

Investigation of Motivational Factors in Construction projects

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ABSTRACT

Paying attention to motivational factors has a direct effect on the level of performance and speed of performance in staff and human resources and helps to achieve the time, economic, and quality goals of the project and increase its profitability and usefulness. Consequently, this study aims to investigate the motivational factors in construction projects. The present research is applied in terms of purpose and descriptive survey in terms of research method. The statistical population in this study included 149 engineers working in the teams of the employer, consultant, and contractor of construction companies in Tehran, in residential projects with a land area between 250 to 350 square meters. A 20-item questionnaire was used to collect data. The reliability results of the questionnaire were obtained through Cronbach's alpha of 0.858. Statistical analyzes were performed using SPSS₂₆. Based on the results and comparing the scores of motivational factors with each other, the five factors that received the most points from the respondents and the respondents benefit from them, respectively, include a sense of responsibility, good communication with colleagues, interest in work, Challenging tasks and a good relationship with the manager or employer, respectively. According to the points, the lowest point belongs to the factor of "similar tasks". The results also revealed that the age of individuals in this study had no significant relationship with motivational factors.

Key words: Motivational factors, Construction projects, Construction companies in Tehran

INTRODUCTION

In recent years, with the progress of management sciences, particularly in the fields of attention to human resources and labor in the construction industry and the increasing desire of employers and executives to increase the quality and speed of work, researchers paid special attention to work motivation and many studies have been done on the subject. Work motivation is a set of energetic forces that originate both inside and outside the person and lead to work-related behaviors in terms of determining the shape, direction, and intensity of this behavior (Dwivedula and Bredillet 2010).

Maloney et al. (1986) began their research to increase productivity by increasing workers' motivation. They collected their data using a questionnaire. The number of workers who responded to the postal questionnaire was 703. In such a case, it was difficult to measure the performance of construction workers individually. Therefore, a self-report of individual performance was used. This study shows that the manufacturing industry should pay special attention to defining performance and encouraging it. More emphasis on these two areas can motivate workers to perform the required behaviors and at the same time create a more valuable and satisfying work experience for workers. The results of the study indicated that workers were less likely to rely on performance rewards because they believed that contract or law-governed not all rewards and that not all contractors were subject to the same rules. Maloney et al. suggested that contractors be more innovative and creative in designing reward systems to make a clear distinction between performance levels. Another important suggestion they made to the contractors was to reward justice. Because the results revealed that if this issue is not observed, workers believe that performance has no effect on rewards and as a result performance will be poor.

In another study, Zakeri et al. (1997) stated that the main objectives of their research were to identify and rank the factors affecting the motivation of Iranian construction users and to identify and rank the level of satisfaction with these factors to individual individuals at construction sites. By identifying and prioritizing these factors in this way, it was likely that managers' awareness would eventually have a positive effect on employee productivity if appropriate corrective action was taken. Lastly, motivational factors were identified and ranked among Iranian construction workers. The five most important factors are "fairness in payment", "financial incentives and rewards", "timely payment", "good work facilities" and "safety and health at work".

Assad et al. (2005) stated that the purpose of their study was to develop interventions appropriate to human resource management to attract and retain individuals who may play a positive role in the performance of new construction jobs. To guarantee a sample large enough to compare different groups statistically significant, structured questionnaires were delivered directly to employees working on a wide range of construction projects. This study revealed that investing in skills is positively correlated with the level of intrinsic job satisfaction (Garba 2021; Dabirian 2022; Ghoddousi 2014). These findings suggest that employers should consider employee

job classification when formulating strategies to improve motivation. Similarly, the results indicated that the size of the company has little effect on employee motivation.

In the next study, Uwakaweh (2006) addressed the motivational atmosphere of a construction trainee. The results indicated that the level of motivation was low among trainees. The mean motivational score in female trainees was higher than the score of male trainees. It was observed that with increasing the age of the trainee, the level of motivation decreases. The motivation was considerably associated with several factors. In another study, Kazaz et al. (2008) stated that their goal was determining the factors affecting the productivity of the labor force in Turkey. In this study, 37 factors affecting the productivity of construction workers in Turkey in 4 main groups of organizational, economic, physical, and social psychological factors were examined. In another study, Dwivedula et al. (2010) stated that work motivation is organizational performance. They believed that organizations are increasingly becoming project-oriented, and it is important to motivate work in traditional, project-based organizations. They concluded that the core values of the company include effective communication of employees, appropriate rewards for employee performance and learning. Job security also appeared as an important motivating factor in their study.

In another study, Rose et al. (2011) recognized motivational factors for achieving voluntary incentive goals in construction projects, called motivational incentives, based on four major construction projects in Australia that included financial incentives in their contractual arrangements. In another study, Tabassi et al. (2012) conducted a study on education and motivation in human resource development and their impact on the performance of construction projects. The results indicated that motivation significantly reinforces the relationship between training exercises and teamwork activities and productivity in responding companies. In another study, Ghoddousi (2014) stated that the purpose of his study was to use a proposed motivation model based on the theory of expectation for workers stationed at the site and to validate this model for the construction industry. The results of the study confirm the existence of a relationship between the theory of expectation and motivation of construction workers in a developing country such as Iran.

Other studies included a comparative analysis of the impact of cultural differences and the relative importance of some factors for productivity. Kim (2015) identified motivational factors for influencing workers' cultural differences and their impact on productivity. In another article, Graboviy (2016) conducted his study to investigate the effect of methods of increasing motivation on increasing productivity using four methods. He noted the importance of rewards for improving performance, as well as the need for an effective and cost-effective strategy for employee participation in identifying ideas for improving productivity. In another study, Yang (2020) examined non-economic incentives for organizational citizenship behavior in large construction projects.

According to what was mentioned, the performance of human resources and staff largely depends on their motivation. Paying attention to the issue of employee motivation is the best way to achieve the goals of a development project as well as improve the performance and productive work of the workforce. Creating motivation requires knowledge of different variables of motivation and their effects on employees. Studies also reveal that paying attention to the individuals' situation and culture is very significant and vital in the effectiveness of the motivation created, and if not, it will have a contradictory effect. Consequently, the purpose of this study is to investigate the motivational factors in development projects.

Table (1) presents all the factors studied in previous studies, along with the number of repetitions of each.

Table 1. Summary of all the factors studied in previous motivation studies

Row	Factor name	Number of repetitions	Row	Factor name	Number of repetitions
1	Fairness in payment	8	15	Feeling perfect in doing the job successfully	4
2	Motivational and financial rewards	8	16	Safety and health at work	3
3	Ability to develop abilities	7	17	Good monitoring	3
4	Participate in company decisions	6	18	Good working conditions	3
5	Job security	6	19	Good working facilities	3
6	Job freedom	6	20	Boss and subordinate relationships	3
7	Detailed job descriptions	5	21	Salary increase	3

8	Possibility to learn	5	22	New tasks	3
9	Self-satisfaction with the work done	5	23	Past performance feedback	3
10	Good communication with colleagues	4	24	Applause from the employer or supervisor	3
11	Timely payment	4	25	Premium	3
12	Possibility of promotion	4	26	Share problems and their consequences	3
13	Challenging tasks	4	27	Opportunities for social activities	3
14	Interest in work	4	28	Overtime	2

Row	Factor name	Number of repetitions	Row	Factor name	Number of repetitions
29	Job recognition	2	43	Quality meal	2
30	More responsibility	2	44	Flexible work schedule	2
31	Company credit	2	45	Automatically	1
32	Support from the employer or supervisor	2	46	The right to choose a partner	1
33	Join the union	2	47	Teamwork	1
34	Case management	2	48	Recognition in the community of doing successful work	1
35	Create competition	2	49	Jobs with a sense of creativity in it	1
36	Cultural differences	2	50	Discontinuity of work	1
37	Distance from home	2	51	Quality of site management	1
38	Access to relevant communication channels	2	52	System workflow	1
39	Incentive flexibility	2	53	Site layout	1
40	responsibility	2	54	The complexity of the design	1

41	Labor rules	2	55	Error tolerance	1
42	Opportunity for equal progress	2	56	Weather conditions	1

Row	Factor name	Number of repetitions	Row	Factor name	Number of repetitions
57	Disorders	1	71	Clash	1
58	Application compression	1	72	Value-based selection	1
59	Shift work	1	73	Company policy	1
60	Site density	1	74	Social status	1
61	Job Discipline	1	75	Job option	1
62	Delegation of responsibility	1	76	Opportunity for social life	1
63	Distance from population centers	1	77	Employment guarantee	1
64	Jobs comparable to other jobs in the organization	1	78	Achievement	1
65	Needs to be completed identifiable work	1	79	Distance from site	1
66	Provide acknowledgment and recognition	1	80	Reward for not being absent	1
67	Requires high knowledge and skills	1	81	Training Rewards	1
68	Risk allocation	1	82	Goodwill reward	1
69	Future work	1	83	Effective evaluation	1
70	Designing	1	84	Invest in more resources to support getting a job done	1

Row	Factor name	Number of repetitions	Row	Factor name	Number of repetitions
85	Provide active skills training for team members	1	99	Access to limited government resources	1
86	Maintain coordinated communication with government units	1	100	Gain better communication with national government institutions	1
87	Establish a harmonious relationship with the surrounding residents	1	101	Gain better communication with provincial government agencies	1
88	Compliance with project objectives	1	102	Gain better communication with municipal government institutions	1
89	Compliance with the requirements of government duties	1	103	Gain better communication with senior executives of state-owned companies	1

90	Trying to avoid creating problems for others	1	104	Improved opportunities to participate in other large projects	1
91	Help meet the challenges of others	1	105	More opportunities to collaborate with other employees, create pride, and promote an image	1
92	Influence on national or regional economic policies	1			
93	Supporting the political development of top managers	1			
94	Provide support for various stages of construction	1			
95	The desire to speed things up without paying	1			
96	Suggestions for improving the efficiency and quality of work	1			
97	Sharing ideas that help the project run without even asking employees.	1			
98	Active adoption of advanced management methods and technology points to potential areas for improvement	1			

METHOD

The current research is applied in terms of purpose and in terms of method is descriptive survey. According to the goal of the research, the first step to attain the goal is to identify and select the factors under study in the research. Accordingly, the factors that were examined in articles and studies in the background of the research were reviewed. The factors mentioned in the studies were finally included in the questionnaire and examined in the study. Particular questions include 20 questions related to project motivators. The first part of the questionnaire is dedicated to general questions with the aim of creating knowledge about the respondent. This questionnaire has been designed and prepared based on the 5-point Likert scale based on the questionnaires of articles and studies reviewed in the relevant fields. It contains 20 questions about 20 motivational factors. The questions are presented in Table (2).

Table 2. Motivation Questionnaire Questions

Question number	Question	The studied factor
1	I have a good relationship with my colleagues.	Good communication with colleagues
2	If I work hard, my income will increase.	Possibility of salary increase
3	I have job security in my job.	Job security
4	I will be able to get a job promotion with a lot of effort.	Possibility of promotion

5	With a lot of effort, I will receive financial and non-financial rewards.	Possibility to receive financial and non-financial rewards
6	My work is one of my most valuable experiences.	Interest in work
7	I feel responsible.	Responsibility
8	I also participate in company decisions.	Participate in company decisions
9	With a lot of effort, I am given more challenging tasks.	Existence of challenging tasks
10	I have good facilities and facilities.	Good working facilities

Continuation of Table 2. Motivation Questionnaire Questions

Question number	Question	The studied factor
11	I have no share in choosing my colleagues	Ability to select a partner
12	I have a good relationship with the manager/employer	Our good relationship manager
13	Payment of salaries by the company is timely	Timely payment
14	The amount of salary I receive is satisfactory	received money
15	I am allowed to improve my skills and abilities.	Ability to upgrade skills
16	If I work hard, I will have more freedom and independence in my work	Existence of work independence
17	My task is clearly explained to me.	Existence of job transparency
18	My job has given me a good reputation and social status	Social status and good work reputation
19	I will be given similar tasks.	Delegate similar tasks
20	My home is close to my place of work	Proximity to work

The statistical population in this study included 149 engineers working in the teams of the employer, consultant, and contractor of construction companies in Tehran, in residential projects with a land area between 250 to 350 square meters. To estimate the minimum sample size to examine the factors of motivation and success, the following relationship with 95% certainty was used:

$$n = \frac{n'}{1 + (\frac{n'}{N})} \quad (1)$$

$$n' = \frac{S^2}{V^2}$$

Where n is the minimum sample size, N is the community size, S is the standard deviation of 0.5 and V is the standard error of 0.05. Based on the above relationship, the minimum sample size is 85.7. In this study, a questionnaire was distributed electronically among 170 engineers working in the contractor, consultant, and employer teams in construction companies. Of these, 149 questionnaires were answered. The reliability results of the questionnaire were obtained through Cronbach's alpha of 0.858.

To prove that all respondents' perceptions of the questions were the same and that everyone's perceptions were the same as the question designer's perception, the questionnaire validation test, and Spearman correlation coefficient were used for each question. Concerning the whole questionnaire, it was calculated that the results of this study are given in Table (3). Regarding the p-value values obtained in this analysis, which were all less than 0.05, it can be concluded that these coefficients have an acceptable correlation and can be generalized to the community.

Table 3: Correlation coefficient and validation test

Variable	Total			Variable	Total		
	Correlation coefficient	P-value	Count		Correlation coefficient	P-value	Count
Good communication with colleagues	0.374	0.000	149	Amount of money That had to be paid	0.603	0.000	149
salary increase	0.599	0.000	149	Ability to upgrade skills	0.650	0.000	149
Job security	0.640	0.000	149	Work independence	0.590	0.000	149
Possibility of promotion	0.604	0.000	149	Job transparency	0.540	0.000	149
Financial and non-financial rewards	0.667	0.000	149	Social status and good work reputation	0.549	0.000	149
Interest in work	0.367	0.000	149	Similar tasks	0.224	0.006	149
responsibility	0.384	0.000	149	Proximity to work	0.334	0.000	149
Participate in company decisions	0.638	0.000	149				
Challenging tasks	0.502	0.000	149				
Good working facilities	0.642	0.000	149				
Ability to select a partner	0.193	0.018	149				
Good relationship with the manager	0.545	0.000	149				
Timely payment	0.503	0.000	149				

In the reliability (reproducibility) stage of the questionnaire, the questionnaire was evaluated and analyzed and Cronbach's alpha values were calculated for the questionnaire as well as for each question alone (if omitted from the questionnaire). The results of this analysis revealed that this questionnaire has good reliability or reproducibility and if each question is removed, there will be no significant change in Cronbach's alpha value.

Table 4: Cronbach's alpha value of the questionnaire if each question is omitted

Question	Alpha value of the questionnaire if the question is omitted	Question	Alpha value of the questionnaire if the question is omitted
Good communication with colleagues	0.855	Amount of money That had to be paid	0.848
salary increase	0.847	Ability to upgrade skills	0.845
Job security	0.845	Work independence	0.846
Possibility of promotion	0.847	Job transparency	0.850
Financial and non-financial rewards	0.844	Social status and good work reputation	0.849
Interest in work	0.856	Similar tasks	0.870
Responsibility	0.856	Proximity to work	0.857
Participate in company decisions	0.846		

Challenging tasks	0.850		
Good working facilities	0.845		
Ability to select a partner	0.861		
Good relationship with the manager	0.850		
Timely payment	0.853		

After collecting data and entering them into the SPSS program, statistical analyzes and analyzes were performed on them. Statistical analyzes were performed using SPSS version 26 statistical software.

Using the Kolmogorov-Smirnov test or K-S test, the distribution of data in each group was examined. The results of this study ($P < 0.05$) revealed that the distribution of data in all groups was not normal and therefore in statistical studies, non-parametric tests should be used. In all statistical tests used, the level of significance was considered 5%. The results of this test are presented in Table (5).

Table 5: K-S test results

Variable	p-value	Variable	p-value
Good communication with colleagues	0.000	Amount of money That had to be paid	0.000
Salary increase	0.000	Ability to upgrade skills	0.000
Job security	0.000	Work independence	0.000
Possibility of promotion	0.000	Job transparency	0.000
Financial and non-financial rewards	0.000	Social status and good work reputation	0.000
Interest in work	0.000	Similar tasks	0.000
Responsibility	0.000	Proximity to work	0.000
Participate in company decisions	0.000		
Challenging tasks	0.000		
Good working facilities	0.000		
Ability to select a partner	0.000		
Good relationship with the manager	0.000		
Timely payment	0.000	--	---

FINDINGS

This study aims to investigate the motivational factors in development projects. In this section, the motivational factors are analyzed and interpreted and the obtained tables are presented. It should be mentioned that in this section, the scores related to the questions are presented - a score of 1 was given to "I completely disagree", and a score of 5 was given to the option "I completely agree with", and in this section, the obtained scores are presented.

Table 6: Motivational factors along with statistical components

Statistical components	Good communication with colleagues	Salary increase	Job security	Possibility of promotion	Financial and non-financial rewards
Valid	149	149	149	149	149
Invalid	0	0	0	0	0
Average	4.35	3.72	2.65	3.68	3.23
Middle	4.00	4.00	2.00	4.00	3.00
Mode	4	4	2	4	4
Standard deviation	0.706	1.126	1.162	1.047	1.171
Variance	0.499	1.268	1.350	1.096	1.370
Domain	4	4	4	4	4

Minimum	1	1	1	1	1
Maximum	5	5	5	5	5
Total	648	555	395	549	482

Continuation of Table 6: Motivational factors along with statistical components

Statistical components	Interest in work	Responsibility	Participate in company decisions	Challenging tasks	Good working facilities
Valid	149	149	149	149	149
Invalid	0	0	0	0	0
Average	4.32	4.58	3.67	3.99	2.98
Middle	5.00	5.00	4.00	4.00	3.00
Mode	5	5	4	4	2
Standard deviation	0.872	0.583	1.003	0.951	1.159
Variance	0.760	0.340	1.006	0.905	1.344
Domain	4	4	4	4	4
Minimum	1	1	1	1	1
Maximum	5	5	5	5	5
Total	644	682	547	594	444

Continuation of Table 6: Motivational factors along with statistical components

Statistical components	Ability to select a partner	A good relationship with the manager	Timely payment	Payments	Ability to upgrade skills
Valid	149	149	149	149	149
Invalid	0	0	0	0	0
Average	2.3087	3.98	3.01	2.60	3.40
Middle	2.0000	4.00	3.00	2.00	4.00
Mode	2.00	4	2	2	4
Standard deviation	1.17346	0.85	1.333	1.208	1.108
Variance	1.377	0.73	1.777	1.458	1.227
Domain	4.00	4	4	4	4
Minimum	1.00	1	1	1	1
Maximum	5.00	5	5	5	5
Total	344.00	593	448	387	506

Continuation of Table 6: Motivational factors along with statistical components

Statistical components	Work independence	Job transparency	Social status and good reputation	Similar tasks	Proximity to work
Valid	149	149	149	149	149
Invalid	0	0	0	0	0
Average	3.40	3.61	3.83	2.1409	2.78
Middle	4.00	4.00	4.00	2.0000	2.00
Mode	4	4	4	2.00	2
Standard deviation	1.179	1.089	1.038	0.83844	1.283

Variance	1.389	1.185	1.077	0.703	1.647
Domain	4	4	4	3.00	4
Minimum	1	1	1	1.00	1
Maximum	5	5	5	4.00	5
Total	506	538	570	319.00	414

Regarding the results and comparing the scores of motivational factors with each other, the five factors that received the most scores from the respondents and the respondents benefit from them are as follows:

1. Sense of responsibility
2. Good communication with colleagues
3. Interest in work
4. Challenging tasks
5. A good relationship with the manager or employer

In addition, based on the scores, the lowest score belongs to the factor "similar tasks", which shows that this factor is not observed among the respondents and people who receive similar tasks. It can be inferred that the respondents of the companies are people who have been accepted and remained over time by showing interest in working and doing things with a sense of responsibility and at the same time having good relationships with employees, colleagues, and managers in the companies under study. Both the managers and the people themselves feel satisfied with their presence in the company. The weakest motivation factor among respondents is also inferred that managers and employers give employees similar tasks with the intention that each person becomes skilled in a particular job and specializes in that type of work so that they need to spend time learning other employees. This is contrary to motivating employees. Compared with the research background, it can be said that the only factor that was mentioned in common in most studies and was also present in the results of this research, is the factor of "good communication with colleagues". Job security, which was mentioned in the studies and was one of the important factors for employees, is still a concern that does not have a proper place in this study. The amount and timely payment were also important factors that were accepted as important factors in studies conducted in Iran, and in this study, non-implementation and observance of this factor are observed.

In the following, as a partial goal, the relationship between motivational factors and their age is examined, which is presented in Table (7).

Table 7: Motivation factors and age of respondents

Age categories	Good communication with colleagues	Salary increase	Job security	Possibility of promotion	Financial and non-financial rewards	Interest in work
	Total	Total	Total	Total	Total	Total
20-25	129	104	82	113	104	129
25-30	150	129	83	126	106	151
30-35	163	145	103	146	129	162
35 and above	206	177	127	164	143	202

Continuation of Table 7: Motivation factors and age of respondents

Age categories	Responsibility	Participate in company decisions	Challenging tasks	Good working facilities	Select colleague
	Total	Total	Total	Total	Total
20-25	138	107	124	94	0.63
25-30	154	119	136	95	0.77
30-35	176	146	160	126	0.85
35 and above	214	175	174	129	0.119

Continuation of **Table 7: Motivation factors and age of respondents**

Age categories	A relationship good with the manager	Timely payment	Timely payment	Ability to upgrade skills	Work independence	Job transparency
	Total	Total	Total	Total	Total	Total
20-25	124	95	95	105	106	110
25-30	132	96	96	112	114	117
30-35	158	109	109	134	139	139
35 and above	179	148	148	155	147	172

Continuation of **Table 7: Motivation factors and age of respondents**

Age categories	Social status and good work reputation	Similar tasks	Proximity to work
	Total	Total	Total
20-25	111	69.00	90
25-30	124	79.00	89
30-35	149	69.00	105
35 and above	186	102.00	130

As it is evident, in all motivational factors, the age group “35 and above” has the highest scores, which indicates that there is more motivation in people in this age group than in other age groups. Now, to see whether the motivation factors with the highest score are different from what was obtained in the previous section or not, the scores of the factors in each age group were examined, and the results are as follows:

In the age group of 20 to 25 years, motivational factors are expressed in the same way as in the previous section. In the age group of 25 to 30 years, only the position of the factors of “interest in work” and “good relationship with colleagues” has changed. In the age group of 30 to 35 years, the motivational factors are the same as expressed in the previous section. In the age group of 35 and above, all factors are the same as those mentioned in the previous section, except for the “challenging tasks” factor, which has given way to the “good position and reputation” factor. Finally yet importantly, in all age groups, the “similar tasks” factor as in the previous section is the weakest motivating factor among respondents.

To put it briefly, it can be said that the age of individuals in this study has no significant relationship with motivational factors; in contrast, Cardoso (2015) concluded that age changes the important factors of individuals.

CONCLUSION

This study aimed to investigate the motivational factors in construction projects. Regarding the motivational factors, the factors of the feeling of responsibility, good communication with colleagues and managers, interest in work, and delegating challenging tasks were identified as factors that receive more attention and, as anticipated, less attention was paid to factors such as salary and job security. In the comparative test section, the responses of the three groups of respondents were investigated, and it was observed that there was no significant difference in all motivational factors except job security. Another point that was observed was that job security in the contractors team is less than the teams working in consulting and employer companies. The results also revealed that the age of individuals in this study has no significant relationship with motivational factors and in all motivational factors, the age group “from 35 and above” has the highest scores, this shows that there is more motivation in people in this age group than in other age groups.

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