

THE IMPACT OF GROUP INCENTIVES ON CONSTRUCTION WORKERS' PERFORMANCE IN NIGERIA

Aina Omotayo Olugbenga*, Ayangade Jonathan Ademola and Omojola Samuel Oludare

Department of Building, Obafemi Awolowo University, Ile-Ife, Nigeria

ABSTRACT: *This study was designed to determine the impact of group incentives on construction workers' performance. The study was conducted with data from questionnaire retrieved from fifty one construction professionals in Ibadan and Lagos, Nigeria. Twenty four possible impacts on workers extracted from literature were presented in the questionnaire for evaluation using a Likert scale of 1-5 for determining the relative importance of these effects. In the overall rankings of the types of group incentives using Analytical Hierarchical Process (AHP), goal sharing ranked the highest as the types of group incentives used in Nigeria. The result of the Factor analysis revealed social effects, effects of motivation, effects due to autonomy, workers' behavioural effects and job dissatisfaction effects as the principal factors. The influence of social effects to motivate workers to improve on their productivity explains its usage as a type of group incentives.*

KEYWORDS: Incentive Schemes, Construction Workers, Workers' Performance, Group Incentives

INTRODUCTION

In recent decades, there is an increasing recognition that the way in which the employment relationship is structured has an impact on the success of an enterprise. Research has shown that there is a positive impact of high performance work systems or high commitment work practices on firm performance. Firms have adopted a wide range of incentives to align their interests with those of their employees (Prendergrast, 1999). Studies have shown that group incentives are most preferred when firms have difficulty observing output of individuals but not overall, or when agents engage in team production and have greater ability than firms to monitor each other's productivity. Varian (1990) and Steven et al. (2003) found that group incentives greatly increase the performance of teams as compared to the performance of individuals with individual incentives. They both conclude that team-based incentive programs have an extraordinary impact on workers performance. Bandura (1997) argues that group incentive programs can increase team members' values, their appreciation of the skills of their teammates and their willingness to collaborate. Argote and McGrath (1993) emphasize the role of effective communication and coordination on group development and performance. Street (1990) sees group incentives as a way to correct workers' imperfections and improve relationship in firms.

Group incentives can induce teamwork and teamwork is a form of motivation. Argote and McGrath (1993) note that social interactions and information sharing as forms of group incentives create an environment in which group members are able to interact and this in turn leads to increase performance and standardized decision-making. Though individual incentives can lead to performance gains but group incentives are much more cost-effective (Steven et al.,

2003). The performance and productivity of construction workers have been extensively researched into over the past decades.

Studies have generally investigated how to measure and improve performance of workers in the Construction Industry. Kaming et al. (1997) and Borcharding (1975) investigated the effective utilization of manpower in construction and identified potential factors influencing productivity on large projects. Horner et al. (1987) studied the relationship between management control and labour productivity. Maloney (1986) and McFillen (1987) examined workforce motivation and productivity. The study links workforce motivational level to productivity. Varian (1990), Street (1990), Argote and McGrath (1993), Ichniowski et al. (1996), Bandura (1997) and Steven et al. (2003) upheld group incentives as being able to impact and improve performance of workers. But they all did not provide the extent of performance improvement, especially in empirical terms so as to substantiate the use or review of the incentive schemes. This gap is the focus of this study.

Group incentives

Incentives are tangible rewards that are available to workers, supervisors and managers and are meant to induce performance (McKienzie and Lee, 1998). Incentives may involve relating employees' pay to their individual performance or relating pay to group performance or firm performance (Brown and Heywood, 2002). It is more common for employees to receive a basic wage together with a bonus if their individual output exceeds a certain target output or with a percentage of the extra output in addition to the basic wage and this is the performance component of pay to an objective measure of output. Individual performance pay may also be based on subjective measures of the employee's performance. This form of performance pay called merit pay, includes pay raises or bonuses that depend in part on subjective assessment of the employee's performance. Almost by definition, subjective measures of performance are likely to be affected by biases, whether of a personal nature or due to prejudice against or favouritism for some ethnic, gender, age and sexual preference (Argote and McGrath, 1993).

Due to the fact that modern construction is based on teamwork and the difficulty of measuring individual performance, group incentives have been developed and recommended as performance pay. In group incentive plans, the earnings of employees are related to the performance of a group. Group incentive plans can reward teamwork and cooperation which individual incentive cannot. Stajkovic and Luthans (1997) observe that group incentives enhance social interactions and information sharing and create an environment in which workers are motivated to solve problems together. James (1999) argues that group incentive plans encourage cooperation and cultivate managerial skills within a team. Iris (2006) notes that productivity effects associated with group incentive schemes are largely believed to be due to employees aligning their efforts in a direction which maximise profits. According to Buchanna (2004), group incentive plan reward all members of a project team equally, where all employees have an equal share of a bonus for reaching pre-defined goals.

Group incentive programs can cover groups of employees as large as an entire agency or as small as a work unit or team. Steven et al. (2003) identify measurable performance, specified performance period, threshold for payments, pay-out formulas, and employee participation as the characteristics of group incentives. Examples of group incentive plans as identified by Hansen (1998) and Weitzman (1995) include; gain sharing, target base schemes, direct incentives, quality incentives, causal incentives and tournament based incentives.

RESEARCH METHODOLOGY

Questionnaire survey was used to obtain data for this study. Questionnaires from fifty one construction professionals in Ibadan and Lagos state comprising Builders, Civil Engineers, Project Managers, Estate Surveyors and Quantity Surveyors were retrieved and used for this study. The questionnaire was structured according to the objectives of the study. The first section was designed to examine the types of group incentives used in the Nigerian Construction Industry. The analytical hierarchical process (AHP) was adopted to analyse the relative judgements among the group incentives because of its strength in extracting accurate qualitative data. The fifty one construction professionals acted as the panel for the AHP evaluation.

The second objective of the study was to evaluate the impact of group incentives on construction workers' performance. Twenty four possible impacts on workers extracted from literature were presented in the questionnaire for evaluation using a Likert scale of 1-5 for determining the relative importance of these effects. On the Likert scales, 1, 2, 3, 4 and 5 represented very low, low, average, high and very high impacts respectively. The perceptions of the construction professionals on the impacts of group incentives on construction workers' performance were subjected to factor analysis. Factor analysis involves decomposing a complex scattered and ungrouped problem into a multilevel hierarchical structure of characteristics and criteria. The factor analysis results in data reduction, removal of duplication from a set of correlated variables and represents correlated variables with a smaller set of derived variables and the derived variables are relatively independent of one another.

The AHP approach involves decomposing a complex problem into a multilevel hierarchical structure of characteristics and criteria, these criteria are simply such as those used in a Likert ranking types of variables. The process of data collection for the AHP involves pairwise evaluation of the criteria by the judging panel. This requires the judging panel to express their opinion about the value of a single pairwise comparison at a time using a fundamental scale. The consistency of the judgement is also required to be calculated after constructing the pairwise judgement matrix. The fundamental scale is a one to one mapping between the set of discrete linguistic choices available to the judging panel and a discrete set of numbers which quantify the linguistic choices. The judging panel were asked to score the types of group incentives on a scale of 1-5. The preference weights, 1, 3, 5, 7 and 9 represented equally preferred, moderately preferred, strongly preferred, very strongly preferred and extremely preferred respectively. To find the weight of each criterion included in the ranking analysis, the eigenvector corresponding to the maximum eigenvalue is determined from matrix analyses. The principal eigenvector is computed and normalized to give the vector of weight.

In order to examine the types of group incentives used by construction professionals as considered in this research, they were grouped into two homogeneous classes in order to facilitate an easier AHP process. The groups and the processes are contained in Tables 1, 2, 4 and 5. The AHP was conducted for each group separately with the same group of respondents. The judgement of the project managers were used to generate a 4 X 4 matrix. Further matrix analysis including transposition and normalization were conducted to reduce the matrix to eigenvectors which are the relative rankings of the types of group incentives.

Data analysis and discussion of findings**Table 1: pairwise comparison judgement matrix on types of group incentives**

Types of group incentives	Profit sharing	Productivity gain sharing	Direct incentive	Target based incentive
Profit sharing	1	5.3840	2.8021	3.5399
Productivity gain sharing	0.1857	1	3.9823	4.0564
Direct incentive	0.3569	0.2511	1	3.6088
Target based incentive	0.2825	0.2465	0.2771	1

Table 2: inconsistency matrix on types of group incentives

Types of group incentives	Profit sharing	Productivity gain sharing	Direct incentive	Target based incentive
Profit sharing	3.9999	12.3442	28.0258	39.0317
Productivity gain sharing	2.9386	3.9997	9.6090	23.1415
Direct incentive	1.7799	3.3133	4.0000	9.4996
Target based incentive	0.7097	2.0836	2.3274	3.9999

Table 3: ratings of usage of types of group incentives

Types of group incentives	Priority vector (normalized vector)	Eigen rank
Profit sharing	0.5493	1
Productivity gain sharing	0.2451	2
Direct incentive	0.1362	3
Target based incentive	0.0685	4

Table 4: Pairwise comparison judgement matrix on types of group incentives

Types of group incentives	Goal sharing	Quality incentive	Casual incentive	Tournament based incentive
Goal sharing	1	6.3170	5.7848	5.3845
Quality incentive	0.1583	1	2.0478	5.2659
Casual incentive	0.1729	0.4883	1	3.3513
Tournament based incentive	0.1857	0.1899	0.2984	1

Table 5: inconsistency matrix on types of group incentives

Types of group incentives	Goal sharing	Quality incentive	Casual incentive	Tournament based incentive
Goal sharing	4.0001	16.4812	26.1107	63.4203
Quality incentive	1.6485	3.9999	32.7410	18.2470
Casual incentive	1.0454	2.7052	3.9992	10.2049
Tournament based incentive	0.4531	1.6986	2.7615	3.9999

Table 6: ratings of usage of types of group incentives

Types of group incentives	Priority vector (normalized Eigen rank vector)
Goal sharing	0.5624
Quality incentive	0.2823
Casual incentive	0.0983
Tournament based incentive	0.0565

Table 7: KMO and Bartlett's test

Kaiser-Meyer-Oikin Measure of Sampling Accuracy	0.805
Bartlett's Test of Sphericity, Approx. Chi square	2.114
Df	276
Sig.	0.000

Table 8: Total Variance Explained

Factor	Rotation sums of squared loadings		
	Total	% of variance	Cumulative %
Factor 1: social effects	6.708	27.950	27.950
Factor 2: effects due to motivation	4.442	18.509	46.459
Factor 3: effects due to autonomy	3.758	15.658	62.117
Factor 4: workers' behavioural effects	3.503	14.596	76.712
Factor 5: job dissatisfaction effect	1.942	8.093	84.805

Table 9: Rotated Component Matrix

Variables	Component factor				
	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Positive but small effect on performance					0.798
Higher goals		0.738	0.426		
Lower workers' morale					0.885
Stimulates inner motivation	0.835				
High need satisfaction level	0.595	0.580			

Motivate individual		0.787		
Standardization constraints	0.512		0.577	0.409
Group supervision		0.485	0.416	0.543
Highest level of performance	0.862			
Take special care in performing routine tasks	0.437	0.498	0.631	
Consistency in performance quality	0.422	0.541	0.631	
Effective social system	0.868			
Commitment to organization objective	0.715		0.452	
Promote teamwork		0.625		0.486
Higher degree of mutual monitoring	0.446	0.754		
Free-ride on the efforts of others	0.624			0.590
Perceptions of the pay system as being unfair				0.901
Financial and decision-making participation			0.806	
Employee involvement and the decentralization of job tasks			0.625	
Maximum output at minimum cost per unit of output	0.628			
Intra-team bargaining			0.432	0.581
High degree mutual team learning	0.659			0.525
Improvement in workers' productivity	0.670	0.603		
Encourages employee to share their strength	0.655			0.470

Types of group incentives used in the Nigerian Construction Industry

Table 3 and 6 contain the overall rankings of all types of group incentives and ratings. In the overall rankings, goal sharing ranked the highest with priority vector (PV) of 0.5624. Profit sharing ranked next in importance to this with PV of 0.5493. Other prominent group incentives are productivity gain sharing, quality incentive, direct incentive and casual incentive. They have priority vectors of 0.2451, 0.2823, 0.1362 and 0.0983 respectively. In addition, the performance ranking within the two sub groups were considered. In the first group, profit sharing ranked highest, next in importance to profit sharing were productivity gain sharing, direct incentive and target based incentive. They have PV of 0.5493, 0.2451, 0.1362 and 0.0685 respectively. Also in the second group, the ranking of usage of types of group incentives in order of importance was goal sharing, quality incentive, casual incentive and tournament based incentive. They had PV of 0.5624, 0.2823, 0.0983 and 0.0565 respectively.

The impact of group incentives on construction workers' performance

The appropriateness of the factor analysis for the factor extraction was determined by calculating the Kaiser-Meyer-Oikin (KMO) that measures the sampling accuracy and anti-image correlation that determines the strength of relationship among the variables based on partial correlation coefficients. Bartlett's test of sphericity was also calculated as shown in Table 7. The value of the Bartlett's test of sphericity was 276.000, this was large compared with the

associated significance level of 0.000. This implied that the correlation matrix produced was an identity matrix and that factor analysis was appropriate for the factor extraction.

Also, the extracted factors were subjected to principal component analysis and varimax orthogonal rotation. The results revealed that 5 of the 24 factors produced a factor solution with eigenvalue greater than 1.0 explaining 58.312%. The rotation sums of squared loadings for each factor greater than 0.5 are shown in Table 8. The five principal factors of impact of group incentives on construction workers' performance can be readily interpreted as follows:

- Factor 1: social effects
- Factor 2: effects of motivation
- Factor 3: effects due to autonomy
- Factor 4: workers' behavioural effects
- Factor 5: job dissatisfaction effects

Social effects comprised effective social system, highest level of performance, stimulate his inner motivation, commitment to organization objectives, improvement in workers' productivity, high degree mutual learning, encourage employee to share their strength, maximum output at minimum cost per unit of output, free-ride on the efforts of others, high need satisfaction level, standardization constraints, higher degree of mutual monitoring, take special care in performing routine tasks and consistency in performance quality. Effects of motivation comprised motivate individual, higher degree of mutual monitoring, higher goals, promote teamwork, improvement in workers' productivity, high need satisfaction level, consistency in performance quality and group supervision.

Effects due to autonomy comprised financial and decision making participation, consistency in performing quality, employee involvement in the decentralization of job task, take special care in performing routine task, standardization constraints, commitment to organization objective, intra team bargaining, higher goals and group supervision.

Workers' behavioural effects included perception of the pay system as being unfair, free ride on the efforts of others, intra team bargaining, group supervision, high degree mutual team learning, promote teamwork, standardization constraints and encourage employee to share their strength.

Job dissatisfaction effects included lower workers' morale and positive but small effects.

The first factor interpreted as social effects represented 27.950% of the variance explained. This showed that it has a high significance as an impact of group incentives on workers' performance. The main characteristics of this factor is that it shows the basic feature of a group, that is, effective social system. Workers are motivated to perform at the highest level and are committed to organizational objectives. The first factor gave the highest level of performance which is synonymous with an improvement in workers' productivity. This factor is a broad summary of group incentives impact on workers and serves as an effective tools for performance improvement where task independence is low and group activities are source of motivation.

The second factor interpreted as effects of motivation represented 18.509% of the variance explained. As the first factor showed the basic feature of a group, the second factor showed the objective of group incentives as individuals in the group will be motivated, teamwork will be promoted and higher goals will be achieved. The importance of this factor is that workers will experience high level of satisfaction and will be able to supervise themselves. Its significance is due to the fact that there is a linkage between an employees' motivational level and performance as observed by Thomas et al. (1990).

The third factor is interpreted as effects due to autonomy and represented 6.516% of the variance explained which indicates significance. The fourth factor interpreted as workers' behavioural effects has perception of the pay system as being unfair, free ride on the efforts of others and intra team bargaining as the specific effects. These and other subjective factors of behaviours and feelings have constituted a great limitation to motivation researches. The fifth factor composed lower workers' morale and positive but small effect. It takes 4.167% of total variance explained. This shows that it is not of high significance as an effect of group incentives or workers' performance.

CONCLUSION

The findings of this research show that group incentives such as profit sharing and goal sharing are predominated as a motivation scheme by construction professionals in Nigeria. Also, effects of group incentives on workers' performance is identified under five factors which are social effects, effects of motivation, effects due to autonomy, workers' behavioural effects and job dissatisfaction effects and it was found that group incentives, when given to workers should lead to effective social system, higher level of performance, stimulation of inner motivation, commitment to organizational objectives and improvement in workers' productivity.

It can therefore be concluded that group incentives have social effects on workers and motivate workers to improve on their productivity. These findings validated the conclusions of Conte and Svejnar (1990) and Kruse (1993). The study reported by Xiangmin and Rosemary (2010) had also supported the effects of group incentives on team members and how group incentives can be used in group management.

REFERENCES

- Argote, L. & McGrath, J. E. (1993). Group Processes in Organizations: Continuity and Change. In: C. L. Cooper & I. T. Robertson (Eds.) International Review of Industrial and Organizational Psychology, 1993. N. Y. John Wiley & Sons.
- Bandura, A. (1997). Self-efficacy: The exercise of control. New York: Freeman
- Borcherding, J.D.; Palmeter, S.B., and Jansma, G.L. (1986) Work Force Management Programs for Increased Productivity and Quality Work, EEI Construction Committee Spring Meetings.
- Brown, M. and Heywood, J. S. (2002). Paying for performance: an international comparison. London, M. E. Sharpe.
- Buchanna, B. H. (2004). Building Organizational Commitment: The socialization of managers work organization. Administrative science quarterly. 19; 17-22.
- Hansen, D. G. (1998). Worker performance and group incentives: a case study. Vol 2, No. 4.

- Huselid, M. A. & Becker, B. E. 1996. Methodological issues in cross-sectional and panel estimates of the human resource-firm performance link. *Industrial Relations*, Vol. 35, pp. 400-422.
- Ichniowski, C., Shaw, L., and Prennushi, G. 1997. The effects of Human Resource
- Iris, K. (2006). Study on staff incentives at microfinance institutions. Institute for financial management and research centre for micro-finance draft intern report.
- James, C. S. (1999). The impact of employee involvement and group incentives on performance in UK high technology establishments. Vol. 20, pp. 299-305.
- Kaming, P.F.; Olomolaiye, P.O.; Holt, G.D and Harris, F.C. (1997) Factors Influencing Construction Time and Cost Overruns on High-Rise Projects in Indonesia. *Construction Management and Economics*, Vol. 15, 83-94.
- Kruse, D. L. (1993). Profit sharing: Does it make a difference? Kalamazoo, MI: W. E. Upjohn Institute
- Maloney, W. F. (1986). Understanding motivation. *Journal of Management in Engineering*, vol. 2, no. 4, pp. 231–245, 1986.
- Management practices on productivity: A study of steel finishing lines. *The American Economic Review*, Vol. 87, No. 3, pp. 291-313
- McFillen, J. and Maloney, W. (1987). Motivational Impact of Work Crews. *Journal of Construction Engineering and Management*, 113(2): 208-221.
- McKenzie, R, and Lee, D. (1998). Managing through Incentives: How to Develop a More Collaborative, Productive, and Profitable Organization. Oxford University Press USA, 1998.
- Prendergrast, C. (1999). The provision of incentives in firms. *Journal of economic literature*. Vol, 37, No. 1.
- Stajkovic, A. D., & Luthans, F. (1997). A meta-analysis of the effects of organizational behavior modification on task performance, 1975–1995. *Academy of Management Journal*, 40,1122–1149.
- Steven, J. C., Richard, E. C., and Harold, D. S. (2003). The effects of incentives on workplace performance: a meta-analyti review of research studies. *Performance improvement quarterly*, Vol. 16, No. 3, pp. 46-63.
- Street, E. (1990). Personnel management. *The academy of management journal*. Vol. 20, No. 1.
- Thomas, H. R., Maloney, W. F., Horner, R. M. W., Smith, G. R., Handa, V. K. and Sanders, S. R. (1990). Modelling construction labour productivity. *Journal of Construction Engineering and Management*, vol. 116, no. 4, pp. 705–726, 1990.
- Varian, H.R., 1990. A Solution To The Problem Of Externalities And Public Goods When Agents Are Well-Informed, Papers 90-01, Michigan - Center for Research on Economic & Social Theory.
- Weitzman, M. L. (1995). Incentive effects of profit sharing. Harvard University.