

## Decision Making for Motivation of Construction Site Personnel

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**Abstract:** Iran's construction industry has been rarely explored to identify the motivation factors which directly affect productivity. This study concerns an investigation of the factors influencing construction productivity using the questionnaire tool. The questionnaire has been distributed in >35 construction sites to collect field data and find the motivation factors in the vision of construction site personnel. The survey showed the main five operator motivation factors are Fairness of pay, on-time payment, company's prestige, employer relation and incentive and financial reward. As the next step the importance of motivation factors and related condition in Iranian construction industry has been discussed. The motivation factors in different work groups had been examined and the survey result shows a meaningful difference between the ideal job condition and the present work condition in the personnel view. In our view the expectation of personnel and the current condition of motivation factor must be taken into account for better decision making. Such an approach helps the manager not only assess the important level of each factor but also to decide the focus of improvement action on the more effective factors which lead to increase productivity of construction activities.

**Key words:** Productivity, motivation, Iran, construction industry, expectation

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### INTRODUCTION

The role of management is to apply organizational resources to achieve objectives. Industry in general, including the construction industry is aware of the importance of human resources in the achievement of such objectives (Yankov and Kleiner, 2001). Because the business environment in construction is highly competitive, the participants in the industry must improve construction productivity performance to survive. Hence, productivity has been generating significant interest in both the construction industry and academia (Park *et al.*, 2005).

Since labor costs account for almost 25-40% of the total project cost, reduction of them presents a great opportunity for an increase in productivity (Laufer and Jenkins, 1982). Construction productivity is influenced by many factors other than labor, namely material, equipment, tools, construction method and management skills. However, these recourses are inanimate if not used by human recourse (Parkin *et al.*, 2009) whose productivity deeply depends on motivation (Zakeri *et al.*, 1997). There are many theories that describe the motivation effect on the performance as the two distinguished evolutionary path can be recognized (Auley *et al.*, 2007). The first set of theories focuses on the management of work itself, dealing with the work control methods and performance of the activities on the other hand the second main stream modern theories relay on the organizational culture and

the behavior of personnel and the productivity. The aim of this research is to evaluate the construction motivation factors effect on productivity and their conditions in the operational site to determine the focus of improvement for the next step.

Construction productivity is rarely analyzed in Iran (Zakeri *et al.*, 1996). In order to identify the current weaknesses a structured questionnaire has been used to collect both the construction productivity factor and the condition of this factor within the operational site in Iranian construction companies.

**Research back ground:** The human resource development could be defined as a set of organized activities conducted within a specified time and designed to produce behavior change (Nadler, 1970). As discussed, the human factors are playing an important role in productivity. To increase the effectiveness of human factors, some driving forces within an individual by which their attempts to achieve some goal in order to fulfill some needs or expectations must be activated. These driving forces within a person are defined as motivations.

Maslow's hierarchy has widespread acceptance since it was introduced in 1954 the theory posits that behavior at a particular moment is determined by the strongest need. Maslow hypothesized five levels of needs: physiological, safety, social, esteem and self-actualization (Maslow *et al.*, 1970). He placed them in a framework referred to as the hierarchy of needs because of the

different levels of importance. Maslow states that if all needs are unsatisfied at a particular time, satisfaction of the predominant need is most pressing. The Herzberg two-factor job satisfaction theory addressed (House and Wigdor, 1967) that there are two types of factor which are related to job satisfaction; the motivators and the hygiene. The motivators have the positive effect on the job satisfaction and if these factors are triggered; they directly increase the job satisfaction. The hygiene factors do not affect the job satisfaction in this way and they do not lead to motivation directly but if they are not maintained in the expected level, it may result in negative effects.

Other theory in this field is rooted to X and Y theory of management. Theory X and Y based on extreme assumptions about people and work, theory X assumes that average employees dislike work and that the only way to maintain or increase productivity is to simplify the production process, supervise the employees closely and motivate them in short term through financial incentive schemes. Theory Y assumes that average employee's desire self-direction and self-control, seek and accept responsibility, enjoy physical and mental effort and have the potential to be self-motivating (McGregor, 1960).

The Vrooms expectation theory somehow differs from above mentioned theories in this theory the motivation is the function of worker expectancy, reward or punishment and valence of the expected outcome to the individual probability function. This formulation shows the expectation of workers and the environment condition in addition to their real needs (Vroom, 1964). This view explains that behaviors are the results of conscious choices among alternatives whose purpose is to maximize pleasure and minimize pain (Barg *et al.*, 2014) as the people join the company expects to fulfill their needs; their expectation will play an important role in their motivation level. Therefore, finding these motivation factors are essential for any research in this field.

Many studies have been conducted upon these theories to determine the affective factors of motivation especially in the construction industry. There have been two major groups of studies to find out these factors, the first method is based on the measurement of effectiveness of worker motivation in the construction industry using methods like benchmarking and mathematical modeling (Yi and Chan, 2013; Ghoddousi *et al.*, 2014).

The second group, focus on identification of motivation factor from the point of view of interviewees (Borcherding and Oglesby, 1975; Mackenzie and Harris, 1984; Sikkil and Erkelens, 1984; Sanders and Thomas, 1991; Zakeri *et al.*, 1997; Kazaz *et al.*, 2008). These groups of studies could help to understand the opinion of the

construction site employees. Researchers in Iran mostly examined the first path (Ghoddousi *et al.*, 2014) or the research scope has been confined to managers after the study conducted by Zakeri *et al.* (1997) construction personnel motivation factor has been rarely related to environment of construction site so the need to re-examine these factors seems to be necessary due to environmental change with respect to new condition in country. Furthermore, the connection between the expectations of construction site personnel and current condition of each factor did not examined yet.

## MATERIALS AND METHODS

**Method and data collection:** The questionnaire aims to identify the factors affecting the motivation of Iranian construction operatives and ranking of gratification levels of these factors to individual operators on their present construction sites. By identifying and prioritizing them, there will be chances of making corrective decisions and improving the labor productivity (Zakeri *et al.*, 1997). The first category of questions relates to personal characteristics of respondents which includes age, experience, educational level, managerial level, employment type and length of current employment. These factors are carefully selected to identify different expectation among the construction site personnel.

The second group of question, estimating the construction works point of view about the motivation factor in their construction site. Factors used in this survey were identified from previous studies and the frequency of their use in the past research (Zakeri *et al.*, 1997; Kazaz *et al.*, 2008; Barg *et al.*, 2014). The scale of this type of questions assigned from 4-1, very important, important, somewhat important and non-important, respectively.

The third group of questions is designed to evaluate the current condition of those motivation factors in the operative construction site. Scores of 1-3 assigned for good, normal and bad condition which represent gratification of personnel from that factor in the site location.

The questioners distributed in 35 construction operative site and asked to be filled by the different construction operators with different managerial level. The construction site has been chosen on the basis of the company prestige which have >100 personnel in filed in the duration of survey. This approach helps us to see the different opinion in different personnel level. After elimination of invalid questioners, including the unfilled and questioners with unreliable data, like filling the same answer for different question, total of 144 complete questioners has been analyzed.

## RESULTS AND DISCUSSION

**General results:** As the survey shows, the most important factor for the motivation of employees are fairness of pay and on-time payment which are both the financial compensation factors. Surprisingly, the company's prestige is the third motivator while the incentive and financial reward placed fourth among other factors. Table 1 shows the complete list of data ranking in the survey. As construction personnel point of view the condition of each factor is meaningfully different from

what they must be as shown clearly in data's of Table 2. Previous studies (Zakeri *et al.*, 1997) addressed this effect as the reason for lower productivity in the construction site. But it could differently be analyzed. These changes could be interpreted through the lens of expectancy theory of motivation. The condition for project prestige is relatively high among others. And the worst factor is non-financial rewards which seems rarely occurred in the Iranian construction sites. As can be observed in Table 3, there is a meaningful difference between the top ranked motivation in the reality and ideal condition. The data in

Table 1: Ranking the importance of motivation factors in construction

Description of factor	Mean	SD	Variance	Skewness	Kurtosis	Survey ranking
Good relation with team mate	2.40	0.970	0.942	-0.047	-1.016	8
HSE at work	2.44	1.056	1.115	0.022	-1.209	6
The work itself	2.24	0.924	0.853	-0.003	-1.089	15
Overtime work	2.12	0.950	0.902	0.357	-0.879	21
Fairness of pay	2.72	0.921	0.848	-0.599	-0.411	1
On-time payment	2.54	0.967	0.935	-0.284	-0.908	2
Recognition on the job	2.24	0.885	0.783	-0.115	-1.105	15
Accurate job description	2.27	0.962	0.926	-0.139	-1.271	13
Participation in decision making	2.40	1.079	1.165	-0.049	-1.313	8
Good supervision	2.22	0.993	0.985	0.192	-1.093	18
Promotion	2.32	0.906	0.820	0.180	-0.739	12
Job security	2.41	1.006	1.013	-0.020	-1.103	7
More responsibility	2.19	0.861	0.741	0.027	-0.956	19
Challenging task	1.91	0.836	0.698	0.391	-0.913	23
Right to choose work mate	2.23	0.951	0.905	0.118	-1.046	17
Incentive and financial reward	2.47	0.915	0.838	-0.395	-0.860	4
Good working environment	2.17	0.847	0.718	-0.131	-1.195	20
Good working facilities	2.37	0.929	0.864	-0.005	-0.905	10
Company prestige	2.49	1.010	1.021	0.018	-1.077	3
Employer/operative relation	2.45	0.907	0.823	0.004	-0.776	5
Non-financial compensation	2.26	0.819	0.671	-0.060	-0.764	14
Non-work relationship with teammate	2.03	0.852	0.726	0.153	-1.157	22
Project prestige	2.37	1.076	1.157	0.143	-1.240	11

Table 2: Ranking the condition of motivation factors in Iranian construction sites

Description of factor	Mean	SD	Variance	Skewness	Kurtosis	Survey ranking
Good relation with team mate	1.58	0.549	0.302	0.205	-0.981	2
HSE at work	1.74	0.719	0.517	0.442	-0.968	8
The work itself	1.75	0.705	0.497	0.395	-0.925	9
Overtime work	1.97	0.761	0.579	0.058	-1.262	20
Fairness of pay	1.91	0.699	0.488	0.250	-0.497	18
On-time payment	1.81	0.784	0.615	0.344	-1.293	12
Recognition on the job	1.77	0.717	0.514	0.370	-0.988	11
Accurate job description	1.73	0.692	0.479	0.417	-0.861	6
Participation in decision making	1.87	0.722	0.521	0.204	-1.052	16
Good supervision	1.65	0.722	0.522	0.635	-0.847	3
Promotion	1.88	0.753	0.566	0.198	-1.204	17
Job security	1.81	0.699	0.489	0.276	-0.929	12
More responsibility	1.76	0.712	0.507	0.392	-0.959	10
Challenging task	1.98	0.752	0.566	0.034	-1.221	21
Right to choose work mate	1.93	0.781	0.611	0.122	-1.347	19
Incentive and financial reward	2.01	0.674	0.454	-0.008	-0.770	22
Good working environment	1.85	0.693	0.480	0.213	-0.899	15
Good working facilities	1.67	0.669	0.448	0.505	-0.734	4
Company prestige	1.72	0.779	0.608	0.531	-1.161	5
Employer/operative relation	1.73	0.712	0.507	0.447	-0.934	6
Non-financial compensation	2.08	0.670	0.449	-0.089	-0.749	23
Non-work relationship with teammate	1.84	0.665	0.443	0.191	-0.748	14
Project prestige	1.55	0.667	0.445	0.822	-0.437	1

Table 3: Variance of importance and condition of motivation factor

Description of factor	Importance ranking	Condition ranking	Relative difference
Incentive and financial reward	4	22	-18
Fairness of pay	1	18	-17
On-time payment	2	12	-10
Non-financial compensation	14	23	-9
Participation in decision making	8	16	-8
Promotion	12	17	-5
Job security	7	12	-5
HSE at work	6	8	-2
Right to choose work mate	17	19	-2
Company prestige	3	5	-2
Employer/operative Relation	5	6	-1
Overtime work	21	20	1
Challenging task	23	21	2
Recognition on the job	15	11	4
Good working environment	20	15	5
Good Relation with team mate	8	2	6
The work itself	15	9	6
Good working facilities	10	4	6
Accurate job description	13	6	7
Non-work relationship with teammate	22	14	8
More responsibility	19	10	9
Project prestige	11	1	10
Good supervision	18	3	15

Table 4: Importance of motivation factors between different personnel age group

Description of factor	Age of personnel				Main result
	20-30	31-40	41-50	>50	
Good relation with team mate	3	12	11	1	8
HSE at work	9	8	5	3	6
The work itself	20	8	16	13	15
Overtime work	21	21	14	20	21
Fairness of pay	1	1	2	5	1
On-time payment	3	3	3	10	2
Recognition on the job	16	12	11	17	15
Accurate job description	15	10	16	13	13
Participation in decision making	13	15	1	6	8
Good supervision	22	11	7	16	18
Promotion	11	7	14	20	12
Job security	5	17	6	6	7
More responsibility	12	17	19	22	19
Challenging task	23	21	22	22	23
Right to choose work mate	18	20	8	6	17
Incentive and financial reward	2	5	18	3	4
Good working environment	13	19	21	17	20
Good working facilities	6	12	11	1	10
Company prestige	9	2	9	11	3
Employer/operative relation	6	3	9	6	5
Non-financial compensation	6	15	20	13	14
Non-work relationship with teammate	17	23	23	17	22
Project prestige	19	6	4	11	11
Number of questioners	46	57	31	10	144

this table has been sorted to show the difference between the important of each factor in the personnel's opinion which could interpret as their expectations and the current site condition.

In general if the factors importance level prioritized as the high rank, then the current condition in the site is ranked lower. As the first 6 important factors relatively have negative difference and the low important factors have all positive relative ranking. Surprisingly all the negative factors are related to the financial compensation

this could be an indicator which shows the direction of manager decision on improvement of financial compensation.

These results not only determine the direction of decision making but also completely fit the Maslow's hierarchy which count the physiological need as the first tier of strangest needs.

**Analyzing opinion of age group:** Table 4 shows the important factors in the views of different age group of

**Table 5: Importance of motivation factors between personnel with different experiences**

Description of factor	Experience (year)					Total
	<2	2-5	6-10	11-20	>20	
Good relation with team mate	2	4	16	10	4	8
HSE at work	16	5	14	7	2	6
The work itself	19	19	3	16	14	15
Overtime work	19	18	22	14	20	21
Fairness of pay	5	2	3	1	3	1
On-time payment	5	3	3	2	5	2
Recognition on the job	16	10	16	16	16	15
Accurate job description	16	16	14	8	14	13
Participation in decision making	19	16	2	12	1	8
Good supervision	5	19	21	8	13	18
Promotion	5	5	6	16	19	12
Job security	1	9	6	12	5	7
More responsibility	2	14	9	20	21	19
Challenging task	19	23	18	23	23	23
Right to choose work mate	5	19	18	14	5	17
Incentive and financial reward	5	1	12	10	10	4
Good working environment	14	11	13	21	17	20
Good working facilities	5	8	20	6	10	10
Company prestige	2	15	1	5	5	3
Employer/operative relation	14	5	10	4	10	5
Non-financial compensation	5	12	10	16	17	14
Non-work relationship with teammate	23	12	22	22	22	22
Project prestige	5	22	6	3	9	11
Number of questioners	5	25	43	48	23	144

personnel. Once more the payment condition (fairness of pay and on-time payment) has relatively high priority. Some special needs could be clearly verified in different age groups. In the age group of 20-30 years old the prestige of company and project was not so important in comparison to the main result. In contrast they seek to gain more responsibility and prefer to have non-financial compensation. Promotion, good supervision and work itself are factors which are highly ranked by the Iranian workers in the age group of 31-40, job security is not important among this age group as the ranking are much different within the main result. The high importance for prestige of project and the company could result in low loyalty to company.

In the age group of 41-50 years, participation in decision making, supervision and overtime working is more important than average result. Beside these, the low priority of financial reward and non-financial compensating factor could interpret as demand for higher job involvement in the project. Surprisingly on-time payment and promotion in the work are not so important for the elder age group but they demand good working facilities. It could be interpreted as the elder person physical condition. The survey shows clearly the different expectation which result in different ranking of importance in the motivation.

**Analyzing the effect of experience in the expectancy:** The questionnaires divided in to 5 groups based on the answers of respondent. This analysis summarized in the

Table 5, supporting the meaningful differences in the expectation of each group. For example, even though the payment factor rank is high but it has various priorities in different groups.

Generally each group of personnel has different concerns. Beside the factor which are having the same pattern, like on-time payment. The result shows different expectations by different groups of experienced people. Comparing to the last section, some differences can be noticed as different age group does not show clearly the job experience and competency in the work group. As an example the non-working relationship have a meaningful difference in the experience group of 2-5 years.

**Analyzing opinion of managerial group:** Categorizing the answer with respect to managerial level not only shows us the expectations with regard to this constraint but it could be a good indicator for decision makers to understand how much the top managers know about the expectations in their construction sites.

Their selected factors are fairness of payment, company prestige, good relation with teammates, promotion and non-financial compensation which shows a huge different with other group.

The case of participation in decision making is even more interesting. While top managers ranked this factor as 21st, managers, supervisors and foremen group notice this factor as the important, ranking it 1st, 4th, 7th, respectively. This clearly shows two different points of view and class of thought. Top manager did not believe

Table 6: Importance of motivation factors between different managerial levels

Description of factor	Job position					Total
	Top manager	Manager	Supervisor/engineer	Foreman	Worker	
Good relation with team mate	3	12	5	19	7	8
HSE at work	6	2	11	10	7	6
The work itself	9	9	15	22	10	15
Overtime work	21	20	20	11	15	21
Fairness of pay	1	3	3	1	3	1
On-time payment	10	13	2	2	1	2
Recognition on the job	10	15	16	7	22	15
Accurate job description	14	13	12	13	21	13
Participation in decision making	21	1	4	7	19	8
Good supervision	13	10	19	13	15	18
Promotion	4	19	6	17	15	12
Job security	16	18	1	4	12	7
More responsibility	10	22	20	15	3	19
challenging task	18	22	22	23	23	23
Right to choose work mate	18	10	13	19	12	17
Incentive and financial reward	6	5	6	11	3	4
Good working environment	18	15	18	15	19	20
Good working facilities	6	5	16	2	12	10
Company prestige	2	7	8	4	6	3
Employer/operative relation	16	3	9	4	2	5
Non-financial compensation	4	20	13	17	7	14
Non-work relationship with teammate	23	15	23	19	15	22
Project prestige	14	7	9	9	11	11
Number of questioners	15	24	57	33	15	144

on the motivation with this tools and other group expected to involve in the decision making. Even the result from these factors in current situation Table 2, ranked it as 16th so this practices as the top manager's opinion did not apply to increase motivation. This gap between expectancy of personnel and top manager point of view may lead to decrease productivity (Table 6).

## CONCLUSION

In this study motivation factors has been identified and ranked. The result clearly shows that there are significant gaps between the importance of motivation factors and their real environment in the operative construction site. In our view the importance of each factor is related to the current work condition of personnel and their demand. The survey has been set to find the condition of each set of factors in the personnel point of view. The results suggest that, beside the Maslow's hierarchy, the site and current environment may affect the result of questionnaires, too.

Grouping and analyzing the questionnaires in the three different group, shows clear differences between personnel expectations and as a result, ranking of motivation factors. These differences could be misleading especially when the decision maker's opinions and the workers expectations are contrary.

More survey must be set up to understand the mechanism of different expectancies and their effects on the motivation factors. In general the results show that

the decision for the improvement of the site condition should not only be made with respect to the importance of each factor by the top management but also the expectation of each group of personnel must be taken into account.

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