A FEASIBILITY STUDY FOR THE INVESTMENT PROJECT ON BATTERY PRODUCTION INDUSTRY

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ABSTRACT

The investment projects are one the most important tools of economic development. In general, the investment project is defined as the suggestions made for creating new opportunities expansion and development with the aim of increasing the production of goods and services in a specific time period. So, they have to be analyzed very carefully before they are realized. Feasibility study is the most important part of the techno-economic, financial and economic analyses of the investment project. The aim of this paper is to propose a systematic project analysis process and by using this process to conduct a feasibility study in a real investment project on battery production industry.

Keywords : Feasibility study, Investment projects, project management

AKÜ ÜRETİM ENDÜSTRİSİNDE BİR YATIRIM PROJESİ İÇİN FİZİBİLİTE ÇALIŞMASI

ÖZET

Yatırım projeleri, ekonomik kalkınmanın en önemli araçlarından biridir. Genel anlamda yatırım projesi, belirli bir zaman süresi içinde, mal ve hizmetlerin üretimini arttırmak için, bazı olanaklar yaratma, genişletme ve geliştirmeye yönelik öneriler olarak tanımlanabilir. Dolayısıyla, yatırım projeleri gerçekleştirilmeden önce çok dikkatli bir şekilde analiz edilmelidirler. Fizibilite etüdü, yatırım projelerinin tekno-ekonomik, finansal ve ekonomik analizlerinin en önemli bölümüdür. Bu makalenin amacı, sistematik bir proje analiz süreci sunmak ve bu süreci kullanarak akü üretim endüstrisindeki gerçek bir yatırım projesi üzerine fizibilite etüdü yapmaktır.

Anahtar Kelimeler : Fizibilite etüdü, yatırım projeleri, proje yönetimi

1. INTRODUCTION

The main purpose of economic activities and economic science is to overcome the shortage between the requirements and the economic sources. Because of limited economic sources and existing alternative usage areas of them, the decision maker must decide about the subject that how and where he/she should use these sources. Therefore, the main problem, which should be solved, is the selection and decision between the alternative usage areas of the sources to obtain the best and the most effective result.

The deficiency of the economic sources compels the countries and the companies to use their sources by the best way and to get maximum profit from them. For that reason, the investment alternatives, which will get the best and maximum outcome with existing sources, should be determined and also it obviously should be made selections and the concrete data related with the future of the investment should be provided.

The term "invest" is simply an order for the prospective investor to enter into the *investment process,* which consists of several interrelated steps. An investor, in this process, will perform the following tasks: identify investment alternatives, evaluate the risk/return characteristic of each of the identified investment alternatives, select investment alternatives, form a portfolio which reflects his/her risk/return preference and monitor and modify his/her portfolio constantly [1].

As mentioned, the economic, technical and financial studies have to be made before deciding to make the investment for providing the data about the future of the investment. All of these studies are called as *feasibility study***.**

The aim of this study is to propose a systematic project analysis process and to conduct a feasibility study in a real-life investment project on battery production industry.

2. INVESTMENT PROJECT CYCLE

The investment project is the plan to realize the specific activities with minimum cost and to obtain the maximum benefit at the end of these activities.

Morris and Hough [2] describe the activity sequence of project cycle as follows: "every project, no matter of what kind or for what duration, essentially follows the activity sequence of pre-feasibility/feasibility, design and contract negotiation, implementation, handover and in-service support.“

The development of an industrial project from the stage of the initial idea until the plant is in operation can be shown in the form of a cycle comprising three distinct phases; The Pre-investment, the Investment, and the Operational Phases.
The pre-investment phase comprises several stages; the first stage is the identification of investment opportunities (opportunity studies); the second is the analysis of project alternatives and preliminary project selection as well as project preparation (pre-feasibility and feasibility studies); and the third stage is project appraisal and investment decisions (appraisal report).

The investment or implementation phase of a project provides wide scope for consultancy and engineering work, first and foremost in the field of project management. The quality and dependability of the project are more important than the time factor in pre-investment phase. However, the time factor is more critical in order to keep the project within the forecasts made in the feasibility study in the investment phase.

The problems of the operational phase need to be considered from both a short and a long-term viewpoint. The short-term view relates to the initial period after commencement of production when a number of problems may arise concerning such matters as the application of production techniques, operation of equipment or inadequate labor productivity owing to a lack of qualified staff and labor. The long-term view relates to chosen strategies and the associated production and marketing costs as well as sales revenues. These have a direct relationship with the projections made at the pre-investment phase [3].

3. FEASIBILITY STUDY

Feasibility Study is a controlled process for identifying problems, opportunities or mandates, determining objectives, describing current situations and successful outcomes, and assessing the range of costs and benefits associated with several alternatives for solving a problem. It deals with the techno-economic, financial and economic analyses of the investment project [3], [4].

Goodman [5] defines feasibility study as the process of determining whether the project can be implemented and describes appraisal as the evaluation of the ability of the project to succeed. He claims that projects will proceed to the feasibility stage only if decision makers find them desirable.

The components of the feasibility study are; market analysis, raw materials and supplies, location, site and environment, engineering and technology, organization and overhead costs, human resources and project implementation schedule.

The last step of the feasibility study is financial analysis. Financial analysis is the core of project evaluation. Financial analysis aims to estimate the necessary investment amount in order to realize the project and the obtained income from the necessary establishment expenses which are made during the economic life of the investment in the next period after the start of the production and according to these estimations, financial analysis aims to determine the achievement degree by evaluating the investment suggestions. The income-expense and fund flow table, which is prepared after financial analysis, provides a great easiness for the project evaluation.

4. EVALUATION OF INVESTMENT PROJECTS

The companies must make selection from several investment project alternatives and arrange their selected alternatives. There are various methods to do this. They are classified into two groups. The first group is defined as discounted methods which care the time value of the money and the second is defined as undiscounted methods which do not care the time value of the money.

In discounted methods, it is accepted that the value of the money can change according to the effects of inflation etc. by the time passed. The discounted methods are; Net Present Value (NPV), Internal Rate of Return (IRR), Benefit-cost Ratio and Discounted Payback Period methods. The undiscounted methods are the Payback Period Method and Some various types of ratios. The ratios, which are most frequently used, are Long-term Debt-Equity Ratio, Current Ratio, Debtor-creditors Ratio, Output-Capital Ratio, and Net Present Value Ratio. For a detailed study on project evaluation methods, the reader can refer to Sotelino and Gustafson [6], Jovanovic [7], Weston et al. [8], and Wedley et al. [9].

4.1. Evaluation of Inflation Risks

Inflation can be defined as rapid and continuously increases of the general level of the prices and the costs. The monetary comparison and the value comparison between periods will be more difficult because of the inflation. So, the inflation increases risk and uncertainty. The question as to whether and when to use constant or current (inflated) prices in financial analysis. It has been shown that for the evaluation of net cash flows and the profitability of the project, inflation effects may be ignored, provided the relative prices of the major project inputs and outputs are likely to remain constant for the project lifetime. However, if relative prices are likely to change (for example, in the costs of labor, imported goods and services), the sensitivity of the projected cash flows to such inflation effects should be analyzed in the feasibility study. For further discussion, see Eski [10] and Sarıaslan [11].

5. APPLICATION

This application has been done in İnci Exide Battery Industry Inc., which is a firm activating in the battery production sector, in the year of 2003. The aim of this study is to determine the feasibility of producing the lead raw material in the own manufacturing plant instead of purchasing from outside.

5.1. Opportunity and Pre-feasibility Study

(i) Project Conception

There are many types and properties of batteries produced in Inci Exide Battery Industry Inc. One of the raw materials used to produce battery is lead metal. The company is used to buy the lead from outside of the firm until this time. However the amount of the lead usage increased by the same ratios with the sales. Because of that, the company decided to investigate that if it is meaningful to produce the lead, which will use in the production of battery, in a new establishment they will construct. Therefore, it is necessary to make a feasibility study to determine the establishing a new lead manufacturing plant will be feasible or not.

There are three project alternatives determined for the company. These are to provide the lead raw material from outside as the firm did until this time, to find another lead supplier which have lower unit price and to establish a manufacturing plant to produce the lead raw material, respectively.

(ii) Initial Selection Among Alternatives

The second alternative has been analyzed firstly to decide which project alternative will be accepted. The results show that there are not many suppliers the company provides lead from, and the unit prices of these suppliers are almost the same. Also the company is pleased with the present supplier and they think that it will have so much risk to deal with a new lead supplier because of quality level. In this situation, the second alternative is eliminated.

Therefore it will be investigated whether it is feasible to establish a new manufacturing plant to produce lead raw material. In order to solve this problem, it is decided to make feasibility study for a new investment decision.

(iii) Opportunity Study

All of the production factors except one can be obtained easily in the new establishment. Arsenic is the only production factor that has problems in its obtainment. This factor is in the government control because of its characteristic properties. However it is expected to obtain this production factor when it is necessary. As the result of the investigations, it seems that there are not important changes in the costs of production factor. So, cost components will be specified better.

The large amount of the products, which will be produced in the new establishment, will be used in Inci Exide Battery Industry Inc. The product of İnci Exide, battery, has a continuously increasing demand, since the firm has become the main battery supplier of some automotive companies. So by the increasing battery demand, it is expected that the demand of the products of the new establishment will increase, too.

There is not any other raw material that substitute with the lead raw material in the production of battery. However, as the results of technological changes, even the new substitute products occur, the structure of the establishment will be flexible enough to stand by these changes.

There are not many companies in the same industrial sector with the new establishment. The existing companies are in middle or small sizes. For that reason, the planned production quality and the technological structure of the establishment will be enough to get over their competitors.

Since above definition of new plant is in conjunction with the Inci Exide's policy and mission, it is worth doing a feasibility study on it.

5.2. Feasibility Study

The subject of the investment is to establish a new manufacturing plant with the aim of producing three types of lead as COS Lead, Grid Lead and Pure Lead. It is planned to produce totally 60 tone of lead per day including; 10 tone of COS Lead, 10 tone of Grid Lead and 40 tone of Pure Lead. The company will be incorporated.

The economic life of the plant is accepted 10 years because of the characteristic of investment, legal amortization periods and quick technological developments. The company will start to establish the new manufacturing plant in 2003 and it is planned that it will be finished at the beginning of 2004. This project can benefit from the incentives of; Custom Duty-Fund Exemption, VAT Support, Investment Reduction, Tax and Charges Exemption and Construction Expenditure Exemption, investment and establishment credits.

1. Step : Market Analysis

The main usage area of lead is the production of battery. In Table 1, the usage areas of metal lead are shown according to the average values;

Table 1. The Usage Areas of Metal Lead.[12]

Usage Area	Consumption Rate (%)
Production of battery	60,0
Wire isolation	5,5
Roll and other products	8,0
Ammunition	2,5
Alloys	4,0
Chemical Materials and pigments	13,0
Gasoline Contribution	3,0
Other	4,0
Total	100

The consumption of lead for lead-acid batteries is 2/3 of total lead consumption. 2/3 of this amount returns as secondary sources. The metal lead is only produced by melting the scrap lead. This method is called as *secondary production***.** So, the battery scrap is the biggest and the most important sources after the lead ores for the metal lead production. However, the metal lead producing by operating the battery scrap is not enough yet. In our country, metal lead is obtained from the secondary production. The production amounts of metal lead in Turkey are shown in Table 2. Sub Commission of Metal Mines of The State Planning Organization could not reach to the data of subsequent year.

Table 2. Production of Metal Lead in Turkey.[13]

Years	Production amount (*1000 tone)
1992	5.1
1993	5.0
1994	4.0
1995	5.1
1996	2.9

Domestic consumption is completely based on metal lead. The domestic consumptions of metal lead between 1990-1996 are shown in the Table 3.

Table 3. The Domestic Consumption of Metal Lead (tone).[12]

Source	1990	1991	1992	1993	1994	1995	1996
Secondary production	11.000	8.500	10.500	?	8.735	861	13.438
Temporary Exportation	6.200	6.400	5.600	5.133	2.262	3.857	6.556
Importation	13.700	18.900	15.500	28.304	23.103	31.772	16.506
Total Consumption	30.900	33.800	31.600	?	34.100	36.500	36.500

There is not any manufacturing plant produces metal lead from the lead ore in Turkey. However, there are some small firms, which obtain the metal lead by using the scrap sources like battery producers. If the rational distribution of consumption areas is considered, it can be seen that the metal lead necessity for the production of battery is taken in the first place by 60%. On the other hand, by considering the technological developments in battery production, it is assumed that this ratio will decrease and the ratio of the annual metal lead consumption in battery production sector will be 35-40% of the total metal lead consumption. According to this data, in present conditions, the amount of the metal lead importation, which is 20.000 tones today, will remain the same in the future.

The metal lead production amount of Turkey is not enough for the domestic metal lead consumption. So there is a large amount of importation of metal lead types. Therefore, it seems that the producer companies in this sector are not sufficient. It is expected that the demand of the metal lead will increase in the future. So, today, the metal lead industry of Turkey still needs the new establishments, since the companies in this sector can not meet the existing demand. According to the market analysis, to establish a new metal lead manufacturing plant seems to be a right decision.

The annual present metal lead requirement of Turkey is about 36.000 tones. 35% of the annual metal lead consumption is realized from the secondary production. The obtained metal lead by the way of temporary exportation is only 15% of the total consumption and 50% of the annual metal consumption requirement must be obtained by importation. The estimated demands of the metal lead in Turkey for the next ten years are shown in Table 4.

Table 4. The Estimated Demands in Turkey for the Next Ten Years

Years	**Estimated Demand of Metal Lead (tone)**
2003	37.200
2004	38.000
2005	38.800
2006	39.600
2007	40.500
2008	41.250
2009	42.000
2010	42.800
2011	43.700
2012	44.550

2. Step : Raw Materials and Supplies

There are three types of products will be produced in the new establishment. The raw materials of these products, their amounts of usage and unit prices have been determined. The auxiliary materials according to usage places can be listed as follows; acid is used in Crushing Department, coal, iron, soda water and gear oil is used in Rotary Furnace Department. The factory supplies are; spanner set, wrench, cable, conductor, pipe spanner, cleaning materials, paints, etc.

3. Step : Location, Site and Environment

Investors think two alternative locations for establishing the plant. First alternative is establishing a manufacturing plant in Manisa Industrial Zone, which the investor firm İnci Exide settled in, too. Second is establishing a manufacturing plant in Aegean Free Zone in İzmir by considering the lower taxes and similar advantages. In order to select the optimum location of the establishment, *The Factorial Comparison and Weighted Method* has been used. After applying this method, the new manufacturing plant has been decided to establish in Manisa Industrial Zone. Because this place has the highest weighted factor point.

4. Step : Engineering and Technology

In this section, the points that should be considered are; plant description, utility requirements, product specification and production capacity, equipment and part supply plans.
Engineering and Technology section starts with the plant description. Plant description includes process flow diagram and plant layout. So, firstly they were found. The plant is going to use electricity, water and LPG. The utility requirements of the plant were determined from the suppliers of machinery and equipment. Then, the specifications of the products were determined after a market survey conducted by the marketing department.

The establishment will work 300 days in the year and each day it will work 24 hours by 3 shifts. The planned production capacity of the new establishment at 100% level of used capacity (full cap.) is 3000 tone/year of COS Lead, 3000 tone/year of Grid Lead and 12.000 tone/year of Pure Lead.

All of the machinery and equipment will purchase from the domestic sources. So, *the equipment supply plan* of the plant includes only domestic suppliers. However, there are two materials, tin and selenium, purchased from foreign suppliers.

5. Step : Organizational Structure of the Establishment

The organizational structure of the establishment has been determined. This structure has been obtained according to the investors' opinion and their proposal. After the beginning of the manufacturing activities, the organizational structure will be able to be revised.

6. Step : Human Resources

The human resource requirements at various levels and during different stages of the project must be defined, as well as their availability and costs. The total human resource requirements for the establishment have been determined as 86 people.

7. Step : Implementation Planning

Orders of machinery and equipment and construction of building are going to be given at the same time. Suppliers of machinery and equipment propose six-month lead time. At the end of sixth month, both the manufacturing machinery and equipment and the building are going to be finished.

Transportation of machinery to the site will take two months. During this time the workers are going to be trained. Starting with the ninth month, installation of machinery and equipment and trial runs will be performed. This will take additional three months. As a result, one year after the start up, the mass production is going to start.

8. Step : Financial Analysis

All calculations are based on year 2003.

(i) Calculation of the Total Investment Amount

The total investment amount contains the total fixed capital investment and working capital. So, firstly the total fixed capital investment and working capital will be determined. The fixed capital investment costs table can be formed as follows.

Table 5. The Fixed Capital Investment Costs of the Establishment.

INVESTMENT COSTS ITEMS	**AMOUNT (TL)**
1. Land Cost	512.000.000.000
2. Analysis and Project Costs	38.357.550.000
3. Arrangement of Land and Dwellings	10.147.500.000
4. Building-Construction Costs	1.014.750.000.000
5. Main and Auxiliary Machinery and Equipment	1.408.960.000.000
6. Import and Custom Costs	---
7. Transportation and Insurance Costs	28.179.200.000
8. Assembling Costs	84.537.600.000
9. Vehicle Costs	150.000.000.000
10. Starting of Production Costs	21.134.400.000
11. General Costs	30.000.000.000
12. Custom Tax and Charges	---
13. Other Expenses	---
TOTAL FIXED CAPITAL INVESTMENT	3.298.066.250.000

The annual establishment costs must be determined for calculating the working capital. Therefore, the annual establishment costs at full capacity of the establishment have been presented in Table 6.

Table 6. The Annual Establishment Costs at Full Capacity.

Expenses	**The ratio of fixed / variable costs**	**Amount (*1000 TL)**	**Fixed Costs (*1000 TL)**	**Variable Costs (*1000 TL)**
1. Raw Materials Costs	0 / 100	8.604.255.600	---	8.604.255.600
2. Auxiliary Materials and Factory Supplies Costs	0 / 100	30.000.000	---	30.000.000
3. Auxiliary Usage Sources Costs (Fuel, Energy, Water Costs)	30 / 70	2.864.660.000	859.398.000	2.005.262.000
4. Labor Costs	50 / 50	769.914.000	384.957.000	384.957.000
5. Repairing and maintenance Costs	30 / 70	56.358.400	16.907.520	39.450.880
6. Costs of Amortization	100 / 0	358.382.000	358.382.000	---
7. Patent and Royalty Costs	100 / 0	---	---	---
8. Fixed Costs	100 / 0	24.686.025	24.686.025	---
9. General Costs	75 / 25	35.000.000	26.250.000	8.750.000
10. Financing Costs (Interests)	75 / 25	---	---	---
11. Selling and Marketing Costs	80 / 20	10.000.000	8.000.000	2.000.000
12. Packing and Packaging Costs	0 / 100	---	---	---
TOTAL		12.753.256.025	1.678.580.545	11.074.675.480

Table 7. The Table of Working Capital at Full Capacity.

Description	**The ratio of fixed / variable costs**	**Period (day)**	**Annual Estab. Costs (*1000 TL)**	**Working Capital (*1000 TL)**	**Fixed Costs (*1000 TL)**	**Variable Costs (*1000 TL)**
1. Inventory of raw material	0 / 100	30	8.604.255.600	717.021.300	---	717.021.300
2. Inventory of auxiliary material and factory supplies	0 / 100	30	30.000.000	2.500.000	---	2.500.000
3. Inventory of fuel	20 / 80	30	2.324.160.000	193.680.000	38.736.000	154.944.000
4. Inventory of goods	13 / 87	15	12.753.256.025	531.385.668	69.080.137	462.305.531
5.Account receivable	13 / 87	15	12.753.256.025	531.385.668	69.080.137	462.305.531
6. Cash requirement	51 / 49	30	814.914.000	67.909.500	34.633.845	33.275.655
TOTAL				2.043.882.136	211.530.119	1.832.352.017

The working capital at full capacity has been calculated by considering the working capital items given in Table 7. All of the values and also the inventory periods at full capacity for all items can be shown in this table. Therefore, the working capital for the first year at full capacity is determined as 2.043.882.136.000 TL and the total investment amount is found as 5.341.948.386.000 TL.

(ii) Financing of the Investment Period

The whole of the total investment amount will be met by domestic sources. External sources will not be used. So 5.341.948.386.000 TL of domestic sources will be required. The financing of the investment period table, which is prepared by considering external sources, domestic sources and investment incentives, is shown in Table 8;

Now, the information of the working period table and project income-expense and fund flow table will be formed. In these tables, the values of costs and incomes items will exist according to the years. They will not be the same for every year. The reason of that is inflation. So, the values of these tables, determined at the beginning of the investment period, can not be assumed to be valid for every year. The inflation effects on the prices must absolutely be determined.

Table 8. Financing of the Investment Period of the Establishment.

EXPLANATIONS	**AMOUNT (TL) (Until The end Of 2003)**
A. REQUIREMENT OF FINANCING	
1. Total Fixed Investment	3.298.066.250.000
2. Working Capital	2.043.882.136.000
3. Interest (VAT) of Investment Period	---
TOTAL REQUIREMENT OF FINANCING	5.341.948.386.000
B. SOURCES OF FINANCING	
1. DOMESTIC SOURCES	
- Capital	5.341.948.386.000
- Funds	---
2. INVESTMENT INCENTIVES	---
3. EXTERNAL SOURCES	
- Medium and long term credit	---
- Establishment credit	---
TOTAL FINANCING	5.341.948.386.000

(iii) Estimation of the Future Inflation Ratios

The Changing Price Method was accepted in the project because of the effects of the inflation and the other risks. After this acceptance, the past annual inflation ratios were researched and the annual inflation ratios for the next years were estimated. In order to estimate the annual inflation ratios, there were three statistical methods used, and one of them which had the least MSE value (218.008), was selected.

The estimated annual inflation ratios for ten years have been found by using selected model. The economic life of the project is 10 year. Then, all of the cost and income values between 2004 and 2013 were calculated according to the estimated annual inflation ratios.

(iv) Information of the Working Period

Depend on the ratios of used capacity, the costs of the annual raw material, auxiliary materials and factory supplies and auxiliary usage sources and the other costs can be seen in Table 9. Also, the annual establishment incomes can be seen in the same table. It is planned that, plastic materials occurred after crushing will be sold to the plastic firms and by this way the new establishment will get incomes. The estimated annual inflation ratios have been considered when the values of the table determine.

Table 9. Information of Working Period of the Establishment.

YEAR	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
The ratio of used capacity (%)	75	90	100	100	100	100	100	100	100	100
Raw materials costs	9.379.714.136	15.876.104.147	24.124.622.256	31.955.474.641	40.954.136.300	50.725.793.221	60.647.758.375	69.902.606.303	77.570.922.214	82.744.902.726
Auxiliary materials and factory supplies costs	32.703.750	55.354.367	84.114.036	111.417.452	142.792.607	176.862.923	211.457.311	243.725.696	270.462.405	288.502.248
Aux. usage sources cost (fuel, energy, water)	3.435.121.231	5.461.905.213	8.031.937.172	10.639.103.978	13.635.075.659	16.888.404.711	20.191.776.672	23.273.041.792	25.826.094.477	27.548.694.979
Other Establishment Costs (amortization and interests are excluded)	1.144.150.076	1.747.645.289	2.512.089.315	3.327.513.507	4.264.541.310	5.282.060.868	6.315.231.973	7.278.936.373	8.077.435.692	8.616.200.653
The total establishment costs (amortization and interests are excluded)	13.991.689.192	23.141.009.016	34.752.762.780	46.033.509.579	58.996.545.876	73.073.121.722	87.366.224.331	100.698310.164	111.744914.789	119.198300.606
The total establishment incomes	17.648.303.976	29.871.519.310	45.391.433.120	60.125.492.311	77.056.830.946	95.442.590.809	114.111161.571	131.524524.827	145.952765.200	155.687814.640

(*1000TL)

(v) Estimated Project Income-Expense and Fund Flow Statement

The income-expense and fund flow statement of the project is shown in Table 10.

Table 10. Income-Expense and Fund Flow of the Investment Project

Description	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
1. Establishment Incomes	17.648.303.976	29.871.519.310	45.391.433.120	60.125.492.311	77.056.830.946	95.442.590.809	114.111161.571	131.524524.827	145.952765.200	155.687814.640
2. Establishment Costs	13.991.689.192	23.141.009.016	34.752.762.780	46.033.509.579	58.996.545.876	73.073.121.722	87.366.224.331	100.698310.164	111.744914.789	119.198300.606
3. Project Profit	3.656.614.784	6.730.510.294	10.638.670.340	14.091.982.732	18.060.285.070	22.369.469.087	26.744.937.240	30.826.214.663	34.207.850.411	36.489.514.034
4. Amortization	520.908.237	734.741.068	1.004.831.885	1.331.000.315	1.705.810.003	239.295.535	286.101.742	329.760.867	365.935.635	390.343.541
5. Interest Payment	---	---	---	---	---	---	---	---	---	---
6. Operating Profit	3.135.706.547	5.995.769.226	9.633.838.455	12.760.982.417	16.354.475.067	22.130.173.552	26.458.835.498	30.496.453.796	33.841.914.776	36.099.170.493
7. Incentives	---	---	---	---	---	---	---	---	---	---
8. Institutions Tax Evaluation	3.135.706.547	5.995.769.226	9.633.838.455	12.760.982.417	16.354.475.067	22.130.173.552	26.458.835.498	30.496.453.796	33.841.914.776	36.099.170.493
9. Institutions Tax (%30)	940.711.964	1.798.730.768	2.890.151.537	3.828.294.725	4.906.342.520	6.639.052.066	7.937.650.649	9.148.936.139	10.152.574.433	10.829.751.148
10. Other Deductions	94.071.196	179.873.077	289.015.154	382.829.473	1.394.627.861	1.887.150.550	2.256.277.197	4.286.276.581	4.756.481.122	5.073.738.414
- Fund Share of Institutions tax (%10 of the ins. Tax)	94.071.196	179.873.077	289.015.154	382.829.473	490.634.252	663.905.207	793.765.065	914.893.614	1.015.257.443	1.082.975.115
- Stoppage payment (%15 of distributed profit)	---	---	---	---	821.812.372	1.112.041.221	1.329.556.484	3.064.893.606	3.401.112.435	3.627.966.635
- Fund Share (%10 of stoppage)	---	---	---	---	82.181.237	111.204.122	132.955.648	306.489.361	340.111.244	362.796.664
11. Profit After Tax	2.100.923.387	4.017.165.381	6.454.671.764	8.549.858.219	10.053.504.686	13.603.970.936	16.264.907.652	17.061.241.076	18.959.859.221	20.195.680.931
12. Capital Payment	---	---	---	---	---	---	---	---	---	---
13. Fund Flow	2.621.831.624	4.751.906.449	7.459.503.649	9.880.858.534	11.759.314.689	13.843.266.471	16.551.009.394	17.391.001.943	19.325.794.856	20.586.024.472

(*1000TL)

5.3. Evaluation of the Project

The project was evaluated by using the project evaluation methods in order to decide that if the investment project was feasible or not.

The average annual inflation ratio during the economic life is determined as 26% according to the estimations of the annual inflation ratios and it is assumed that all of the other factors' effects except inflation on discount rate are 25%. These factors are risk possibility suggestions, expected and planned profitability, profitability of the alternative investment possibility, interest rate of the market and suggestions about the investment. After these assumptions, discount rate is accepted as 51%.

Therefore, The NPV of the project is determined as 7.587.079.601.833 TL. The NPV is positive. The IRR is determined as 0,94 and this is greater than the rate of return required by the company for the investment (94% > 51%). The benefit-cost ratio is calculated as 2.42. This value is more than 1. So, it can be said that the benefit of the investment is more than its costs. In this project, it is assumed that the project paid back its total investment amount within 4 years. The pay back period is determined as 2,14 year.

6. CONCLUSION

Even if the companies are very strong and they have a large amount of financial sources, they already have not the possibility to realize and finance all of the investment projects at the same time. For that reason, the companies must make selection from several investment project alternatives and arrange their selected alternatives. As a conclusion, after the result of economical evaluation of this investment project, it was decided that *establishing a metal lead manufacturing plant in Manisa Industrial Zone is feasible.* This decision is based on the project evaluation methods results.

This paper has been summarized the feasibility study for the potential investment project on one of the production industry. It has been proposed a systematic project analysis process for construction of new industrial plants. Furthermore, it is expected that this study and obtained data at the end of the study may be helpful for researches related with battery and metal lead production.

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