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# **Analysis and prioritization of the causes of delays in the construction projects of Arvand Free Zone Organization**

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## **Abstract**

The projects of Arvand Free Zone have specific goals to upgrade the infrastructure of various recreational, commercial, cultural, health and tourism centers in this region, and actually the work mission of this organization is far beyond and different from a construction plan. Arvand Free Zone Organization is a series of different but related projects, which, according to the philosophy of creating Arvand Free Zone, needs to attract foreign and domestic investors for further prosperity and the life and survival of the region, which, of course, with planning Short-term and long-term plans can be defined with specific goals to achieve the upstream goals, and many projects will be created following the mentioned plans. This chain will be an ideal and standard set in accordance with other developed and advanced countries in the world, which will definitely reduce delays in projects will lead to early resumption of investment in the region, and delays in projects are the main factor in reducing the entire process. The mentioned matters will be mentioned, therefore, the reduction of delays is more and more important. For this reason, analyzing and prioritizing the causes of delays can be effective in solving and reducing this phenomenon.

**Keywords:** Delay reduction, Construction project, Financial factors, Natural factors, Human factors, Arvand Free Zone.

## **1. Introduction**

Today, our country is progressing and taking great steps in the path of development, progress and construction [1-7]. In this direction, the implementation of various plans and projects, including the creation of large production factories, refineries, dams, power plants, universities, railways,

roads, residential towns, etc., play a significant role. D plans and projects, with components and There are many and complicated components that cannot be managed except by scientific management. In response to the question of the reasons for the failure of construction projects in Iran, various factors are considered. But one of the most important factors is the method of managing construction projects.

One of the characteristics of the industrial and economic growth and development of any country is the success of its construction projects [1, 2, 8, 9]. The main indicators in the success of projects are their high-quality execution without delay. Most of these policies pursue goals such as reducing cost, time, and improving quality. Delay, slowness and time increase in road construction projects indicate the existence of obstacles and root problems in the implementation of valuable projects. The implementation process of the government's plans and construction projects is always interrupted due to various reasons, which ultimately leads to the prolongation of the projects and delays in the time of their use. Increasing the life of construction plans and projects, while their implementation is accompanied by a lot of risk, also increases their finished cost. Increase in life The government's construction plans have progressed to the point where the failure to complete the plans within the specified time is considered normal and basically an established and unwritten procedure by the country's budgeting and executive system. Also, the major part of the capital of every country, especially in developing countries, is dedicated to construction projects and its infrastructure, which is one of the factors of economic growth and development of any society, success in implementing Its construction projects are considered. If the projects are delayed, some of them will lose their technical and economic justification, along with the waste of national funds.

Examining the project delays by the employer or the contractor in order to use the experience and knowledge gained during the implementation of the project can be used in the next similar projects, especially This is the reason that in projects that are implemented in different places Many executive agents of the project change, so the knowledge and experience gained during the project in different parts by executive agents at all levels should be documented and managed. In this case, it is possible to prevent similar cases from happening in the future by using past experiences.

Employers are looking for the cause of delays in order to be able to calculate the compensation of damages and penalties for contractors' delays, and also in exchange for appropriate estimates of the amount of additional costs to be imposed. It helps the contractor to file a claim for the delay in

the work and analyze the causes of the delays. do Also, the companies that provide guarantees and project credits should also have detailed information about the causes and responsibilities of delays in order to control the performance of the recipients of these facilities [10-13].

### **1.1 The status of construction projects in Iran**

The Iranian Parliament Research Center announced in a report published in line with the review of the 2019 budget bill, that it shows the progress of the completion of construction projects during the years 1381 to 1390. During these years, an average of 473 construction projects that should be implemented annually The country was reached alone; in the percentage of the concession, the atmosphere was at the same time, and the percentage of the time was not ended and the cost of 1/8/16,000. Budget laws have been imposed on the country's economy.

This cost is about 75.95 thousand billion tomans, which is considered as the cost of delay in the completion of the projects, which is more than the annual average required to complete the projects, and it is 245% on average. Surplus credit according to the budget law should be allocated to each plan He works until the designs are completed. In simpler terms, any construction plan costs 2.5 times its actual price. which should be seen as the initial budget of the predicted error or the additional cost caused by the effects created during the implementation of the project.

Some reports tell about the existence of 9,800 national construction projects and 45,000 provincial projects that are half finished and are being implemented in the country. Lack of credit has contributed 36 percent to the delay of national and construction projects. Following the problems caused by financial and credit inadequacies, the weakness of executive devices in performing the assigned construction tasks, with 5.8 percent, has been one of the main reasons for project delays.

At the same time, 4.8 percent of the causes of delays in projects are due to contracting problems. This percentage in some ministries, including road and urban development with 3.14 percent, industry, mining and trade with 13.2 percent and the Ministry of Energy with 10 percent, is more than the national average (4.8 percent) [14-16].

## **2. Analysis method**

To analyze the data, after ensuring the normality of the population by Pearson's correlation coefficient, and to obtain the degree of relationship, we have used multiple regression analysis.

The reliability of the questionnaire prepared in this research was obtained by Cronbach's alpha and its significance level is 85.0

## **2.1 Analytical findings**

This type of statistics is about the characteristics and parameters related to the research statistical community and the quality of the relationship between concepts and variables. The main difference between descriptive statistics and inferential statistics is that in descriptive statistics it is not possible to generalize the results obtained from the statistical sample to the entire statistical population of the research, the purpose of descriptive statistics is simply to provide a description of the characteristics of the statistical sample of the research along with the central indicators. and dispersion, while in inferential statistics, the results and findings obtained from the statistical sample can be generalized to the entire statistical population of the research. In other words, the central concept of inferential statistics is generalizability. In which, in order to check the hypotheses and test the research model, simple or bivariate regression, f-test of two independent groups, multiple regression analysis and Cronbach's alpha method were used to calculate reliability coefficients. In addition, a significance level of 0.05 has been considered for all hypotheses [17-20].

## **3. Results**

By using the research, the reasons for the delays in the construction projects of Arvand Free Zone were divided into 6 general spectrums and more than 7 indicators were identified for these spectrums. Then, by asking the experts of the matter and competent specialists, 52 indicators were finally obtained to identify the reasons for the delay in the construction projects of Arvand Free Zone. The identified spectra are as described in the following tables (table no. 1 to 6).

**Table 1. indicators related to (financial factors)**

	Criterion	index
1	Financial factors	Vague and non-transparent financial and economic laws
2		The difference between government approved prices and real prices
3		Inefficiency of financial structures and planning
4		Reduction or lack of access to anticipated resources
5		Lack of sufficient and timely funding
6		Improper budgeting in terms of the amount and time of allocation according to the amount of funds available.
7		Lack of appropriate financial incentives in the employer, consultant and contractor system
8		Excessive savings in the use of financial and human resources.

**Table 2. Indicators related to (manpower)**

	Criterion	index
1		Absence or reduction of the use of specialist forces and other facilities due to issues and Political conditions
2		Not justifying effective and influential people and political and religious leaders of the region regarding Mufid existence as well as the importance and role of the project in the prosperity, progress and development of the region, which not only reduces Their cooperation may be the factor preventing the implementation or delaying the completion of the project will also be
3		The low image of the project organizations (contractor, consultant, employer) among the people of the region
4		Lack of attention to the initial correct estimate of the amounts and volumes of work, human forces, machines and materials. Required for the construction and completion of the project
5		Lack of useful technical experience for the type of project

6	Manpower	The weakening of the will of the project partners due to the concentrated pressure of high-ranking managers or political officials social
7		Neglecting to establish an efficient and effective relationship with specialized scientific institutions for the use of methods and new materials
8		Neglecting the efficient selection of human resources and employing people with insufficient experience or otherwise have similar
9		Low importance of efficient evaluation of human resources
10		Lack of attention to mental health and workplace health

**Table 3. Indicators related to (natural factors and land ownership)**

	Criterion	index
1	natural factors and land ownership	Natural accidents and disasters
2		Poor condition of the project land
3		Difficult ways to access the project
4		Failure to pay attention to the geographical conditions of the region in estimating and predicting the duration of the project
5		Inflexibility of the project plan to environmental conditions
6		Neighboring and being close to military, security and sensitive centers
7		Not owning the land and finding objections during the project

**Table 4. Index related to employer**

	Criterion	index
1		The low image of the contractor, consultant and employer among themselves, which causes skepticism, lack of trust, lack of obedience and responsibility, discontinuity in executive management, inconsistency in implementation and technical issues, creating false obstacles, etc.
2		Lack of trust in the project implementers and social and behavioral indicators of the implementing organization and the project implementer do not match with the standards accepted by the people of the region.
3		Disruption of the popular culture of the people of the region by the executive agents of the project and non-native forces and the contradiction and contradiction of the executive agents of the project with the culture, values and

	employer	ideological foundations of the people of the region during the construction period, as well as the contradiction and contradiction between the ideas, national and ethnic customs and cultural beliefs with the use Project.
4		Failure to draw a logical and correct connection between the elements of the project
5		Lack of timely identification of suitable and optimal resources and mines for the preparation of materials, which increases the cost and time of project implementation.
6		Lack of feasibility and correct planning and correct analysis of the critical path to control the project and prevent delays in implementation by the three factors of the employer, consultant and contractor.
7		Lack of sufficient field research before starting
8		Delay in approval of agendas, maps and meeting minutes by the consultant and employer
9		Selection of inappropriate subcontractors
10		Changing the priority of the project from the point of view of the employer
11		Many defects in the plans and documents of the agreement
12		Constant change of plans and documents and materials by the employer or consultant
13		Lack of attention and lack of understanding and understanding or studying the conditions of the contract, the geotechnical condition of the land, and the maps by the contractor at the beginning of the work and presenting the proposal and concluding the contract
14		Sudden changes in the price of materials and materials or lack of access to necessary and vital machinery at the right time.
15		The lack of transparency of some clauses of the contract, which makes it possible for the contractor to dispute, misappropriate or abuse the created situation.

**Table 5. Indicators related to management issues**

Criterion	index
	Lack of management skills to control the project
	Lack of technical knowledge required for the implementation of large projects by the management
	Lack of meritocracy in the selection of managers
	Lack of attention to collaborative management



management issues	Management's lack of attention to employer and worker issues
	Failure to use the appropriate project implementation and control method
	Failure to provide a suitable and continuous policy to the engineering and project control departments on the part of Management
	Continuous change of managers during project implementation
	Non-attendance of managers and its representatives at the project site continuously

**Table 6. Index related to (factors caused by war)**

	Criterion	index
1	factors caused by war	Existence of unneutralized mines
2		Existence of lands that have not been cleared from war
3		Existence of explosives in the project site that survived the war

In the following, by examining and analyzing the results of the questionnaires, the influence of each spectrum has been calculated as follows.

**Table 7. The variable effect of financial factors in the occurrence of project delays in the studied samples**

statistics	value
Average	16.70
Middle	17.00
fashion	17.00
standard deviation	4.26
Variance	18.22
the least	9.00
the most	26.00

According to the above table, it can be seen that the mean of the variable is 16.70 and its variance is 18.22.

**Table 8. The variable effect of the human force factor in the occurrence of project delays in the studied samples**

<b>Statistics</b>	<b>Value</b>
Average	29.80
Middle	30.00
fashion	29.00
standard deviation	3.59
Variance	12.93
the least	18.00
the most	38.00

According to the above table, it can be seen that the mean of the variable is 29.80 and its variance is 12.93.

**Table 9. The variable effect of natural factors in the occurrence of project delays in the studied samples**

value	statistics
٠٢,٢٠	Average
٠٠,٢٠	Middle
٠٠,٢٣	fashion
٥٢,٢	standard deviation
٣٨,٦	Variance
٠٠,١٥	the least
٠٠,٢٣	the most

According to the above table, it can be seen that the mean of the variable is 20.02 and its variance is 6.38.

**Table 10. The effect of the agent and employer variable on the occurrence of project delays in the studied samples**

value	statistics
36,68	Average
0,37	Middle
0,38	fashion
28,4	standard deviation
34,18	Variance
0,24	the least
0,48	the most

According to the above table, it can be seen that the mean of the variable is 36.68 and its variance is 18.34

**Table 11. The variable effect of management issues in the occurrence of project delays in the studied samples**

value	statistics
25,38	Average
0,20	Middle
0,20	fashion
66,3	standard deviation
46,13	Variance
0,16	the least
0,30	the most

According to the above table, it can be seen that the mean of the variable is 25.38 and its variance is 13.46

**Table 12. The variable effect of war factors on the occurrence of project delays in the studied samples**

value	statistics
78,7	Average
0,8	Middle
0,9	fashion
26,1	standard deviation

٦٠,١	Variance
٠٠,٣	the least
٠٠,١٠	the most

According to the above table, it can be seen that the mean of the variable is ٧٧/٧ and its variance is ٩٠/١

### 3.1 Data normality test

For the normality of the data, two methods of displaying normal distribution analysis, Kolmogorov-Smirnov- and Shapiro, which are similar but have different applications in different sample sizes, can be used.

**Table 13. Tests of Normality**

	Kolmogorov-Smirnov <sup>a</sup>		
	Statistic	df	Sig.
Overall performance	.587	49	0.881

Basically, by performing the Kolmogorov test, we are testing a neutral hypothesis, which is as follows:

Now, according to the above table, we look at the number corresponding to Sig. If this number is smaller than the desired P, usually P=0.05, then we ignore the above hypothesis in favor of the non-normal distribution of the studied variable. But if it is equal to or greater than the P number (as it is equal to 881.0 in the Kolmogorov test and 691.0 in the Shapiro test), then we cannot ignore the above neutral hypothesis (in favor of the normality of the distribution of the desired variable) therefore, the result of the above table means that the desired variable has a normal distribution.

## General regression

**Table 14. The coefficients of the regression equation of the regression test with the dependent variable of project delay**

Model	Not standardized coefficients		Standardized coefficients	T statistic	The significance level
	B	SDT			
Constant	٢٥,٢	٦٢,١		٥٩٢,٩	.../٠
managerial	٠٢٣,١	٠٦٦,٠	٢١٧,٠	٥١١,١٥	...٠
Financial factors	٠٤,١	١٠,٠	١١٥,٠	٦٨,٨	...٠
Manpower	٠٢٦,١	٧٩,٠	٢٤٢,٠	٩٧,١٢	...٠
Natural factors	٠٨,١	١٢,٠	١٥٠,٠	٩٧,٩	...٠
the employer	٠٩٨,١	٦١,٠	٢٠١,٠	٠٤٤,١٠	...٠
war	٠٧٥,٠	٠١٠,٠	٠٧٥,٠	٠٥/٤	.../٠

In Table 14, in column B, beta is presented as a constant value and as an independent variable coefficient. The table of coefficients includes two categories of standardized beta and unstandardized beta coefficients. In non-standardized beta coefficients, the scale of the variables is not the same with each other, while in the standardized beta coefficients, the scale of the variables is the same and it is possible to compare the variables. Therefore, standardized coefficients are used to compare the effect of the independent variable on the dependent variable.

The influence of the coefficients in order are: related to human power (242.0), employer issues (201.0) and managerial issues (217.0), natural factors (150.0), financial (115.0) and war (075.0).

Friedman's test Friedman's test was used to rank the factors and their effect on project delay:

**Table number 15. Average ratings**

Variables	Average ratings
Financial factors	09.2
Manpower	92.4
Natural factors	94.2
the employer	98.5
managerial	07.4
war	00.1

#### **4. Conclusion**

After summarizing and analyzing the points assigned to the indicators related to each criterion and the meetings that were held with the experts and citing the proof of the six hypotheses raised in the previous section, finally the causes of delays in the construction projects of Arvand Free Zone based on priority The impact of the criterion is as follows:

- 1- The employer;
- 2- Manpower;
- 3- Management principles;
- 4- Natural factors;
- 5- Financial factors;
- 6- War factors.

#### **- References:**

[1] Houshmandrad MH, Haghghi MFF, Khodahemmati H. Examining the methods of providing financial resources for large-scale housing massification projects. 6th National Conference on Applied Research in Civil Engineering, Architecture and Urban Management and the 5th Specialized Exhibition of Housing and Building Mass Builders in Tehran Province 2019.

[2] Houshmandrad MH, Beizapour M, Aminzadeh R. Choosing the most optimal type of contract in infrastructure projects from the employer's point of view in the field of technical participation and getting rid of the pressures of liquidity provision. The International Conference on Recent Progresses in Civil Engineering 2017.

- [3] Mobasseri S, Soltani H. Impact of driving style on fuel consumption. *Nature and Science*. 2013:87-9.
- [4] Mobasseri S, Soltani H. Traffic noise and its measurement methods. *Advances in Environmental Biology*. 2014;8:1277-85.
- [5] Mobasseri S. Intelligent Circuit Application for Detecting the amount of Air in Automobile Tires. Iranian Patent, Patent2014.
- [6] Mobasseri S. Intelligent Circuit Application for Monitoring the Employees Attendance. Iranian Patent, Patent2014.
- [7] Mobasseri S, Mobasseri M. A Comparative Study Between ABS and Disc Brake System Using Finite Element Method. *International Conference on Researches in Science and Engineering*. Istanbul University, Turkey2017.
- [8] Houshmandrad MH, Beizapour M, Aminzadeh R. Identifying the necessary indicators to confirm the qualification of the executive contract of infrastructure plans. *5th national conference on applied research in civil engineering, architecture and urban management*2017.
- [9] Houshmand MH. In the selection of the most optimal treaty on infrastructural projects from the perspective of the employer in the field of technical assistance and relief from the pressures of funding. 2017.
- [10] Ahmadi R. Investigating the reasons for the delay of construction projects in Iran and its solutions. Iran: Iran University of Science and Technology (IUST), 2006.
- [11] Parchami M. An analysis of the factors of time and cost changes in dam construction projects and the impact of the employer, consultant and contractor on it. *International project management conference*. Iran2007.
- [12] Report on investigation and elimination of the causes of increase in cost or cost of construction projects. *Planning and Budget Organization*.
- [13] Mirzaei Q. The role and effectiveness of construction regulations in the technical and social development of the country. *Majlis and Research Journal*. 2013.
- [14] Ataei N. The root of problems in government tenders and during execution. *Majles and Research Journal*. 2013.
- [15] Shakeri I. Project management and recognition of the main causes of construction project contractors' claims. *Second International Project Management Conference*. Iran2014.
- [16] Vatankhah R. Investigation of the causes of delay in construction projects: *Tarbiat Modares University*, 2003.
- [17] Irannezhad Parisi M. *Research method in science*. Iran1999.
- [18] Azar AR, Ali. *Applied Decision Making*. Iran: Danesh Publications, 2002.
- [19] Azar AF, Hojjat. *Science of Fuzzy Management*. Iran: Mehrban Publications, 2010.
- [20] Khaki G. *Research method in management*. Iran: Reflection Publications, 2000.