Major Factors Influencing Employee Productivity in the KSA Public Construction Projects

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***Abstract*--** **The study aims at identifying the factors affecting labor productivity in public construction projects in Saudi Arabia from contractors' viewpoint. To do so, 41 contractors working in public construction completed a structured questionnaire survey and the factors were ranked according to their impact level. 32 factors were identified through literature review. These factors were grouped into five groups: labor, managerial, materials and equipments, project, and financial. The analysis of the identified 32 factors indicates that the top ten important factors negatively affecting labor productivity in public construction projects are: lack of labor experience, poor communication and coordination between construction parties, bad relations between labors and management team, payments delay by owner, misuse of time schedule, rework, labor's low wage, financial conditions of contractor, poor site management, and frequent change orders.**

***Index Term*--** **Labors, productivity, contractors, public construction, Saudi Arabia.**

1. INTRODUCTION

Saudi Arabia has experienced a construction boom during the past three decades, attracting construction professionals from all over the world. According to the Saudi Ministry of Planning, the construction industry contributed between 30% to 40% of the non-oil productive sectors at the end of each National Development Plan from 1980 to 2000 (Cordsman, 2000). However, construction industry in Saudi Arabia faces some critical problems; poor labor productivity is one of them. Labor productivity is simply defined as the amount of goods and services that a laborer produces in a given amount of time (Al-Saleh, 1995). Labor productivity plays a key role in determining the success of a project. However, it might affected by many unexpected variables. These variables may include factors related to labor, materials, tools and equipments, construction methods, political, financing, and environment. Poor labor productivity is one of the main causes affecting cost and time overruns in construction projects. Accordingly, high attention should be paid to this driving factor in construction industry.

This paper aims at identifying factors affecting labor productivity in public construction projects in Saudi Arabia from contractors' perspective. To do so, 41 contractors working in public construction in Northern Province of Saudi Arabia completed a structured questionnaire survey and the identified factors were ranked according to their impact level. It is hoped that these findings will guide efforts to enhance the performance of the construction industry in Saudi Arabia and other developing countries.

2. LITERATURE REVIEW

Many previous studies were conducted to identify the factors affecting labor productivity in construction projects. In Palestine, Mahamid (2013) concluded that the top five important factors negatively affecting labor productivity in public construction projects are: political situation, equipments shortages, old and inefficient equipment, lack of labor experience, and poor site management. Alinaitwe et al. (2007) concluded that the top ten factors affecting labor productivity in Uganda are: incompetent supervisors, lack of skills from the workers, rework, lack of tools/equipment, poor construction methods, poor communication, inaccurate drawings, stoppages because of work being rejected by consultants, insecurity, tools/equipment breakdown, and harsh weather conditions. Kaming et al. (1997) conducted a study to identify the major factors affecting productivity of craftsmen in Indonesia. They concluded that the top affecting factors are: lack of materials, rework, work interference, absenteeism; lack of equipment and tools. Lim et al. (1995) conducted a study aimed at identifying factors affecting productivity in the construction industry in Singapore. They concluded that the top affecting factors are: difficulty with recruitment of supervisors, difficulty with recruitment of workers, high rate of labor turnover, absenteeism from the work site; and communication problems with foreign workers. Zakeri et al. (1996) concluded that the main factors affecting construction labor productivity in Iran are: lack of materials, weather and physical site conditions, lack of proper tools and equipment, design, drawing and change orders, inspection delays, absenteeism, safety, improper plan of work, repeating work, changing crew size and labor turnover.

In UAE, Ailabouni et al. (2007) conducted a study aimed at identifying the factors affecting employee productivity in the UAE construction industry. They concluded that the top five affecting factors are: proper work timings giving a balance between work and time for family, leadership skills of supervisors, technical qualifications, whether they are well paid or not and on time, security of job, and transparency and accountability of management. Makulsawatudom et al. (2002) conducted a study to identify the critical factors affecting construction productivity in Thailand. They found that the top critical factors include: lack of materials, incomplete

drawings, incompetent supervisors, lack of tools and equipment, absenteeism, poor communication, instruction time, poor site layout, inspection delay and rework. Mahamid (2013) conducted a study to identify the main factors affecting labor productivity in Palestinian building construction projects. He concluded that the top five factors negatively affecting labor productivity in building construction are: rework, lack of cooperation and communication between construction parties, financial status of the owner, lack of labor experience, and lack in materials.

3. Research Method

32 factors that might affect labor productivity in public construction projects were defined through a detailed literature review. The factors were tabulated into a questionnaire form, and then the draft questionnaire was discussed with three local experts in public construction to evaluate the content of the questionnaire. Modifications and changes have been done. The questionnaire is divided into two main parts. Part I is related to general information for the company. The surveyed contractors were requested to answer questions pertaining to their experience in public construction. Part II includes the list of the identified factors.

41 contractors working on public construction projects were successfully questioned. The questionnaire gave each respondent an opportunity to identify factors that they perceived as likely to contribute to poor labor productivity by responding on a scale from 5 (very important) to 1 (not important). For each factor, the mean value of the respondents' importance rating was named the importance index. The importance index for all factors was calculated. The group index was calculated by taking the average of factors under each group.

4. Research Findings and Results

4.1 Ranking of factors affecting labor productivity

The factors under each group are ranked by the measurement of importance index as explained in the previous section.

4.1.1 Labor group

Table I shows the ranking of factors under labor group. 8 factors are identified under this group. The results show that the top three important factors are: lack of labor experience, labor disloyalty, and overmanning.

Table I
Ranking of factors under labor group

Factors	RII	Rank
Lack of labor experience	75.1	1
Labor disloyalty	63.5	2
Overmanning	59.7	3
Lack of labors in the market	56.2	4
Labor personal problems	52.2	5
Bad labor relations	51.8	6
Craft turnover	48.3	7
Labor absenteeism	45.5	8

4.1.2 Managerial group

Table II illustrates the ranking of factors under managerial group. 9 factors are identified under this group. The results show that the top three important factors negatively affecting labor productivity under this group are: poor communication and coordination between construction parties, bad relations between labors and management team, and misuse of time schedule.

Table II
Ranking of factors under managerial group

Factors	RII	Rank
Poor communication and coordination between construction parties	74.6	1
Bad relations between labors and management team	73.0	2
Misuse of time schedule	71.3	3
Rework	68.4	4
Poor site management	67.3	5
Frequent change orders	67.0	6
Lack of supervisors experience	62.5	7
Misunderstanding between labors and superintendents	59.5	8
Inspection delay	54.5	9

4.1.3 Financial group

Table III shows the ranking of factors under financial group. 4 factors are identified under this group. The results show that the top important factors under this group is payments delay by the owner, followed by labor's low wage, financial conditions of contractor , and lack of financial motivation system, respectively.

Table III
Ranking of factors under financial group

Factors	RII	Rank
Payments delay by owner	72.6	1
Labor's low wage	68.0	2
Financial conditions of contractor	67.6	3
Lack of financial motivation system	61.9	4

4.1.4 Project group

Table IV shows the ranking of factors under project group. 6 factors are identified under this group. The results show that the top three important factors negatively affecting labor productivity under this group are: project location, poor soil conditions, and project size..

Table IV
Ranking of factors under project group

Factors	RII	Rank
Project location	65.3	1
Poor soil conditions	63.2	2
Project size	57.9	3
Poor terrain conditions	50.4	4
Poor soil drillability	47.3	5
Working within a confined space	45.2	6

4.1.5 Materials and equipments group

Table V shows the ranking of factors under material and equipments group. 5 factors are identified under this group. The results show that the following factors are the top three important factors negatively affecting labor productivity under this group: material shortages, equipment shortages, and low quality of raw materials shortage.

Table V
Ranking of factors under materials and equipments group

Factors	RII	Rank
Material shortages	66.5	1
Equipments shortages	63.4	2
Low quality of raw materials	62.6	3
Unsuitable materials storage location	60.4	4
Old and inefficient equipment	55.8	5

4.1.6 Overall factors ranking

Importance index and ranking of all investigated 32 factors that might affect labor productivity in road construction in Saudi Arabia are listed in Table VI. The Analysis shows the followings: (1) there are 5 factors with importance index higher than 70, (2) the minimum importance index is 45.2. These indicate that the identified factors are highly relevant to the problem of labor productivity in public construction in Saudi Arabia.

Table VI shows that the top ten important factors affecting labor productivity in public construction projects in Saudi Arabia from contractors' view are: lack of labor experience, poor communication and coordination between construction parties, bad relations between labors and management team, payments delay by owner, misuse of time schedule, rework, labor's low wage, financial conditions of contractor, poor site management, and frequent change orders.

Table VI
Overall factors ranking

Factors	**RII**	**Rank**
Lack of labour experience	75.1	1
Poor communication and coordination between construction parties	74.6	2
Bad relations between labors and management team	73.0	3
Payments delay by owner	72.6	4
Misuse of time schedule	71.3	5
Rework	68.4	6
Labor's low wage	68.0	7
Financial conditions of contractor	67.6	8
Poor site management	67.3	9
Frequent change orders	67.0	10
Material shortages	66.5	11
Project location	65.3	12
Labour disloyalty	63.5	13
Equipments shortages	63.4	14
Poor soil conditions	63.2	15
Low quality of raw materials	62.6	16
Lack of supervisors experience	62.5	17
Lack of financial motivation system	61.9	18
Unsuitable materials storage location	60.4	19
Overmanning	59.7	20
Misunderstanding between labours and superintendents	59.5	21
Project size	57.9	22
Lack of labors in the market	56.2	23
Old and inefficient equipment	55.8	24
Inspection delay	54.5	25
Labour personal problems	52.2	26
Bad labor relations	51.8	27
Poor terrain conditions	50.4	28
Craft turnover	48.3	29
Poor soil drillability	47.3	30
Labour absenteeism	45.5	31
Working within a confined space	45.2	32

4.2 Groups ranking

The 32 identified factors are grouped into five groups. Ranking of these groups associated with importance as assessed by the contractors is presented in Tables VII. Contractors indicate that the top important group affecting labor productivity in public construction is financial, followed by managerial, material and equipment, labors, and project respectively.

Table VII
Main groups ranking

Group	RII	Rank
Financial	67.5	1
Managerial	66.4	2
Materials and equipments	61.7	3
Labors	56.5	4
Project	54.9	5

5. CONCLUSION

The study aims at identifying the factors affecting labor productivity in public construction projects in Saudi Arabia from contractors' viewpoint. To do so, 41 contractors working in public construction completed a structured questionnaire survey and the factors were ranked according to their impact level. 32 factors were identified through literature review. These factors were grouped into five groups: labor, managerial, materials and equipments, project, and financial. The analysis of the identified 32 factors indicates that the top ten important factors negatively affecting labor productivity in public construction are: lack of labor experience, poor communication and coordination between construction parties, bad relations between labors and management team, payments delay by owner, misuse of time schedule, rework, labor's low wage, financial conditions of contractor, poor site management, and frequent change orders.

The results show that poor labor productivity in public construction is mostly affected by the financial, followed by managerial, material and equipment, labors, and project respectively. The Analysis shows the followings: (1) there are 5 factors with importance index higher than 70, (2) the minimum importance index is 45.2, (3) main group index is ranging between 54 and 68. These all indicate that the identified factors are highly relevant to the problem of labor productivity in public construction in Saudi Arabia.

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