

# ASSESSING THE EFFICIENCY OF HUMAN RESOURCES MANAGEMENT IN CONSTRUCTION PROJECTS

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*Abstract*— In the developing countries, there is a common lack of experience in construction management implementation. This study introduces a methodology to evaluate the human resources management processes in construction projects. The study used inputs, outputs, and tools and techniques recommended by the Guide to the Project Management Body of Knowledge [1]. The opinions of experts in the field of construction projects are collected regarding considered managerial parameters and tools. The analytic hierarchy process is used to evaluate the order of each parameter. The performance of each process is determined based on the importance weight and the proposed efficiency of each variable. The results of the implementation show that there is considerable progress in project planning, but team development and team management need much more attention. The study presents a methodology for human resources assessment in the construction industry but the findings are applicable to Kuwait and the similar developing countries.

*Index Terms*— Assessment; construction; human resources; project management;

## 1. INTRODUCTION

**H**UMAN resources management is one of the core management areas in construction projects. Human resources constitute 25% to 40% of the direct costs of such projects depending on their complexity and nature. Human resources management also affects the total cost of the project drastically because it controls the productivity of material and equipment that constitute the remainder the direct cost [2]-[7]. However, this area of management application has had a little attention from researchers in the construction management field.

In developing countries, there is a common lack of experience in construction management implementation. Management knowledge and skills become experienced through practice, training, and interacting with other experienced individuals and entities. The state of Kuwait has thus been working on the development of qualified citizens to take over local construction projects. After more than fifty years of such preparation, construction projects still depend on expatriates mainly from Arab and Asian countries, especially in the private sector.

The current study presents the results of an assessment process for human resources management in the field of construction projects in Kuwait. The study utilized the guidelines of the Project Management Institute in the field of human resources to

assess the conduct of the different processes in the construction sector. The assessment employed professionals from the governmental sector as well as the private sector.

## 2. EFFICIENCY OF HUMAN RESOURCES MANAGEMENT

The construction industry in Kuwait suffers from a lack of national experiences that satisfy the expanding demand for construction. These insufficient experiences result from being a new emerging country (dependency, 1960) that still depends mainly on the production of oil. This situation forces the industry to use expatriates mainly from other Arab and Asian countries to fill the required vacancies. Over the last fifty years, the construction authority has worked hard on developing local experience to substitute for that of expatriates. Now, it is important to assess the local capacities that participate in the construction management process.

The assessment process is targeted to determine the reasons for the lack of local experience needed to carry out the management of construction projects and define the strengths and weaknesses in the citizen professionals.

## 3. METHODOLOGY

The current study presents a managerial assessment of the human resources management in construction projects in Kuwait from the practitioners' perspective. The study utilized the guidelines of the Project Management Institute in human resources to conduct the study. The participants were Kuwaiti citizens with technical and managerial backgrounds and experience ranging from 15 to 32 years on construction projects. The discussion sessions examined the guidelines of the Project Management Body of Knowledge [1].

A questionnaire was constructed and distributed to the participants to assess the priority and efficiency of the parameters and tools utilized in human resources management. The questionnaire was divided into two main categories. The first considered the inputs and outputs of the processes of human resources management, and the second category considered the various tools used for human resources management. The priority arrangement of these management parameters was developed using the analytical hierarchical process (AHP). The AHP was developed in the early 1970s by Saaty [8] to evaluate the relative importance of multivariate. The efficiency of each management parameter was evaluated on a scale from one to five. The value of five represented the highest efficiency, and one indicated the least efficiency. Fifty-seven (57) participants provided their responses to the questionnaire. Figure (1) presents the distribution of the participants. Almost two-thirds of the participants represented the owner side while the other one-third was distributed among engineer, contractor, or supplier.

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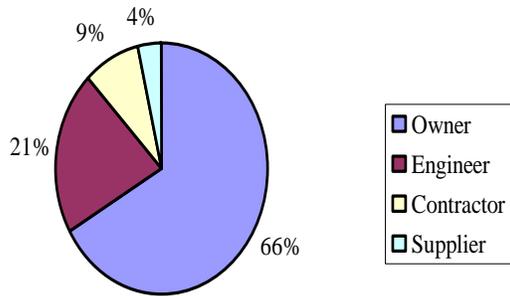


Fig. 1 – Participants' distribution

#### 4. HR MANAGEMENT PARAMETERS

Four processes were considered in the study as per the guide of the PMBOK: planning, team acquirement, team development, and team management. Each process had its inputs and outputs, which were considered in this study as managerial parameters that affect the trend of the project. The following section elaborates the effect of these parameters as compiled from the discussions and responses by the professionals who participated in the study.

##### 4.1. Planning

Human resource planning is the initial process in human resource management. It is comprised of the determination of roles, responsibilities, reporting relationships, and the creation of a staffing management plan. With respect to planning, the study considered the environment of the project, including professionals who participate in the project, reporting relationships among the teams, cultural and language differences, and the level of trust apparent among stakeholders. The participants indicated that the enterprise environment is well established according to the defined items, due to a long experience with other international establishments and previously recruited consultants.

Organizational process assets help project planning based on accumulated information from previous projects. The status in the government sector showed that these assets had already accumulated over the past years in the form of templates or checklists, roles and responsibilities, and safety considerations. In the private sector, the assets are not as well established as in the government sector. In addition, there is no commercial documentation available for the local market.

One of the major planning documents is the project management plan that includes PM activities such as quality assurance, risk management, and procurement and contracts. Usually, the authorities request the full details to be submitted for approval through a strict documentation life cycle. However, the updating of the project management plan is not as strict as the initial approval. The weak point is that the preparation of the plan is prepared by the contractor or the project manager who is part of the private sector where only 5% of the employees are citizens.

Roles and responsibilities must be clear in the project plan. Organizational planning involves identifying, documenting, and assigning project roles, responsibilities, and reporting relationships. In the private sector, the roles and responsibilities

are well defined in most of the projects since the work breakdown structure and the corresponding responsibility is usually requested by the owner for initial approval. The problem usually arises in the functional management at the owner side where the roles and responsibilities are not as clear as in the contractor side.

##### 4.2. Team Acquirement

Team acquirement is the process of obtaining the human resources needed to accomplish the project. It may include any additional stakeholder whose role has not yet been filled. Acquirement extends to engineers, contractors, subcontractors, and suppliers.

Project staff assignments are the set of documents that refer to acquiring the staff officially. This parameter encounters serious attention in the construction industry. Most of the participants appreciated the documentation process for staff assignment, including the project WBS, procurement process, policies and regulations, recruitment rates, qualifications, required training, and resource allocation with respect to the project schedule.

##### 4.3. Team Development

Team development is the process of improving the competencies and interaction of team members to enhance project performance. In this process, individual and group skills need to be enhanced to improve the overall productivity of the project. Assessment of the performance is a milestone in the modern management processes. Team performance assessment provides a clear picture of an integrated working team. Unfortunately, despite the fact that most teams in the construction industry work together on several projects, the participants indicated that the assessment process is seldom conducted. This lack of assessment narrows the prospect for fast development and improvement in this category.

##### 4.4. Team Management

Team management involves the processes of following performance, providing feedback, resolving issues, and coordinating changes to enhance project performance [9], [10]. Managing team members on construction projects is a major challenge because of the loyalty to the functional manager in the governmental association. In the private sector, this aspect has been nullified, and most of the employees on the construction projects are following the project organization matrix. Team management is one of the poorest areas in the field of construction management in Kuwait.

Another parameter that affects team management is the change in project staff that reduces the performance of the project drastically. This change has more effect when the change is in the top management of the project. Despite the fact that changes in the government managing positions are rare for construction projects; when it occurs, it can ruin the project in terms of time and cost.

Corrective action is a serious parameter in team management. The impact of human resources corrective actions is similar to that for human resources change. The responses from the study showed that corrective action and changes in the Kuwait construction industry are carried out based on personal interests more than project requirements, in many cases.

## 5. HR MANAGEMENT TOOLS

Management tools are the set of means that facilitate the implementation of management parameters to reach the target plan of the project. The skills of the stakeholders in using these tools need to be high enough to generate the required productivity of the individuals and the teams.

### 5.1. Planning

Many tools are used in planning process. Organization charts are documents that state the roles and responsibilities for each person in the project. These documents are usually available, but often do not provide the required details. This lack leads to poor control of most of the project processes. Another tool is networking. The interaction among project stakeholders determines political and interpersonal factors that can influence the effectiveness of the staffing management options. Networking is one of the social habits among the Bedouin tribes, which makes it more likely to be imposed on the modernized organization management.

On the other hand, organizational theory provides information regarding the ways that people and organizational units behave. Unfortunately, the social life in Kuwait makes the implementation of the organizational theory hard to be implemented. Although the major policies are stated in writing or by tradition, the exceptions to these policies are commonly accepted.

### 5.2. Team Acquisition

Pre-assignment is a tool that is used when project team members are known in advance. This use is valid in the government sector based on the policies of the organization and can be based on experience or a turn in the assignment process. In the private sector, this pre-assignment could be carried out when there is special need for high expertise in a complex project. Negotiation is another tool that is carried out with staff to compromise the functional duties against project requirements. Practically, this process occurs in the private sector and occurs rarely in government establishments. Eventually, acquisition is the common tool that is used with investment firms or governmental authorities, where the contractor, subcontractors, and suppliers are found outside the organization. Sometimes, the engineer or the project manager is acquired from outside, too.

### 5.3. Team Development

Management skills are very important in construction projects as in other application areas. The high capacity of understanding the nature and requirements of employees enhances the competency of the team members and groups. Training is a prime tool for team development. It includes all activities designed to enhance the competencies of the project team members [7]. Training programs are usually well developed and organized. The conduct of training activities is also professional. The main problem in training activities is the assignment of the appropriate person to take the appropriate training program.

Team building is the process of influencing a group of different individuals, with their own goals, needs, and perspectives, to work together effectively. The goal is that the team effort will accomplish more than the sum of the individual efforts. Team building is a great challenge in Kuwait because of the old customs earlier/long developed in the local culture over the years. The individual nature and tribal loyalty overcome most of the attempts to create a team paradigm.

The original plans that concern ways to reward people are well developed during the planning process. Award decisions are made during the process of managing the project team through performance appraisals. Recognition and reward should consider cultural differences. In cultures that encourage individualism, it is difficult to reward team development.

### 5.4. Team Management

Observation are essential for the evaluation of the project and its staff through the sequential progress of the project. The management team should observe using specific metrics, such as earned value, productivity of individuals and teams, and consistency with project's baseline. The discussions and written responses of the participants showed that construction project managers do not pay a lot of attention to the attitude of the project's staff as they do to outputs for the project's cost and schedule.

A project performance appraisal depends on the length of the project, complexity of the project, organizational policy, labor contracts, and regular communication. A performance appraisal is needed in a construction project to assure that roles and responsibilities are optimized [9]. Changes and corrective actions regarding the project's human resources are usually based on these appraisals.

Conflict management is another tool that results in greater productivity and better relationships. Team ground rules and solid project management reduce the potential for conflict. In the local culture, it is difficult to use confrontation to solve project conflicts. Usually, smoothing the problem is a common response for both internal and external conflict. This management weakness leads to repetition of the conflict.

## 6. ANALYSIS

The collected data was based on a dual comparison. Each parameter was compared to the other parameter and ranked from one to nine using odd numbers (1, 3, 5, 7, 9) with "9" indicating that the first parameter is much more important than the second one. The parameter of "1" indicated that both parameters are of equal importance. On the contrary, a comparison value from 1/3, 1/5, 1/7, and 1/9 indicated that the first parameter was less important than the second parameter. The results provided a consistency ratio of 0.12, which was very close to the value of 0.1, which is usually considered the limit for acceptance.

Table 1 - Efficiency of human resources management parameters

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
#	Process	Parameter	Parameter Weight	Process Weight	Process weight %	Parameter Weight per Process%	Efficiency	Process Efficiency	Parameter Performance (7) * (8)	Process Performance
1	Planning	Enterprise Environment	0.2466	0.0982	35%	42%	3.68	3.20	1.5413	3.25
2		Organizational Process Assets	0.0164			3%	3.47		0.0968	
3		Project Management Plan	0.1379			23%	3.03		0.7095	
4		Roles & Responsibilities	0.0909			15%	2.36		0.3641	
5		Project Organization Charts	0.0151			3%	3.39		0.0869	
6		Staffing Management Plan	0.0820			14%	3.26		0.4539	
7	Acquisition	Enterprise Environment	0.2466	0.0698	25%	50%	3.68	3.12	1.8571	3.30
8		Organizational Process Assets	0.0164			3%	3.47		0.1166	
9		Roles & Responsibilities	0.0909			19%	2.36		0.4387	
10		Project Organization Charts	0.0151			3%	3.39		0.1047	
11		Staffing Management Plan	0.0820			17%	3.26		0.5469	
12		Project Staff Assignments	0.0249			5%	3.43		0.1749	
13		Resource Availability	0.0128			3%	2.23		0.0585	
14	Team Development	Project Staff Assignments	0.0249	0.0519	19%	12%	3.43	2.79	0.4122	2.78
15		Staffing Management Plan	0.0820			40%	3.26		1.2888	
16		Resource Availability	0.0128			6%	2.23		0.1378	
17		Team Performance Assessment	0.0877			42%	2.23		0.9426	
18	Team Management	Organizational Process Assets	0.0164	0.0582	21%	2%	3.47	2.77	0.0770	2.65
19		Project Staff Assignments	0.0249			3%	3.43		0.1155	
20		Roles & Responsibilities	0.0909			12%	2.36		0.2895	
21		Project Organization Charts	0.0151			2%	3.39		0.0691	
22		Staffing Management Plan	0.0820			11%	3.26		0.3610	
23		Team Performance Assessment	0.0877			12%	2.23		0.2640	
24		Work Performance	0.0537			7%	2.59		0.1878	
25		Performance Reports	0.1110			15%	2.17		0.3253	
26		Changes	0.0316			4%	2.47		0.1053	
27		Corrective Actions	0.0482			7%	2.45		0.1595	
28		Preventive Actions	0.0412			6%	2.33		0.1296	
29		Project Management Plan	0.137895			19%	3.03		0.5642	

### 6.1. Human Resources Management Parameters

Table (1) shows a summary for the results obtained for the assessment of the parameters of human resources management in construction projects. The Eigenvalues of the parameters show that the enterprise environment is considered the prime factor in construction project human resources management. A large difference is shown between the importance values given between the enterprise environment and the other parameters. In the second category, five parameters can be grouped together. These parameters are the project management plan, performance reports, roles and responsibilities, team performance assessment, and the staffing management plan. The rest of the considered parameters can be grouped together into a third category of less importance as indicated by the collected data. Column (4) provides the Eigenvalues of each parameter as obtained from the analytic hierarchy process. These Eigenvalues represent the weight of each parameter with respect to the whole management process. Column (5) provides an average of the weights of the parameters for each process. These values provide the deduced weights for each process. Column (6) provides the process weights percent. The values of the process weights indicated that planning had the most importance accreditation to the participants while team

development and team management received the least appreciation from the participants. This finding reflects the capacities of the participants who have good conduct of project planning and indicates that team development and team management skills are far below the needed level as discussed at the outset of this paper. Column (7) provides the weight of each parameter in a percentage form with respect to its process. The participants assigned an efficiency level for each parameter, based on the practical conduct of construction project management. The efficiency level was assigned on a five-point scale from one to five with five being the maximum efficiency and one being the least efficiency. Column (8) of Table (1) provides the average efficiency factor for each parameter as determined from the data provided by the respondents. Column (9) provides the average of the efficiency factors for each process. It is noted that the planning process has the highest efficiency followed by the team acquirement process while team development and team management have the lowest efficiency factors. The low level of team integration and team morale became clear from the quantified results and were the same as aforementioned.

The weight and level of efficiency of the parameters are combined together in a performance factor. The performance factor of each parameter is obtained as the product of the

parameter's weight per process [column (7)] times the assigned efficiency of this specific parameter [column (8)]. The result of this step is offered in Column (10). The performance factors of all parameters from the same process are then added together to bring about the overall performance factor of the process as provided in Column (11). It is easily observed from the table that the planning and team acquirement processes have close performance factors of around 3.25. On the other hand, the performance factors obtained for team development and team management processes were considerably lower with values around 2.7. Figure (2) presents the distribution of the weights of each process as deduced from the data collected.

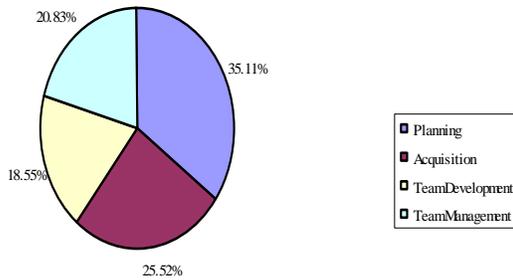


Fig. 2 – Weight of HR Management Parameters

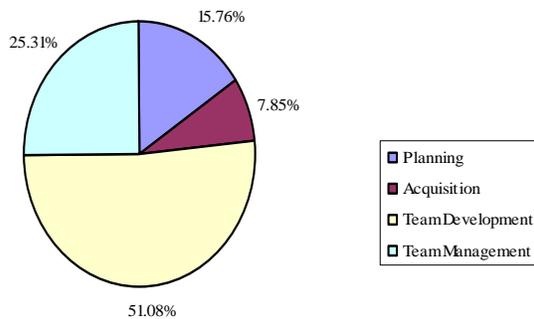


Fig. 3 – Weight of HR Management Tools

## 6.2. Human Resources Management Tools

The tools and techniques utilized by the project management team in the human resources management process in construction projects were investigated using the same method as the management parameter discussed earlier. Table (2) presents a summary for the results of these management tools. The Eigenvalues of the managerial tools show that recognition and awards were indicated as the most important tool to enhance the competency of the working staff. Four tools could be grouped together in a second category according to the calculated Eigenvalues. These tools are general management skills, training, observation and conversation, and team building, sorted in a descending order. It is easily observed that all these tools and techniques are adjunct to the team development and team management. These results reflect the real need of the employees for more appreciation through recognition and award system. In addition, it is useful to enhance the sentiments of the individuals toward the team, project, and firm. The process weights illuminate the importance of team development where its process weight was calculated as 51%. Team management tools come next with an

importance weight of 25% ,and the planning and team acquirement had low tools' weights of 16% and 8%; respectively, as shown in Figure (3).

Table (2) shows the values proposed by the participants for the efficiency factors for each of the considered managerial tools and techniques. Planning tools had the highest efficiency factors with all of its factors around the value of 3.30 on a scale from one to five. Team acquirement tools received an evaluation of efficiency around the average of 2.79 with negotiation process showing high efficiency with an efficiency factor of 3.48. Team development tools have lower efficiency factors with an average of 2.66. Co-location is the only tool in the team development process that has a high efficiency factor of 3.99 while all other tools have factors less than 2.65. It should be noticed that the nature of construction projects forces the co-location. Team management tools had the lowest appreciation for efficiency. The efficiency factors for this process had an average of 2.33 with all factors below 2.60.

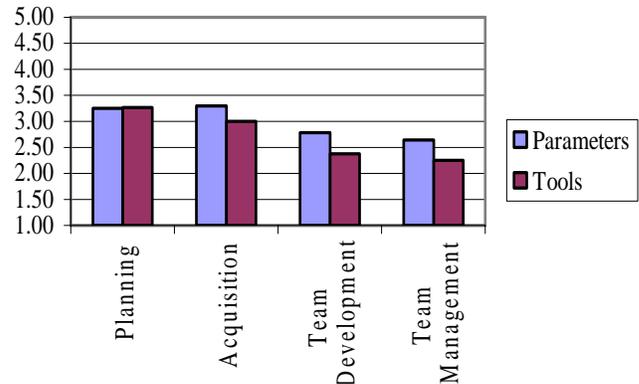


Fig. 4 – Performance of HR Management Parameters and Tools

The performance factors for the managerial tools introduced the planning tools as the best performance with a performance factor of 3.27. Team acquirement comes next with a performance factor of 3.00 and then team development and team management with as low a factor as 2.38 and 2.25, respectively. The low performance factors for the team development and team management processes fortify the fact that construction projects in Kuwait are in strong need of more attention for team trust and cohesiveness among team members to raise project productivity.

The comparison between the performance of the managerial parameters and the managerial tools in the construction projects in Kuwait, as indicated by the participants, is shown in Figure (4). The figure shows that there is a strong need to improve the awareness, knowledge, and skills of the team development and team management processes in order to improve productivity of construction projects in Kuwait. Project planning and team acquirement are in better circumstances due to the previous involvement of international firms and personnel. This involvement has helped the establishment of a project initiation system for the Kuwait authorities and large local construction firms.

Table 2 - Efficiency of human resources management tools

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
#	Process	Parameter	Parameter Weight	Process Weight	Process Weight %	Parameter Weight per Process%	Efficiency	Process Efficiency	Parameter Performance (7) * (8)	Process Performance
1	Planning	Organization Charts	0.0182	0.0324	16%	19%	3.39	3.29	0.635407	3.27
2		Networking	0.0544			56%	3.23		1.80892	
3		Organizational Theory	0.0246			25%	3.25		0.820713	
4	Acquisition	Pre-assignment	0.0116	0.0161	8%	18%	2.33	2.79	0.417967	3.00
5		Negotiation	0.0303			47%	3.48		1.63167	
6		Acquisition	0.0127			20%	2.77		0.546238	
7		Virtual Teams	0.0100			15%	2.59		0.400275	
8	Team Development	General Management Skills	0.1354	0.1050	51%	21%	2.47	2.66	0.530714	2.38
9		Training	0.1098			17%	2.62		0.456378	
10		Team Building	0.0848			13%	2.23		0.300105	
11		Ground Rules	0.0412			7%	2.63		0.17192	
12		Co-location	0.0285			5%	3.99		0.18044	
13		Recognition & Awards	0.2305			37%	2.02		0.738871	
14	Team Management	Observation & Conversation	0.0908	0.0520	25%	44%	2.10	2.33	0.91659	2.25
15		Performance Appraisals	0.0564			27%	2.17		0.587736	
16		Conflict Management	0.0422			20%	2.58		0.523635	
17		Issue log	0.0187			9%	2.47		0.221616	

## 7. SUMMARY AND CONCLUSIONS

The presented study introduced a methodology to evaluate human resources management processes on construction projects. The study used the inputs, outputs, and tools and techniques recommended by the guidelines for Project Management Body of Knowledge (PMBOK). The inputs and outputs of each process were considered as the parameters in the HR management process. The tools and techniques were dealt with as a separate category. The opinions of experts in the field of construction projects were collected regarding the importance of the considered managerial parameters and tools. The analytic hierarchy process was utilized to evaluate the order of each parameter. The performance of each process presented the importance weight and the proposed level of efficiency of that variable.

The results of the study can be summarized by the following points:

- Human resources management in construction projects in Kuwait is below the targeted international standard.
- Planning activities are the most developed process in the HR management processes.
- Team development and team management processes are far below the level desired/needed to enhance the productivity of the construction projects.
- The tenure stability of the citizens reduces the loyalty toward the project entity much less than the loyalty toward the functional entity.

The following main recommendations can be deduced for the construction industry in Kuwait;

- Stressing privatization for the construction industry will attract citizens to the private sector and encourage them to enhance their competence capacities.
- Improving communications among the stakeholders inside and outside jobsites would also improve team productivity.

- Allowing more space for recognition and awards in private and government sectors would encourage individuals to provide optimum efforts for the projects. Moreover, it is important to relate the awards to training activities, team building, ground rules, and performance reports.
- Improving the observation system in the government sector throughout the project life cycle and relating these observations to a standard metric would be beneficial.

## REFERENCES

- [1] Project Management Institute (PMI). A guide to the project management body of knowledge - PMBOK™, PMI, Pennsylvania, USA, 2004.
- [2] H. S. Lee, J. H. Yu, and S. K. Kim. Impact of labor factors on workflow. *Journal of Construction Engineering and Management*, 2004, (130) 918-923.
- [3] H. R. Thomas, M. J. Horman, and U. E. Lemes de Souza. Symbiotic Crew Relationship and Labor Flow. *Journal of Construction Engineering and Management*, 2004, (130): 908-917.
- [4] M. Loosemore, A. Dainty, and H. Lingard. Human resource management in construction projects: strategic and operational approach. Spon Press, Taylor and Francis Group, London, UK, 2003.
- [5] W. F. Maloney. Labor-management cooperation and customer satisfaction. *Journal of Construction Engineering and Management*, 2003, (129): 165-172.
- [6] S. AbouRizk, P. Knowles, and U. R. Hermann. Estimating labor production rates for industrial construction activities. *Journal of Construction Engineering and Management*, 2001, (127): 502-511.
- [7] E. Allmon, C. T. Haas, J. D. Borchering, and P. M. Goodrum. U.S. Construction labor productivity trends, 1970-1998. *Journal of Construction Engineering and Management*, 2000, (126): 97-104.
- [8] T. L. Saaty. The analytic hierarchy process. McGraw Hill International, NY, USA, 1980.
- [9] H. R. Thomas and I. Zavrski. Construction baseline productivity: theory and practice. *Journal of Construction Engineering and Management*, 1999, (125): 295-303.
- [10] H. R. Thomas, M. J. Horman, R. E. Minchin, and D. Chen. Improving labor flow reliability for better productivity as lean construction principle. *Journal of Construction Engineering and Management*, 2003, (129): 251-261.