

A SYSTEM FOR RAISING PRODUCTIVITY OF CONSTRUCTION CRAFTSMEN IN SOUTH-WESTERN NIGERIA

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Abstract

In Nigeria's labour intensive and highly competitive construction industry, firms are currently applying various systems aimed at improving operatives' productivity and also to remain in business. This paper therefore discussed the influence of semi-financial incentives as one of the motivating measures. The principal objective was to determine if a relationship exists between the application of semi-financial incentives and the productivity of construction craftsmen in

Southwestern Nigeria. To achieve this, a questionnaire survey of management and operatives of construction firms backed up with on-site measurements was conducted to determine the impact of these schemes on the productivity of bricklayers, carpenters and steel fixers in the study area. Descriptive and inferential statistical techniques were used for the analysis. Comparative analysis of sites with or without incentives indicated that semi-financial incentive schemes had significant effects on the productive time of these craftsmen. The paper

concluded that the application of semi-financial incentives should be further intensified by management of all construction firms for an improved productivity.

Keywords: Construction Craftsmen, Motivation, Semi-financial Incentives, Productivity, South-western Nigeria.

Introduction

The construction industry in Nigeria is often considered to be complex and a unique one. It is also considered to be fast moving and exciting process. It therefore constitutes the most single sector of capital formulation in the nation's economy (Ayandele, 1996). The industry is highly fragmented and diversified with construction contractors and consultants ranging from a few giants who employ thousands of people to the majority of contractors that employ less than ten operatives (Fagbenle et al., 2004).

The construction industry's fortunes fluctuate with that of the general economy and its organizational patterns change with time and at times become so varied that they are difficult to understand. Unfortunately, the current global economic situation and

its negative impact on the construction projects have made construction productivity improvement to be more important. However, the current shortage of skilled manpower (craftsmen) is posing challenges of coping with the full workload that most construction firms now have. Therefore, the few ones that remain in the industry need to be motivated if productivity is to improve.

Incentive schemes can be categorized into two: financial and non-financial incentive schemes. Although, the financial incentive schemes, which is based on cost motives for its operation, possesses the advantage of making the operatives to be more dedicated to work, there are some inherent dangers on their operation and these include the following (Olomolaiye, 1990 and Fagbenle et al., 2004):

- (1) The financial incentive scheme tends to deteriorate over a period of time due to difficulties in its administration or supervision. In fact, Olomolaiye (1990) submitted that they worked only when newly introduced and further described them as merely "Kicks in the ass" in themotivation process.

(2) The targeted task or operation might not be clearly established to the satisfaction and understanding of the operatives and this subsequently result in argument and dissatisfaction.

(3) There may be problem if the scheme is not fairly and reasonably administered by the employer.

(4) There is every tendency that the operatives might be made to suffer because of deviation from the planned operation that is not the making of the operatives. Such deviations includeshortage of materials, bad weather, plant breakdown, non-availability of transportation owing to acute fuel shortage, etc.

Olomolaiye (1990) and Fagbenle (2000) categorised non-financial incentives, which do not rely on cost motive but concentrates on fringe benefits, into purely non-financial incentives and semi-financial incentives. According to the authors, purely non-financial incentives include the following: finish and go (no delay of operatives after the day's work); prompt payment of wages; making the work situation satisfying for workers; good relations with mates; good safety programme;

recognition on the job; accurate description of work; participation in decision making; good supervision; promotion; more responsibility; challenging tasks; job security; choosing workmates, etc. Semi-financial incentives on the other hand has been developed in recent years partly in response to competition for permanent employees, partly for reasons of cost effectiveness and also to alleviate the effects of government pay restraints and tension. They include the following: provision of insurance schemes; soft loans availability; free/subsidized medical services; entertainment allowances; outstation expenses; subsidized meal tickets; free/subsidized transport services; staff children scholarship scheme; end of the year or periodical cocktails; provision of social environment (such as recreational centres); education and training, etc. This study therefore investigates the aspect of semi-financial incentives as one of the motivating measures for construction craftsmen in Nigeria.

Literature Review

People apply themselves to work in varying degrees and this is explained by a law of behaviour: motivation

decreases if it is either unsatisfied or blocked from satisfaction. Khan (1993) reported that the importance of human factors in management, including motivation, was not well recognized until the famous Hawthorne studies were conducted in the 1920s and early 1930s. The major implication of the Hawthorne studies was a change in management thinking that the work environment, the feeling of being part of something important and the satisfaction of having some control on one's own destiny could have a significant influence on productivity.

The labour force plays a vital role in the construction process of any nation. Two sets of factors, as posited by Olubodun (1984), can be said to have considerable effect on the productive capacity of labour (operatives). One set of these factors which highlights the contribution of indirect labour, materials and equipment are:

- (1) The level of organization of work and especially the management aspects of the goal-attainment functions. That is, the allocation, co-ordination and control of the human and non-human resources that are to be transformed into products;
- (2) The degree of mechanization

and automation of production process, and;

- (3) The quality and quantity of supplies of raw materials.

The other set of factors affecting the productive capacity of labour usually recognized in literature are the following attributes of workers:

- (1) The skill of the workers, that is, technical and attitudinal as well as educational background;
- (2) His innate ability, that is, his physical mental energy, and;
- (3) The intensity of the application of both his skill and organic ability to the production process.

Hassan (1992) also submitted that there are various factors that affect productive efficiency in the construction industry which can be categorized as external and internal factors. External factors are those that are outside the control of the organization and these include weather conditions and clients' influence. The internal factors on the other hand, can be traced to both the

management and technology in the construction industry. Maloney (1986) believed that the design of the work determines its complexity and intricacy which in turn influence operatives' productivity. He then cited failure of the management of construction firms to provide tools, equipment, materials and information to their workers as well as government regulations and labour itself as some of the factors affecting operatives' performance. As perceived by Olomolaiye and Ogunlana (1989), workers' enthusiasm to produce and achieve are undoubtedly affected by their working environment. Factors such as type of materials, gang size, equipment, motivation level of the craftsmen, job planning and organization method, supervision, skill and weather were therefore itemized as being influencing performance in construction trades.

Research conducted by Jergeas (2009) indicated that productivity is a complex issue as many factors influence productivity such as labour, capital, materials and equipment. Lack of right materials, tools and equipment, poor communication or relationship between operatives and management, disorganized projects,

poor supervision, lack of cooperation and communication between different crafts, lack of operatives in decision process and unfair workloads are some of the factors that affect productivity. Technical problems like inadequate designs or incomplete engineering work can also lead to backlog in productivity. Also listed are restrictive and redundant procedures which affect the effectiveness of a project. A number of studies (Olubodun, 1984; Maloney, 1986; Olomolaiye, 1990; Ayandele, 1996; Kaming et al., 1997; Fagbenle, 2000; Fagbenle et al., 2004; and Jergeas, 2009) have attributed the low performance in the construction industry to the presence of a number of demotivators (dissatisfiers). In the same vein, Adeyemi (2000) observed the presence of a number of demotivators in the Nigerian construction industry, which are clogs to productivity improvement of craftsmen.

They are identified as:

- Inappropriate tools and equipment breakdown
- Materials shortage, delay and wastage.

- Incessant rework and estimating errors.
- Absence of training and safety programmes.
- Job insecurity/employee turnover.
- Non involvement of construction crew in production objectives
- Incompetent foremen.
- Predominance of Maslow's theory X site managers.

non-financial incentives and semi-financial incentives as earlier enumerated. Hewage (2007) conducted a research on fifty one factors affecting productivity. These factors were prioritized and clustered into nine categories. They are: design and changes; operatives motivation; inadequate communication; operatives skills; non-availability of information; lack of planning; congested work areas; inadequate supervision, and; adverse weather conditions.

Arising from this submission, important questions are:

Olomolaiye (1990) also enumerated the various non-financial incentives as good relations with mates, good safety programme, the work itself, participation of work, participation in decision making, good supervision, promotion, more responsibility, challenging task, job security and choosing workmates. Fagbenle (2000) and Wahab (1977) further identified the various non-financial incentives as finish and go, prompt wage payment, satisfying working environment and management by objectives. Fagbenle (2000) further classified non-financial incentive schemes into two: purely

- Which is more preferred between financial and non-financial incentives by the craftsmen and what are the various semi-financial incentive schemes in operation in the construction industry in Southwestern Nigeria?
- Are there any relationships between craftsmen' productivity and the application of semi-financial incentive schemes in construction industry in the study area?

It is against this backdrop that semi-financial incentive schemes are being researched into, with a view to knowing their impact on the productivity of construction craftsmen in Southwestern Nigeria.

Research Methodology

The population for the study was randomly drawn from the construction firms within Southwestern Nigeria, namely Lagos, Ogun, Oyo, Osun, Ondo and Ekiti States. The construction firms surveyed were classified into three different categories according to their contract values. They are: below N100m, N100m-N500m and above N500m (N157 = \$1). The essence of this was to ensure homogeneity of response and comparative analysis. Two sets of questionnaires were prepared, on a Likert type scale of zero to four, to sample the opinion of the construction practitioners (management and craftsmen) in the study area. The questionnaires were designed in such a way that they could be easily completed by the respondents.

One hundred and seventy (170) questionnaires were distributed to each set of the aforementioned

respondents (bricklayers, carpenters and steel fixers) in the study area, using stratified random sampling. The sample was further stratified in terms of main three trades in the industry and consisted of 71 bricklayers, 57 carpenters and 42 steel fixers, using ratio 2.5:2.0:1.5. Lagos State had the largest proportion of the distribution owing to the large concentration of construction activities in the state. Even distribution of questionnaires was ensured in the remaining states. Out of these distributions, one hundred and three (103) questionnaires were completed and returned by the management while one hundred and eighteen (118) were duly completed and returned by the craftsmen. It must be stressed that preliminary studies of construction firms within the study area, coupled with an in-depth study of the characteristics of the various construction firms listed in the Directory of the construction firms, served as a guide in the determination of the numbers of questionnaires that were distributed in this regard. Four activities each were studied in the bricklaying and carpentry trades while two activities were sampled in the steel fixing trade. Construction activities covered in the bricklaying

trade include: laying of 225mm sandcrete blocks, laying of 150mm sandcrete blocks, oversite concreting (100mm-150mm thick) and wall plastering. Activities in the carpentry trade include the following: fixing of hardwood rafters/purlins, fixing of ceiling noggings, fixing of aluminum roofing sheets and fixing of door complete with lock. Activities in the steel fixing trade include iron bending and laying of steel reinforcement.

Each craftsman was asked to rate the importance level (IL) of each of the motivation schemes on a likert scale of 0 to 4 (4 – very important to 1 – not important). Zero was allocated if the variable was considered non-applicable. They were then asked to indicate the frequency of occurrence (F) of each of the semi-financial incentive schemes on their sites, ranging from 3 (high occurrence) to 1 (low occurrence). Next, importance and gratification regarding these schemes were calculated using a relative importance index (RII) and relative gratification index (RGI). These indices were calculated from the following formulae (Kaming et al., 1997):

$$RII = \frac{4m_1 + 3m_2 + 2m_3 + m_4}{4(m_1 + m_2 + m_3 + m_4)} \quad (1)$$

where m_1 = number of respondents who rated “very important”, m_2 = number of respondents that rated “important”, m_3 = number of respondents who rated “averagely important”, and m_4 = number of respondents who rated “not important”.

$$\text{Also, } RGI = \frac{3n_1 + 2n_2 + n_3}{3(n_1 + n_2 + n_3)} \quad (2)$$

where n_1 = number of respondents who rated “high frequency”, n_2 = number of respondents who rated “average frequency”, and n_3 = number of respondents who rated “low frequency”. Ten variables of the semi-financial incentive schemes were considered and they include: provision of insurance schemes; soft loans availability; free/subsidized medical services; entertainment allowances; outstation expenses; subsidized meal tickets; free/subsidized transport services; end of the year or periodical cocktails; provision of social environment (such as recreational centres); education and training.

On-site observation and measurements were conducted on thirty building/civil engineering projects within the study area (five from each state). The sampled sites are such that semi-financial incentives were being employed in some sites (first fifteen sites) while they were completely absent in the other fifteen sites. For the sake of comparison, five out of the listed variables of semi-financial incentives were selected.

The variables are:

- (1) Provision of soft loans to operatives.
- (2) Free/subsidized medical services.
- (3) Subsidized meal tickets.
- (4) Free/subsidized transport services.
- (5) Education and training.

The fifteen sites where semi-financial incentive schemes were being employed were then serially numbered with Roman numerals I to XV and they will be referred to as sites I to XV. The remaining fifteen sites

were numbered from XVI to XXX and they will be referred to as sites XVI to XXX.

The actual production outputs in each of the identified activities per trade were measured using the method of observation of productivity of the end result of a key activity (for 8 – hour). That is, the traditional working period of 8.00 am to 5.00 pm, less the 1 – hour lunch break. The decision to adopt this method lies on its wide acceptability over other measuring techniques on the construction sites, as revealed by the responses to the questionnaires. However, formal appointments were booked for the site observations on each of the randomly selected days during the entire investigation periods. Most of the projects were building works while the few engineering works there were on water supply to public institutions which involved casting of concrete and drainage works. The mean observed outputs for each for each of the activities per trade were calculated from the following formula.

Mean observed output =
$$\frac{\text{Summation of all observed outputs per site}}{\text{Number of men observed}}$$

Results And Discussions

Table 1 shows the Relative Importance Index (RII) of the premiums attached to these schemes by the management and the craftsmen in the three categories of construction firms surveyed. The analysis in Table 1 indicates that non-financial incentives (RII = 0.76) are more widely used in the three categories of the construction firms surveyed when compared with the financial incentives (RI = 0.54).

The emergence of the fact that non-monetary incentives were more commonly employed in the construction industry in the study area further justified the need to examine the application of semi-financial incentives (an aspect of non-financial incentive scheme) and also establish the effectiveness of the usage in increasing productivity of construction craftsmen which this study aimed to achieve.

Table 1: Relative Importance Index of Premiums Placed on the Usage of Financial and Non-Financial Incentive Schemes in the Study Area.

| Incentive Schemes | Management | | | | Craftsmen | | | | Mean |
|-------------------|-------------|-------------|-------------|-----------|-------------|-------------|-------------|-----------|------|
| | Below N100m | N100m-N500m | Above N500m | All Firms | Below N100m | N100m-N500m | Above N500m | All Firms | |
| Financial | 0.53 | 0.52 | 0.54 | 0.53 | 0.56 | 0.56 | 0.54 | 0.55 | 0.54 |
| Non-Financial | 0.74 | 0.75 | 0.74 | 0.74 | 0.75 | 0.77 | 0.78 | 0.77 | 0.76 |

Efforts were also made to identify the various semi-financial incentives that are in operation in the construction industry in the study area and ten variables were identified as prominent by these three categories of respondents. They are: provision of insurance scheme; soft loans availability; free/subsidized medical services; entertainment allowances; outstation expenses; subsidized meal tickets; free/subsidized transport services; end of the year or periodical

cocktails; provision of social environment; and, education and training. Tables 2 and 3 therefore depict the relative indices of these variables, determined from the entire sample using equations 1 and 2 and the results are presented under "importance" and "gratification" columns. Importance ranks express the cumulative experience of craftsmen in connection with each variable as a motivator. The relative gratification indices on the other hand,

express satisfaction on the usage of these variables on their sites. In general, craftsmen's responses indicate that the semi-financial incentive variables (perceived to be important by them) are likely to be satisfied on their present sites/firms and can stimulate greater productivity. This is confirmed by a significant Spearman rank correlation of 0.76 between importance and gratification ranks of the whole sample as indicated in Table 2. Bricklayers (Table 3) have the highest correlation coefficient ($R_s = 0.77$) indicating that they are likely to have better incentives compared to the other two trades. That is, Carpenters $R_s = 0.71$ and Steelfixers $R_s = 0.72$.

In terms of aggregate responses, the five most important incentives are:

education and training; free/subsidized transport services; free/subsidized medical services; subsidized meal tickets; and, outstation expenses. The satisfaction levels indicated by gratification of these variables were ranked 4th, 1st, 2nd, 7th and 3rd respectively. The implication of this is that a large variance between level of craftsmen's expectation and fulfillment might be a major source of discouragement and can culminate to lack of interest in the present job. The same trends could be observed in the responses of bricklayers, carpenters and the steelfixers in Tables 3.

Table 2: Ranking of Craftsmen's Semi-financial Incentives according to Importance and Gratification (All Firms)

| S/N | Semi-financial Incentives | Importance | | Gratification | |
|-----|---------------------------------------|------------------|---------|------------------|---------|
| | | Relative Indices | Ranking | Relative Indices | Ranking |
| 1. | Provision of insurance scheme. | 0.75 | 7 | 0.58 | 8 |
| 2. | Soft loans availability. | 0.76 | 6 | 0.64 | 5 |
| 3. | Free/subsidized medical services. | 0.80 | 3 | 0.73 | 2 |
| 4. | Entertainment allowances. | 0.72 | 8 | 0.62 | 6 |
| 5. | Outstation allowances. | 0.78 | 5 | 0.69 | 3 |
| 6. | Subsidized meal tickets. | 0.79 | 4 | 0.60 | 7 |
| 7. | Free/subsidized transport services. | 0.81 | 2 | 0.76 | 1 |
| 8. | End of the year/periodical cocktails. | 0.72 | 8 | 0.54 | 9 |
| 9. | Provision of social environment. | 0.70 | 10 | 0.54 | 9 |
| 10. | Education and training. | 0.83 | 1 | 0.67 | 4 |

Spearman Rank Correlation (R_s) = 0.76

2 Tailed significance (P) = 0.001.

Table 3 indicates that bricklayers' three most important semi-financial incentives were free/subsidized transport services, outstation expenses and education and training, with gratification factors of 3rd, 4th and 2nd respectively. The near consensus of opinions expressed here is an indication that bricklayers in the study area were satisfied with their present jobs. Transport services are a bit expensive in this part of the continent and subsidizing such is always seen as a big relief. Little wonders therefore that this variable is rated highest by the bricklayers. In the same vein, most operatives, especially permanent workers, normally see the issue of outstation duties as a great opportunity to have some savings and they are always looking forward to such occasions from time to time. This might therefore be responsible for its second highest rating by the bricklayers. Similarly, every individual's wish is to make progress in his/her chosen career via further training and this might explain the reason for the third highest premium that was accorded education and training by this set of craftsmen.

Responses from Table 3 also indicates that carpenters' three most important

needs were free/subsidized transport services, subsidized meal tickets and outstation allowances, with gratification factors of 1st, 3rd and 4th respectively. This implies that carpenters in the study area were satisfied with the provision/operation of free/subsidized transport services by the firms' managements. This was seen as a big relief to these craftsmen especially with the incessant fuel scarcity and high transportation cost in the country. The issue of subsidized meal ticket was also highly embraced by these craftsmen bearing in mind the economic recession in the country and the world at large. Also, craftsmen always look forward for outstation work opportunities as a way of having some savings for their immediate/future needs and this might be responsible for the high level of importance/gratification accorded this motivational need. On the other hand, social activities were regarded as a non motivational issue by this category of craftsmen and this might be responsible for its lowest rating by the craftsmen.

Responses of the steel fixers (Table 3) were quite similar to the opinions of carpenters in this regard. For example, the three most important semi-

financial incentives were outstation allowances, subsidized meal tickets and free/subsidized medical services with gratification factors of 1st, 3rd and 2nd respectively. This is an indication that steelfixers were quite satisfied

with the provision and operation of these incentives. Every operative had a good sense of belongings in their various firms which could which could stimulate higher productivity.

Table 3: Ranking of Craftsmen's Semi-financial Incentives according to Importance and Gratification (Bricklayers, Carpenters and Steelfixers)

| Semi-financial Incentive | Bricklayers | | Carpenters | | Steel fixers | |
|---|-------------------------------------|--|-------------------------------------|--|-------------------------------------|--|
| | Importance Relative Indices (Ranks) | Gratification Relative Indices (Ranks) | Importance Relative Indices (Ranks) | Gratification Relative Indices (Ranks) | Importance Relative Indices (Ranks) | Gratification Relative Indices (Ranks) |
| 1. Provision of insurance scheme. | 0.65 (9) | 0.49 (10) | 0.67 (7) | 0.50 (9) | 0.64 (7) | 0.63 (6) |
| 2. Soft loans availability. | 0.72 (6) | 0.55 (7) | 0.70 (5) | 0.62 (5) | 0.68 (6) | 0.61 (7) |
| 3. Free / subsidized medical services. | 0.76 (5) | 0.57 (6) | 0.71 (4) | 0.70 (2) | 0.76 (3) | 0.75 (2) |
| 4. Entertainment allowances. | 0.71 (7) | 0.61 (5) | 0.64 (8) | 0.56 (7) | 0.63 (8) | 0.59 (8) |
| 5. Outstation allowances. | 0.84 (2) | 0.65 (4) | 0.74 (3) | 0.64 (4) | 0.81 (1) | 0.77 (1) |
| 6. Subsidized meal tickets. | 0.79 (4) | 0.73 (1) | 0.77 (2) | 0.67 (3) | 0.79 (2) | 0.71 (3) |
| 7. Free / subsidized transportation services. | 0.87 (1) | 0.66 (3) | 0.79 (1) | 0.71 (1) | 0.73 (4) | 0.71 (3) |
| 8. End of the year / periodic cocktails. | 0.71 (7) | 0.53 (8) | 0.66 (9) | 0.52 (8) | 0.61 (9) | 0.59 (9) |
| 9. Provision of social environment. | 0.63 (10) | 0.51 (9) | 0.63 (10) | 0.48 (10) | 0.60 (10) | 0.59 (9) |
| 10. Education and training. | 0.83 (3) | 0.70 (2) | 0.68 (6) | 0.62 (5) | 0.71 (5) | 0.67 (5) |

Spearman Rank Correlation (Rs) = 0.77, 2 - Tailed Significance (p) = 0.001(Bricklayers); Spearman Rank Correlation (Rs) = 0.71, 2 - Tailed Significance (p) = 0.001(Carpenters); Spearman Rank Correlation (Rs) = 0.72, 2 - Tailed Significance (p) = 0.001(Steelfixers).

financial incentives were absent. This could be attributed to the removal of idle time of the operatives through the implementation of semi-financial incentive schemes. It must however be stressed that the application of semi-financial incentives by management to their operatives on sites is one of the several ways of motivating craftsmen for a higher construction productivity and this accounted for just a proportion of the productive time of these workmen. Other factors such as operatives' skills and equipment, good communication, working condition, well implemented financial incentives, training and retraining, etc are assumed to have also accounted for the craftsmen's productive time.

The study therefore concluded that proper implementation of semi-financial incentives stimulates the productivity of construction craftsmen and should therefore be imbibed by management of all categories of construction sites in the study area. This study investigated the relationship between the application of semi-financial incentives and the performance of bricklayers, carpenters and steelfixers in Southwestern Nigeria. However, there is still the need to test these schemes

on other construction operatives in other regions of the country as well as in other parts of the continent/globe for wider application.

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