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Assessment of Financial and Physical Constructive Projects of Arvand Free Zone Organization (Abadan-Khoramshahr) by Implementation of Cost-**Benefit Analysis System**

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ABSTRACT

Arvand Free Zone whose establishment has been ratified in the first half of the year 2003 is the second biggest commercial and industrial free zone with an area over 17200 hectares after the Qeshm Free Zone. Among the anticipated goals in this area are the expedition of implementation of infrastructural affairs, development and prosperity, economic growth, investment and growth of public revenue, creation of healthy and reproductive occupations, market and goods adjustment, active participation in global and regional markets, production and export of industrial and manufactured goods, as well as rendering general services. The area consists of three zones including the industrial zone (zone A) covering 8600 hectares, tourism-administration zone (zone B) covering 4800 hectares, and port, warehousing, and transit zone (zone C) covering 3800 hectares, as well as a city service zone. 1 The main goal of this study is the implementation of economic value added management system and cost-benefit analysis of constructive projects of Arvand Free Zone Organization (Abadan - Khorramshahr). Therefore, Economic Value Added Management (EVA) system has been used to control the costs and define periods of financial credits attraction (in Rials and foreign currencies) as well as calculation of physical, scheduler, and financial progress in constructive projects of the organization, and the cost-Benefit Analysis (CBA) method has been used for the financial evaluation of constructive projects during 5 years from 2006 to 2010.

Keywords: Economic value added, cost-benefit analysis system, Arvand free zone, constructive projects operational areas

1. INTRODUCTION

From the national economy development viewpoint, establishment of free zone can ensure freedom of commercial transactions, and expand the flow of the country's industrial development by attraction of human and physical resources. And also from the regional development point of view, it could be a factor to activate the economy of neighboring areas, and speed up the movement of capital, human resource and management to the backward and deprived regions. In fact establishment of free zones is a purposive process to prosper and economically develope the region and pave the way for international commercial transactions, especially in the field of export.²

The process of globalization of economy around the world has been accompanied by many scientific and applied researches. The attainment of development goals is basically impossible without study and research and needs comprehensive scientific development. Numerous studies have been conducted on the establishment and the advantages of free zones in the world. Due to the fact that free zones in Iran are still young and newly established, no comprehensive study and research has been conducted regarding the implementation of the cost-benefit analysis system and economical, as well as financial and physical evaluation of constructive projects of Arvand (Abadan-Khorramshahr) industrial - commercial free zone organization, and it is clear that research in this regard is inevitable in order to reach the defined goals.

Arvand free zone officially started its activity in August 2005. The area is located in the northwest of the Persian Gulf at the junction of Karoon and Arvand rivers covering over 172 km2, and has a shared border with Iraq and Kuwait. The availability of proper industrial backgrounds (special natural and geographical situation), skilled human resource, special cultural capabilities together with mild weather specially in autumn and winter, as well as

³ Rah Shahr Consulting Engineers Group Periodicals, Free and Special Zones Studies. Tehran: 2007.

² Free Zones "Free Zones Journal", 1st year, No. 1, (March 1990), p. 39.

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cultural and tourism attractions, Abadan and Khorramshahr ports, abundant freshwater (Karoon, Arvand, and Bahmanshir), international transport facilities (road, railroad, marine, and aerial) and short distance with neighboring countries are among the unique characteristics of Arvand free zone. This area has incorporated parts of Abadan and Khorramshahr cities which have appropriate industrial, commercial and tourism infrastructures, and enjoys a privileged situation in comparison with other free zones in the country. Regarding the huge volume of investment, complexity of the involved systems, and the need for a systematic and changing relation between executive factors, the review and analysis of the situation, and compiling management systems are in a direction to create a comprehensive, technical, economic, and coordinated view. Since active contractors in constructive projects of Arvand free zone organization are operating in A, B, and C zones, therefore it is tried to use the two methods of economic value added management system and cost-benefit analysis system in order to implement the cost-benefit system of constructive projects of Arvand free zone organization. Hypotheses are:

- 1. If this system is carried out, programming, timing, supervising and controlling are done in the optimal way in constructive projects of Arvand Free zone Organization (Abadan-Khoramshahr).
- 2. Projects managers should have the necessary knowledge for harmony and making connection between organization members (executive and staff)
- 3. There are appropriate connection between projects managers and executives managers of organization different parts.
- 4. The personal of executive units can report to their managers and projects managers. Research objectives are:
- 1- The scientific goals of this research consist of using necessary technical knowledge, skills, means and techniques in managing project executive process to remove administrator's needs and expectations of doing them.

This research method can be located in trading –industrial Free Zone of country especially in Arvand Free Zone Organization due to programming importance in opportune prove of projects and proposal goals for quick and appropriate advance of various projects of these Zones and can be resolved the important management issues in decision making of honorable responsible of Arvand Free Zone Organization. Implementation of cost-benefit system is appropriate for optimal executive of constructive projects from time, cost and quality view.

- 2- The presentation of programming and guidance of constructive projects their relation with each other should be in a way that provides desirable goals.
- 3- Acquaintance of projects managers should be conformed to the description of given executive duties and responsibilities such as work performing way, required preparations, sources benefits and projects timing.
- 4- Documentation, keeping and transferring of project knowledge experiences of Arvand Free Zone Organization and using it in similar projects of other Free Zone Organizations such as Kish, Qeshm, Aras, Chabahar and Indonesia is useful.

2. RESEARCH METHODOLOGY

The study of estimate methods and information collection style is in library-documentary way. Two methods of economic value added management and benefit-cost analysis system are used for analyzing research information. Also Comfar, Msproject and Primavera software's packages are used a lot.

2.1. In method of economic value added management

In this method, constructive projects state of Arvand Free Zone Organization and their future forecasting is studied on the basis of concrete and mechanized system of programming by using applied soft wares such as Msproject and Primavera for calculating physical, financial and chronological progresses in parts and zones.

2.2. In method of benefit-cost analysis:

Assessment standards in benefit-cost method have two main and important approaches including accounting and discounted cash flow approaches. Accounting approach contains two standards of capital return period and investment output and discounted cash flow approach includes four standards of discounted capital return period, net present value, internal rate of return and profit index which we will explain in detail:

- 2.3. Accounting approach contains these following standards:
- 2.3.1. Standard of capital return period (payback period)

Analyst by using this method is seeking time or period which the initial capital can be compensated by annual incomes. (Breakeven point) Flow of founds values from base period are counted up for payment period counting. (Funds accumulation) when accumulated amounts reach to zero from negative, it is called capital return period. If the accumulated amounts change from negative to positive, it is considered capital return period through internal finding between negative and positive amounts. Generally the proposal is better which has smaller capital return period.

2.3.2. Investment output standard

Investment profit is studied in this standard. This standard is called accounting rate of return (ARR) and also average of investment output (AROI). To calculate this standard, the average of annual incomes is divided by total investment so the average of investment output is obtained.

2.4. Discounted cash flow approach contains four standards

2.4.1. The standard of discounted capital return period

This standard is not different from the first standard for the purpose of concept which is introduced in the previous part and also provides information about capital return period. Counting method of this standard is as the preceding method. But money temporal value is considered in this standard and calculations are done on the basis of discounted data.

2.4.2. Standard of net present value

The purpose of net present value is the value sum of total incomes costs of project financial process. The procedure is in this way that income and cost flow of favorite investment project during different years is provided as a table on the basis of first information:

It is necessary to mention that present net value is the same present value of resulted profits sum along project life or discounted present value (PDV) therefore through done calculation; we obtain one of these three conditions.

- If discounted project life is larger than zero PNV>0 the result is investment has economic explaining.
- If discounted project value is smaller than zero NPV<0 the result is investment has not economic explaining.
- If discounted project value is equal to zero NPV=0 the result is economic profit of investment is equal to zero.

2.4.3. Internal rate of return standard (IRR):

Internal rate of return which is also called marginal efficiency of investment consists of discounted rate that in exchange of it, the present net value is equal to zero. Namely internal rate of return shows the profit rate, so if the investment is done in that profit rate, project result will be zero economic profit for investment.

I=IRR, NPV=0, IRR=Internal Rate of Return

Now for investment or not investment by using internal return should decide, if the investor borrows and invests in that profit rate, he will not take economic profit. Therefore if:

- 1- The project has an economic explaining for performance. i<IRR, NPV=0
- 2- The project does not have economic explaining for performance. i>IRR, NPV=0
- 3- Present net value of the project will be equal to zero. I=IRR, NPV=0

For counting IRR, we should solve the below equation that is NPV formula, according to IRR:

There are two possible ways for solving above questions, one is error experience and the other is graph drawing. In error experience, first amount is guessed for IRR, if NPV becomes positive with this amount, the guessed IRR amount should be increased and NPV should be calculated again. Error and experience is repeated to the extent that negative amount is resulted for NPV. In graph drawing method, first we calculate NPV according to various discount rates several times. Then we draw the calculated NPV amounts in front of their corresponding discount rates and pass a line through the dots. In meeting point of mentioned line with horizontal line which passes through NPV=0, IRR is obtained.

2.4.4. profit index standard

One of the weak points of IRR and NPV is that these two techniques can't reflex the first investment volume and in this direction, profit index standard is introduced as a standard for assessing profit. We use the division of present value of future cash flow on investment present value for calculating this index. The profit index formula (PI) is as follows:

PI= Profit Index

This index shows that how much economic profit will be obtained during project life in exchange of every money unit for investment proposals. Evidently every project which has more profit index, it has more priority to perform.

3. RESULTS

The results of this study are divided in two important categories as follows.

The general progress of Arvand free zone organization until the end of January 2011 is 69.81% in comparison with 95.14% of the plan and 69.01% of financial attraction. The total number of constructive projects of the organization is 184 projects with the contractual value of 1891187 million Rials and duration of around 69 months from 30-07-2006 to 19-4-2012. Of all constructive projects of this organization 134 projects have been completed which include 11 projects in the year 2007, 42 projects in the year 2008, 57 project in the year 2009, and 24 projects in the year 2010; two projects have been cancelled, and 48 projects are underway. An amount of 1305218 million Rials has been paid so far through the latest financial statement which equals 69.01%. With reference to that it could

be seen that there is totally 25.33% delay compared to the plan, and 8% difference between the physical progress and financial payment. This minor difference is the result of precise control of financial statements of the organization's constructive contractors. The comparison of physical progress percentage with plan progress percentage shows that the cumulative procedure was 73.4% which has a 26.6% delay in comparison with the desired situation. Therefore it could be seen that with this procedure, at least 20 months would be needed for the completion of projects in this area and according to the completion date of this organization's constructive projects it will extend until September 2012. With a financial comparison between primary value of the contract and the price of the latest paid financial statement in constructive projects of Arvand free zone organization's operational area it could be seen that the highest amount paid is related to the B operational area and the highest percentage of payments is related to the A operational area. The biggest difference between the percentage of progress and the plan in constructive projects relates to the B operational area, and the lowest difference relates to constructive projects of A operational area. It is also seen that in A operational area the payment of financial statement is about 6.38% more than the physical progress percentage, and in C operational area the physical progress is 8.82% more than financial payment and the best situation of financial control relates to constructive projects of B operational area. Most completed development projects and projects underway are in B operational area and the lowest number of constructive projects underway relates to the C operational area.

In the industrial area (A) of Arvand free zone the total numbers of constructive projects are 28 projects with the contractual price of 336316 million Rials and duration of about 51 months from 11-2-2007 to 2-5-2011. The physical progress of constructive projects in this area until the end of January 2011 equals 77.8% in comparison with 97.6% of the plan. The amount of deviation from the plan was 19.79% and the amount of financial attraction according to the latest paid financial statements is 84.18%. Of the total number of development projects in this area, around 20 projects have been completed which include 8 projects in the year 2008, 10 projects in the year 2009, and two projects in the year 2010; one project has been canceled and 7 projects are underway. An amount of 283124 million Rials has been paid so far through the latest financial statement which equals 84.8%. With reference to that it could be seen that there is totally 19.79% delay compared to the plan, and 6.38% difference between the physical progress and financial payment, which is the result of the prepayment made to the executive contractors. The comparison between physical progress percentage with the plan progress percentage shows that the cumulative procedure was 79.7% which has about 20.3% delay in comparison with the desired situation, therefore it could be seen that with this procedure at least 10 months would be needed for the completion of the projects in this area, and thus the completion date of the projects in this area will extend until November 2011 with a six month delay.

In the tourism-administration (B) area of Arvand free zone the total number of constructive projects are 123 projects with the contractual price of 1161125 million Rials and duration of about 66.5 months from 8-7-2006 to 20-1-2012. The physical progress of constructive projects in this area until the end of January 2011 equals 66.36% in comparison with 94.82% of the plan. The amount of deviation from the plan was 28.45% and the amount of financial attraction according to the latest paid financial statements is 65.94%. Of the total number of constructive projects in this area, around 99 projects have been completed which include 11 projects in the year 2007, 32 projects in the year 2008, 42 projects in the year 2009, and 14 projects in the year 2010, and 24 projects are underway. An amount of 765625 million Rials has been paid so far through the latest financial statement which equals 66.5%. With reference to that it could be seen that there is totally a 28.45% delay compared to the plan, and 0.42% difference between the physical progress and financial payment. This shows the precise control of the paid financial statement according to the percentage of physical progress. The comparison between physical progress percentage and the plan progress percentage shows that the cumulative procedure was 70% which has about 30% delay in comparison with the desired situation, therefore, with this procedure at least 20 months would be needed for the completion of the projects in this area, and thus the completion date of the projects in this area will extend until September 2012 with an eight month delay.

In the port, warehousing, and transit (C) area of Arvand free zone the total number of constructive projects are 17 projects with the contractual price of 298633 million Rials and duration of 56.5 months from 8-7-2007 to 19-4-2012. The physical progress of constructive projects in this area until the end of January 2011 equals 72.48% in comparison with 93.44% of the plan. The amount of deviation from the plan was 20.96% and the amount of financial attraction according to the latest paid financial statements is 63.66%. Of the total number of constructive projects in this area, around 11 projects (64.7%) have been completed which include 3 projects in the year 2009 (17.6%), 8 projects in the year 2010, and six projects are underway. An amount of 190112 million Rials equal to 63.66% has been paid so far through the latest financial statements. With reference to that it could be seen that there is totally a 20.96% delay compared to the plan, and 8.82% performance more than payments made to the constructive contractors in this area which could be the result of fulfillment of affairs without informing the supervision body, or without any minutes, that results in partial payment, and is probably included in calculation of

contractors' progress, or performing some activities without reflecting in financial statement, or making mistakes in the input of data in the system whether regarding the weight of activities, or physical progress weight of individual activities of projects. The comparison between the physical progress percentage and the plan progress percentage shows that the cumulative procedure was 77.6% which has about 22.4% delay compared to the desired situation, therefore it could be seen that with this procedure the completion of projects in this area will extend until April 2012.

In the projects shared between the areas (A, B, C) of Arvand free zone the total number of constructive projects are 16 projects with the contractual price of 95113 million Rials and duration of 38.3 months from 12-3-2008 to 20-5-2011. The physical progress until the end of January 2011 equals 75.20% in comparison with 95.76% of the plan. The amount of deviation from the plan was 20.56% and the amount of financial attraction according to the latest paid financial statements is 69.74%. Of the total number of projects in this area, 4 projects have been completed which include 2 projects in the year 2008, and 2 projects in the year 2009; one project has been canceled in the year 2010, and 11 projects are underway. An amount of 66330 million Rials equal to 69.74% has been paid so far through the latest financial statements. With reference to that it could be seen that there is totally 20.56% delay compared to the plan, and 5.46% performance more than payments made to the development contractors and performers which could be the result of fulfillment of affairs without informing the supervision body, or without any minutes, that results in partial payment, and is probably included in calculation of progress, or performing some activities without reflecting in financial statement, or making mistakes in the input of data in the system regarding the weight of activities, or calculation of physical progress. The comparison between the physical progress percentage and the plan progress percentage shows that the cumulative procedure was 78.5% which has about 21.5% delay compared to the desired situation, therefore it could be seen that with this procedure the completion of activities in this section will extend until 7-10-2011.

Reviewing the performance indices of constructive projects in the operational area (A) shows that from among 28 constructive projects in this area, only 7 projects are underway, and the rest are completed. Reviews and calculations conducted on the basis of the information and statistics of the projects underway in the industrial area show that Tornab Pardazesh Ammar Rahsazan Pishro Abadan, Fardj Rah Shadegan, and Bargh-o-Electronic companies have had a better performance compared to other contractors, and it is estimated that their executive activities will be completed within the set period. However, the performance of Forcement, Sakhtemani Band, and Ammar Rahsazan Pishro Abadan has been weaker than other contractors and most probably the completion of the projects by these contractors will face a long delay.

Reviewing the performance indices of constructive projects in the operational area (B) shows that from among 123 constructive projects in this area, only 24 projects are underway, and the rest are completed. Reviews and calculations conducted on the basis of the information and statistics of the projects underway in the tourism - administration (B) area show that Rahsazan Garmsir, Azarsandj Jonoob, Talashkaran Sanat Sinad Abshar Zarrin Shivand, Gharargah Khatamol Anbia, Ista Beton Saze, Taze Sanat Sangsar, Sarir Sazan Ferdos companies, have had a better performance compared to other contractors, and it is estimated that their executive activities will be completed within the set period. However, the performance of Sahandazar S-white, Poolad Mechanic, Kosaran Novin Abadan, Serat Khuzestan, Eilrah Jonoob, Fonoon Karkhe, Tehran Yasan, Javid Saz Jonoob, Omran Saze Arand, Shahrdari Minooshahr companies has been average compared to other contractors and there is the probability of delay in the completion of the projects. The performance of Band constructioncompany, Shahb Sakht Esfahan, and Koosha Mahan Ahwaz company has been weaker compared to other contractors and most probably the completion of projects by these contractors will face a long delay.

Reviewing the performance indices of constructive projects in the operational area (C) shows that from among 17 constructive projects in this area, only 6 projects are underway, and the rest are completed. Reviews and calculations conducted on the basis of the information and statistics of the projects underway in the port - warehousing - transit (C) area show that Fazakaran Sanat Company had a better performance compared to other contractors, and it is estimated that its executive activities will be completed within the set period. The performance of Markaz Minzodayee Sepah, Ista Beton Sazeh, and Bonyan Omran Pars Company was average compared to other contractors and there is a possibility of delay in the completion of projects. The performance of Omran Karan Khuzestan is rather weak compared to other contractors and most probably the completion of the projects by this contractor will face a long delay. Mahak Gostar Khuzestan and Eskele Abgir companies have not started operation in Arvand free zone yet.

Reviewing the performance indices of joint projects between the areas (A, B, C) shows that from among 16 joint projects in this area, 11 projects are underway, and the rest are completed. Reviews and calculations conducted on the basis of the information and statistics of the joint projects underway in the areas (A, B, C) show that Imen Parto Armin, Sanat Tadbir Dorak, Setareh Mohajerin Bandar, Setareh Ghaem Abadan, Shahrdari Korramshahr,

Azhand Sazan Zagroscompanies had a better performance compared to other contractors and it is estimated that their activities will be completed within the set period. The performance of Etesalat va Looleh Poly Etilen Abadan (LPA) and Farzadgan Keshavarzi was average compared to other companies and there is the possibility of delay in the completion of operation. The performance of Fanavar Plastic Sepehan is rather weak compared to other contractors and most probably the completion of operation by this company will face a long delay. Avan Saze Zagros company has not received any payments yet, although it has a very good physical progress according to the plan.

4. Conclusion

According to the statistics of Arvand free zone in the year 2010 the manpower count of this organization in the contractor section is 266 persons including 40 persons with educations of under diploma, 64 persons holding diploma, 29 persons holding associate certificates, 118 persons holding bachelor's degrees, 14 persons holding the master's degrees and one person holding a PhD degree. About 60.9% of the employed persons in this organization have academic educations. The total number of manpower working in different parts of Arvand free zone organization is 6243. Considering the statistics of urban and rural population of Abadan and Khorramshahr it could be seen that the organization have had a share of 1.14% in the employment of Abadan and Khorramshahr.

Calculations on constructive projects of Arvand free zone operational areas show that the payback period is 5 years which seems to be desirable regarding the prospect plan and missions of the organization in 2026 (in 20 years).

Calculations on the current net value of constructive projects of Arvand free zone operational areas show that 0< NPV ratio is applied to all operational areas. It is therefore concluded that investment in this organization is economically justifiable.

Calculations show that internal rate of return of constructive projects in Arvand free zone operational area equals 29%.

The cost-benefit proportion calculated for constructive projects of the organization's operational areas equals 1.2 and 1< B/C ratio applies to all areas which is indicative of economic activities of constructive projects in this organization.

According to the calculations, the current total net value of the capital is 4,050,055 million Rials, break-even point is 14.29%, and the internal rate of return of investments is 29% (IRR).

The sensitivity analysis of constructive projects located in operational areas A, B and C and the joint area of Arvand free zone shows that the greatest amount of cost deviation relates to B operational area and the lowest amount relates to the joint area (city services). constructive projects located in B operational area are therefore of higher risks compared to the projects in other areas due to higher standard deviation. In terms of risk, cin the A operational area are in the second place and development projects in the C operational area are in the third place.

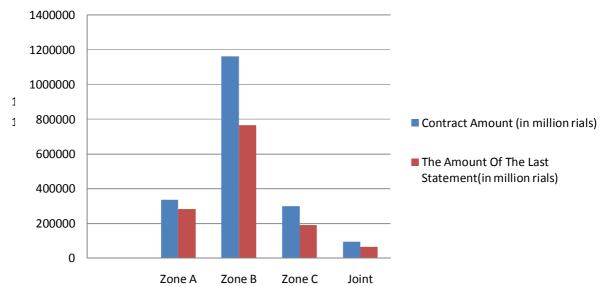


Figure 1: Financial Comparative bar Geraph of Operation Zones

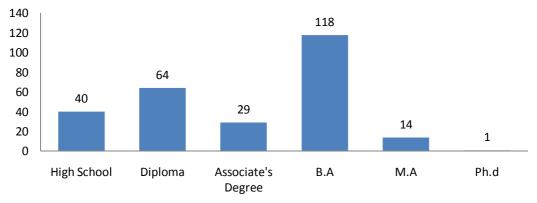
120 99 100 80 60 40 24 20 20 11 11 0 0 Zone A Zone B Zone C Joint

■ The Projects Cancelled

Figure 2: Comparative Bar Graph of Construction Projects Completed, Construction Projects Cancelled and Construction Projects Underway In Operational Zones



■ The Projects Underway



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