argues that the motivational force to perform or expend effort is a multiplicative function of the expectancies that individuals have concerning future outcomes and the value they place on those outcomes (Jenkins 1982 cited in Kazaz et al., 2008).

The fourth barrier is the unsuitability of multiskilling strategy in accomplishing complex works. That is, complex tasks do not easily lend themselves to multiskilling (CII, 1998). This partly agrees with the assertion of De Vero and Martins (2010) that a multiskilled worker can perform tasks up to a point, but as the level of skill or complexity of the work increases, only workers specialised in that area can be able to perform creditably. That is, specialized workers, either due to more intensive training or due to more focused learning-by-doing, are more skilled at the task they are specialized in than those workers whose training are spread across multiple tasks. This suggests that specialized workers will have deeper knowledge of a given task and will be more productive in accomplishing a complex task than will multiskilled workers.
The fifth ranked barrier is resistance to change. This tallies with the findings of CII (1998) and Dada and Ekpe (2006) that workers and perhaps management, tend to show some resistance to broad changes in labour strategy within the organisation. For instance, superior officers who are critical of the lower productivity encountered at the beginning of each rotation, may be unwilling to release employees as and when due. Similarly, resistance can arise on the part of employees who might refuse to give up a job in which they feel at home, thanks to the nature of their work, their colleagues, or their superiors, because they are afraid the demands made on them might be too great (Friederich et al., 1998).

From the overall ranking of the effects of multiskilling, the five highest ranked effects in descending order are; improved employability of workers, hindered specialization, enhanced productivity, increased training cost of workers and improved project site safety due to increased employment duration on the site.

Improved employability of workers has been found to be the most important effect of multiskilling. This finding is supported by Carley (1999) and Dada and Ekpe (2006) that multiskilling reduces workers' idle time and enhances employability. This implies that, as workers become multiskilled, their versatility, skills and experience increase thereby expanding their career options throughout their construction careers. In this regard, multiskilling can be seen as the panacea to skill shortages and high labour turnover rates.

The second effect of multiskilling is it hinders specialisation. This is in line with Dada and Ekpe's (2006) finding that multiskilling hinders specialisation. This is not unexpected because specialisation is only achieved when same operation is frequently repeated. This suggests that specialized workers will have deeper knowledge of a given task and will be more productive at it than will multiskilled workers. This supports the assertion of Lill (2009) that the higher the level of specialisation, the higher the quality of work and the higher the productivity that can be achieved. It should however, be noted that, the efficiency of specialisation is primarily guaranteed by the necessary

quantity of work. Where workers are not provided with work, efficiency may fall or even yield opposite results (Lill 2009). The implication of this is that, a balance must be struck between multiskilling and specialisation if high productivity is to be realised.

The third effect is enhanced productivity. This agrees with the works of Fox and Yuen (2004) and Dada and Ekpe (2006) that multiskilling improves productivity. Enhanced productivity is achieved by longer employment duration, ability to switch quickly from one job to another and reduced idle time (Haas et al., 2001; Gomar et al., 2002).

The fourth effect is increased training cost of workers. This is to be expected because the effectiveness of multiskilling is predicated on further additional training of workers to fit into a variety of roles in the construction processes, and this comes at a cost to the employers. The higher the breadth and depth of workforce training, the higher the cost of the training programme.
The fifth effect is improved project site safety due to increased employment duration on the site. This is not surprising because previous studies have shown that most accidents occur in the first months on a new site (Burleson et al., 1998).

## CONCLUSIONS AND RECOMMENDATIONS

The main objective of the study was to determine the major barriers to, and the effects of multiskilling strategy on the employees and employers of labour in the construction industry in north-western Nigeria. To this end, a questionnaire survey was conducted to achieve this. From the results, lack of adequate training was found to be the biggest barrier to multiskilling, followed by limit on human skill retention and then difficulty in developing suitable compensation policies to match the level of skills acquired. Similarly, improved employability, hindered specialisation and enhanced productivity were found to be the most important effects of multiskilling strategy to the workers and the organisation. In order for the strategy to be effectively implemented, the identified barriers and some of the negative effects such as hindrance to specialisation must be properly addressed.

The following recommendations can be made from the results

1.Employers should provide training, as well as encourage craftsmen to acquire additional skills in order to enable them become multiskilled so as to improve their employability potentials.

2.Government should assist in the training needs of the industry through subsidies or other incentive schemes to the employers, employees and the self-employed. This will mitigate the overall cost of training and motivate craftsmen in their qualification improvement

3.Comprehensive compensation/management policies should be evolved by employers in order to adequately reward multiskilled workers.

4.Although multiskilling strategy has been shown to improve employability and project site safety, it should however, be adopted with caution because it hinders specialisation.

A balance should therefore be struck between multiskilling and specialisation if high productivity is to be realised.

5.Sensitisation and awareness campaign on the benefits of the strategy should be embarked upon by organisations willing to adopt the strategy so that resistance to broad changes in labour strategy within organisations can be reduced to the minimum.

6.Organisations willing to adopt the strategy should evolve a formal skills assessment procedure in order to ensure that tasks are not assigned outside worker capabilities.

## LIMITATIONS OF THE RESEARCH

Like any other research study, this study has some limitations to consider. The findings of this study cannot be generalised statistically to all of Nigeria because it is geographically constrained, with respondents only drawn from a sample of construction firms in north-western Nigeria. The study further acknowledges the limitation that pertains to the use of surveys as method of data collection. Surveys can only show the strength of statistical association between variables and they provide no basis to expect that the respondents correctly interpret the questions. However, the effect of this has been reduced by the rigorous process that was undertaken in preparing the questionnaire.

## REFERENCES

Adamu, N., Zubairu, I. K., Ibrahim, Y. M., and Ibrahim, A. M. (2011). Evaluating the impact of product diversification on financial performance of Selected Nigerian construction firms. *Journal of Construction in Developing Countries. 16(2): 91–114*

Alinaitwe, H. M., Mwakali, J. A., and Hansson, B. (2007). Factors affecting the productivity of building craftsmen – studies of Uganda. *Journal of Civil Engineering and Management,* 13(3): 169–176

Alinaitwe, H. M. (2008). An assessment of clients' performance in having an efficient building process in Uganda. *Journal of Civil Engineering and Management* 14(2): 73–78.

Andersen M. K. (2010). Multiskilling and Job satisfaction in outsourcing. Aspector White Paper June, 2010.

Burleson, R. C., Hans, C. T., Tucker, R. L., and Stanley, A. (1998). Multiskilled labour utilization strategies in construction. *Journal of Construction Engineering and Management* 124(6): 480–489.

Carley, L. A. (1999). Worker's attitudes toward and experiences with multiskilling. Unpublished M.Sc Thesis, University of Texas at Austin, Austin, Texas

Clarke, L. and Wall, C. (2000). Craft versus industry: the devision of labour in European housing construction. *Construction Management and Economics,* 18: 689–698.

Construction Industry Institute (1997). *Multiskilling labor strategies in construction: Experiences with multiskilling labor strategies in the construction industry. http://constructioninstitute.org/services/catalog/more/rr137_12_more.cfm.*Retrieved February 22, 2010

Construction Industry Institute (CII) (1998). An Analysis of Multiskilled Labor Strategies in Construction. Research Summary 137-1, Austin, Texas

Cordery, J. 1989). Multi-skilling: a discussion of proposed benefits of new approaches to labour flexibility within enterprises. *Personnel Review*, 18 (3), 13-22

Cross, M. (1996). Multi-skilling brings cost and productivity benefits. *Proc., Training Plant Management: 11th National Maintenance Engineering Conf.*, U.K.

Crowley, L. G., Lutz, J. D. and Burleson, R. C. (1997). Functional illiteracy in construction industry. *Journal of Construction Engineering and Management – ASCE* 123(2): 162–170.

Dada, M.O. and Ekpe, J. (2006). The Place of Multi-Skilling in the Nigerian construction industry: a pilot study. P*roceedings of the 3rd International Built and Human Environment Research Week*. Vol.1, Delft University of Technology, Amsterdam

Davids, Z. (2004). Aspects of multi-skilling contributing to quality service provision within academiclibraries.http://libwww.syr.edu/information/strategicplan/progressreports/crosstrain/finalreport.pdf Retrieved October 22, 2011

DeVaro, J. and Martin F. (2010).Two Perspectives on Multiskilling and Product Market Volatility.:http://libwww.syr.edu/information/strategicplan/progressreports/crosstrain / finalreport.pdf RetrievedNovember11,2011

Ejowhomu, O A., Proverbs, D. G. and Olomolaiye, P. (2006). Multiskilling: a UK construction and building services perspective. *In:* Boyd, D (Ed) *Procs 22nd Annual*

*ARCOM Conference*, 4-6 September 2006, Birmingham, UK, Association of Researchers in Construction Management, 885-894

Fox, P. and Yuen, R. (2004). Multiskilling as a Response to Globalization In: Ogunlana, S.O., Charoenngam, C., Herabat, P., Hadikusumo, B.H.W. (Eds.) *Proceedings of International*

Symposium on Globalisation and Construction. AIT& CIB: Thailand pp. 249 – 260.

Friederich, A., Kabst, R., Weber, W. and Rodehuth, M. (1998). Functional flexibility: merely reacting or acting strategically? *Employee Relations*, 20 (5): 504-523

Garland, R. (1991). The mid-point on a rating scale: is it desirable? Research Note 3. *Marketing Bulletin*, 2: 66-70

Gomar, J. E., Haas, C. T. and Morton, D. P. (2002). Assignment and allocation optimization of partially multiskilled workforce. *Journal of Construction Engineering and Management*, 128(2): 103-109

Haas, C. T., Rodriguez, A.M., Glover, R., and Goodrum, P. M. (2001). *Planning and scheduling of a multiskilled workforce*, Center for construction industry studies

(CCIS). http://www.ce.utexas.edu/prof/hass/a_text_multiskill.pdf. Retrieved September 28, 2011

Haas, C. T., Tucker, R. L., Glover, R. W., and John, D. (2002). Craft workers' experiences with multiskilling and attitudes towards multiskilling, *Center for construction industry studies* (CCIS). http://www.ce.utexas.edu/prof/haas/a_text_craftwe.pdf Retrieved on September 28, 2011

Hegazy, T., Shabeeb, A. K., Elbeltagi, E. and Cheema, T. (2000). Algorithm for scheduling with multiskilled constrained resources. *Journal of Construction Engineering and Management – ASCE* 126(6): 414–421.

Kamya, M. T., Ntayi, J. M. and Ahiauzu, A. (2010). Knowledge management and competitive advantage: The interaction effect of market orientation. *African Journal of Business Management*, 4(14): 2971-2980.

Kazaz, A., Manisali, E. and Ulubeyli, S. *(2008).* Effect of basic motivational factors on construction workforce productivity in Turkey. *Journal of Civil Engineering and Management*, 14(2): 95–106

Lill I. (2008). Sustainable management of construction labour. The 25th *International Symposium on Automation and Robotics in Construction (ISARC)*, 26th -29th June 2008

Lill I. (2009). Multiskilling in construction – a strategy for stable employment. *Technological and Economic Development of Economy 15(4): 540–560.*

Lim, E.C., and Alum, J. (1995). Construction productivity: issues encountered by contractors in Singapore. *International Journal of Project Management*, 13(1): 51–8.

Moser, C.A. and Kalton, G. (1971). *Survey Methods in Social Investigation*.UK: Heinemann Educational

Odusami, K.T., Oyediran, O.S. and Oseni, A.O. (2007). Training needs of construction site managers. *Emirates Journal for Engineering Research, 12 (1): 73-81*

Osuagwa, L. (2006). Market orientation in Nigerian companies, Mark. Intelligence. Planning., 24(6): 608-631

Polit, D.F, Beck C.T, and Hungler, B.P. (2001). Essentials of Nursing Research: Methods, Appraisal and Utilization, 5th edition, Philadelphia, Lippincott Williams and Wilkins.

Rodriguez, A. (1998). Planning and scheduling a multiskilled workforce. Unpublished M.Sc Thesis, University of Texas at Austin, Austin, Tex.

Stanley, A. (1997). Benefits, impediments, and limitations to multiskilling in construction. Unpublished M.Sc Thesis, University of Texas at Austin, Austin, Texas

Wang, X. and Huang, J. (2006). The relationships between key stakeholders project performance and project success: Perceptions of Chinese construction supervising engineers. *International Journal of Project Management*, 24, 253–260

Williamson, R. M. (1992). Optimum performance through multi-skill maintenance. *AIPE Facilities*, 2(8), 34-42.