UNIVERSIDAD TÉCNICA DEL NORTE

FACULTY OF ENGINEERING IN APPLIED SCIENCES

TEXTILE ENGINEERING

"FEASIBILITY STUDY FOR THE CREATION OF A LAUNDRY FOR GARMENTS MANUFACTURERS IN ATUNTAQUI CITY"

SCIENTIFIC ARTICLE (ENGLISH)

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INTRODUCTION

The present research entitled "Feasibility study for the creation of a laundry for garments manufacturers in Atuntaqui City" was carried out according to the regulations imposed by the Technical University of the North and its presentation conforms to standards APA 6th Edition.

Theoretical framework, refers to research conducted by experts in the field and published both in print media and on the Internet, as well as observations and experiences of the author in his performance in the national textile industry, the chapter gives the bases to continue the work in later chapters leading researcher on the path to follow.

In the study of market, investigates the need that has the population of product study, based on the current situation of the canton Antonio Ante in relation to its population, economic activities, levels of income.

Market study, research on the demand and offer of trade centers of jeans in the province of Imbabura, demonstrates the existence of unsatisfied demand in the market and researches about the competition in the workplace, formation of prices and levels of these, establishes strategies plaza, product and promotion, in other words, builds the marketing mix for the marketing of the products in Studio.

The technical study, analyses the needs of human talent and material resources for the implementation of the project, designed to flow diagrams for the different processes that carry out the initiative in the most efficient way possible.

The financial study, financially supports the feasibility of the project through the study of indicators normally used in financial assessments.

The chapter analysis of impacts, technically evaluates the impacts of social, educational, business, using tools designed for this purpose and makes an overall assessment of the impact of the project.

The final chapter, conclusions and recommendations, specifies the results of the study, defines its feasibility and based on it makes suggestions.

I THEORETICAL PART

CHAPTER I

FABRICS

WOVEN FABRICS

Fabrics woven, tissue is resulting from the crossbreeding between two perpendicular sets of threads. The longitudinal series of threads is called warp. The entire warp width is the width of the fabric. The transverse series of threads is the plot, and each element of this is called a pass.

The classification of woven fabrics is given by the type of ligaments, which are determined on the basis of a square rapport, we have taffeta, Twill, Satin.

Weight per Area of tissue

Usually called weight, this parameter expresses the amount of weight or mass contained in a unit area of the tissue. It is usually expressed as grams per square meter or ounces per square yard. From this data, it is possible to determine the performance of a fabric, very important variable for the makers

KNITTED FABRICS

Knitwear is obtained by the interweaving of threads, this operation is called a knitting.

There are knitted warp knitting and knitted by weft as Ribb, Interlock, Jersey.

Mass per unit area.

Commonly known as grammage, is an important variable to control in a weaving of point, due largely to the knitwear are sold according to weight.

DENIM FABRIC

Rolls of fabric Denim

Denim fabric takes its name from the place where it had origin, the French city of Nîmes. It was initially used as cover of carp, its application for making garments has origins in the final years of the 19th century, when Levi Strauss opened a local in San Francisco to sell tents to the miners.

Composition of fibers

Denim fabric, the warp yarns are 100% cotton and are dyed with indigo, which is a superficial dyeing, which helps the fabric to leave white areas when we cause abrasion. Weft yarns od Denim can be made of cotton, polyester, lyocell;

unbleached, dyed or bleached, or can be pre-dyed or white polyester yarns. Also used core spun yarn with elastane

Indigo Dyeing

For this process, previously held a sectional warping in which groups of threads come together forming strings.

A group of strings (24 to 36 depending on the width of the fabric) are simultaneously subjected to dyeing, which is a process of reduction - oxidation of indigo dye.

Indigo Dyeing Machine

Weaving of denim

Denim is woven, also known as Jean or indigo.

Usually are Twills of 4 (3/1) diagonal S or Z, but are also produced in Twills 3 (2/1), as well as Satin and Taffeta.

CHAPTER II
DYEING OF GARMENTS APTITUDE FOR DYEING

Raw fabric

The condition of raw fabric, applies to newly-woven fabrics with natural yarns mainly cotton, which preserved all its original features as waxes, oils and plant remains. They are fabrics particularly rough and hard, dirty yellowish color, which can repel water and dirt.

Fabric suitable for dyeing

APT is a term used to refer to the fabric (cotton usually) that has been treated to remove waxes and natural oils, residual seed and dirty yellow colour, known as raw material. In this way it gives hydrophility (not repels water) or aptitude to be dyeing.

IMPORTANCE OF APT CLOTHS

Garments manufacturers occasionally use garments that are not ready for dyeing. To reduce costs decide to use white fabrics, not measure the risks. The white garments dyeing dark colors or media may be differences between pieces because each can come from a roll or lot different fabrics .The importance of fabrics suitable for dyeing is making the process give the garment a value added measurable

parameters such as color uniformity, reproducibility and robustness. Unique colors can be achieved with small batches, even with special finishes.

PARAMETERS GARMENTS TO DYE

Fabric composition .

Generally fabrics made of cotton 100% are used to garments to dye, due to demand for articles made from this fiber , and mainly most dyeing machines are atmospheric , ie, they are not high pressure and bath temperature that can reach is the boiling point of water under these conditions it is optimal dyeing cotton .

Shrinks

The high temperatures at which the garments are disclosed in dyeing processes and drying , exposure times more to the same , causing the reduction measures of the fabric in its different dimensions. Therefore, the garments must be tailored with a positive tolerance.

Yarns for sewing

Yarns used in the different seams of garments, can be cotton APT to adopt in the same color dyeing of the garment , or polyester yarns prestained with color previously defined for the garment.

CHAPTER III

LAUNDRY PROCESS

Laundry processes are those physico-chemical procedures performed on the clothing to enhance the visual appearance and tactile denim, contributing to fabrics various characteristics such as softness, good drape, wear or aging, all of the needs of the market and trying to convey the design language trends by applying different techniques to help generate lots of versatility in producción.

WET PROCESSES

Processes that need dyeing and washing garments machines to its application, and consequently hydraulic, electrical, pneumatic heat and even required, in addition to defined processes pors conditions. Examples: gumming , Smoothing , Siliconate , Stone Wash, Discoloration, enzymatic or biochemical Washing, Dirty , Frosteado , Tie Dye, Ozone , Acid wash .

DRIED PROCESS

Complementary processes performed on the garments. Usually develops them manually using various techniques so they are popularly known as craft and performed at the beginning, the middle or end of a wet process , and materials like

sandpaper, brushes, sand, emery are used, and other.

Brushing, Sandblasting, Grinding, Permanganate, Crackle, Destroyed, Whiskers, Resin, glitter effect , Laser, among others.

Manualidades

BLEACH

Bleaching is applied to remove impurities from the substrate and obtain a degree of white, dyed to prepare to homogenize light colors and tone unwanted variations. There are two types of procedures , chemical and optical bleaching .

CHAPTER IV
PROJECTS

The term project relates to the idea or desire to do something , it is a temporary endeavor undertaken to create a product, service or result.

There are many definitions , one of which states that the project " is seeking an intelligent solution to approach problem solving aimed at , among many a human need " .

IMPORTANCE OF PROJECTS

It is clear that investments are not made just because someone wants something, or because he wants to produce an article, or because he thinks that will leave you money , you must then make a smart investment , and this requires a base to justify it , said base is a investment project well structured and evaluated to indicate the way forward . This leads to the need to develop projects.

TYPES OF PROJECTS

There are different ways to classify projects. Some considering its purpose, others according to the time of its execution, or relating to production.

STAGES OF PROJECT

Idealization of the project

The project idea is to establish the need or opportunity from which it is possible to design the project.

Design

Stage in which the options, methodologies and strategies to follow are valued, with the main indicator to achieve the objective. project approval, which is usually done after review of the project profile and feasibility studies occurs.

Execution

It is the stage when the project goes into production, beginning the revenue stream from the sale of the good or service results of operations.

Market research

In the study of market sales are estimated. The first is to define the product or service, then you should study the demand and supply.

The Technical Study

The technical study defined:

Where to locate the company. Where to get materials or raw materials. Machines to use. Personnel needed to carry out this project. It describes the process implemented.

The Financial Study

The important thing here is shown: The idea is profitable? To know you have three budgets: sales, investment, expenses.

Evaluation

In a project evaluation provided information for decision-making occurs, so also it can be considered as aimed at improving the effectiveness of projects in relation to their end activity.

NPV: NET PRESENT VALUE

The NPV is the algebraic sum of the balances of the cash flow of a project discounted at a discount rate. From the point of view of financial analysis is the present value of the stream of income received by the company.

IRR: INTERNAL RATE OF RETURN

Internal Rate of Return is the interest rate at which the NPV is zero. If the IRR is high, this is a profitable business project if the IRR is low, we could possibly find another destination for our money.

PART II PRACTICE

CHAPTER V

MARKET STUDY

The aim of this chapter is to determine the commercial feasibility of the project.

PRODUCT IDENTIFICATION

A laundry garment processing offers readymade garments or process.

MARKET SEGMENT

The project will be located in the city of Atuntaqui, canton of Antonio Ante, intended future be present throughout the province of Imbabura, focuses the entire population because the clothes are processed in a laundry they can be used by anyone .

OPERATIVE MECHANICS

They were defined as parameters to investigate the demand for jeans and garments tinctured in Canton Antonio Ante and the feasibility of companies engaged in the manufacture can produce. They interviewed residents of Canton to determine the demand for clothing, besides clothing manufacturers were interviewed to determine the demand for the service, and merchants to meet the current offer.

ANALYSIS OF DEMAND

Current situation

Antonio Ante population was 43518 inhabitants in 2010 and its population growth rate is 2.09%, therefore its estimated 2015 population is 48260.

Assuming a consumption rate of 3 items per person annually, demand for jeans and clothing tinctured in Canton is 137,613 per year.

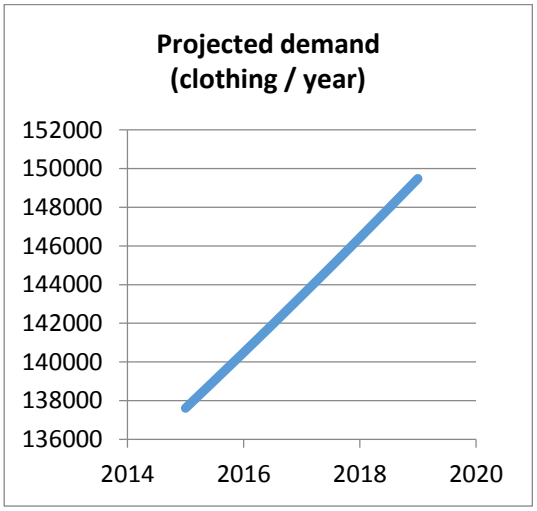
Población Total (habitants)	People using jeans (%)	Target Market (habitants)	Demand jeans garments (units)
48260	**95%**	**45871**	**137613**

Future demand situation

$$Projecting\ current\ demand = demand * (1+i)^n$$

Where: n = period searched

i = projected growth rate (2.09 %)



ANALYSIS OF SUPPLY

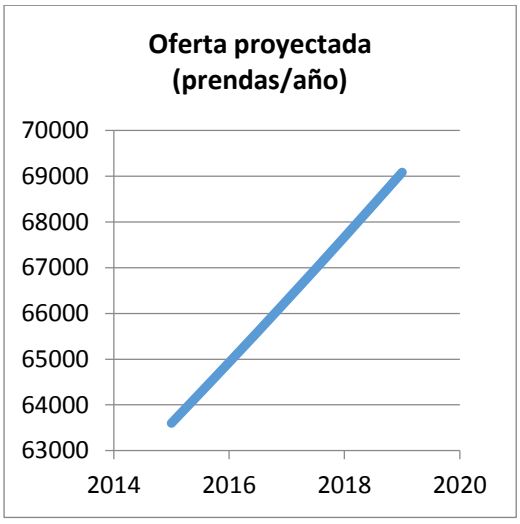
Current situation

In Antonio Ante there are 12 shops offering clothes jeans, however, in no case are locally manufactured according to survey of managers of these businesses , garments that sell acquired in other cities and abroad.

Projection of supply

$$Projection\ of\ supply = supply * (1+i)^n$$

Year	Monthly offer jeans (units)	Anual offer jeans (units)
2015	**5300**	**63600**
2016	**5411**	**64929**
2017	**5524**	**66286**
2018	**5639**	**67672**
2019	**5757**	**69086**



DEMAND UNMET

It is appreciated that the unmet demand for 2015 is 74013 jeans clothes , which corresponds to 53.78 % from the total demand , which allows to deduce that this lack of jeans garments covered with Atuntaqui offer other cities.

COMMERCIALIZATION

Square

The project suppose a direct distribution company – garments manufacturer.

Product

Service strategies will be:

• Quality

• Constant evaluation of the services offered (continuous improvement)

• Inclusion of new services periodically.

• Variety of supply for different types of garments.

Promotion

Direct communication channels to ensure a trusting relationship with clothing manufacturers, finding potential consumers located in the same city, and with personalized visits.

In addition, due to the low cost it represents and the social impact they represent social networks like be used Facebook, Instagram, Twitter and Linked In.

CONCLUSIONS OF MARKET STUDY

- The demand for jeans garments and dyed garments local production, projected to 2015 is 137,613 units. As the production of this type of clothing a nascent alternative and growing, it is necessary ancillary services are offered such as laundry and garment dyeing.

- With the integration to industrial Atuntaqui´s market, of a laundry capable of processing 48,000 units per year, demand for jeans and stained garments, will unsatisfied because 2015 is 74013 units.

- According to the analysis of the results of the surveys; and analysis of supply and demand, it is concluded that the creation of a laundry garment manufacturers in the city of Atuntaqui is feasible.

CHAPTER VI
TECHNICAL STUDY

SIZING THE PROJECT
SIZE OF THE COMPANY

Project size according to the unsatisfied demand.

The size of the project in relation to the application, can be determined by comparing total unsatisfied demand is 74013 garments 2015 with the production of the project that is processed 48000 garments per year, representing 65%; so there is no risk to place this level of production, since it is clearly inferior.

Project size and funding.

48000 garments for annual production (initially), will be financed through:

Equity investment: 50%

Borrowings investment: 50%

Technology and equipment.

For production processes that will develop the project, resources must be invested in the acquisition of machinery and equipment. The investment will be $ 21,600 in relation to the technology to be applied will generate an estimated annual production of 48000 garments.

Project size , supplies and consumables

There in the middle sufficient amount of raw materials and inputs for this type of economic activity. Providers would be producing and importing companies of inputs of Quito , El portfolio management vendor management would be to support a supply of raw materials and quality inputs and dates planned requirements .

DETERMINING THE LOCATION OF THE PROJECT

Macro Location

The project facilities will be located in the province of Imbabura , in the Canton Antonio Ante whose cantonal head is the city of Atuntaqui .

The population of the canton according to 2010 census INEC is 43518 inhabitants.

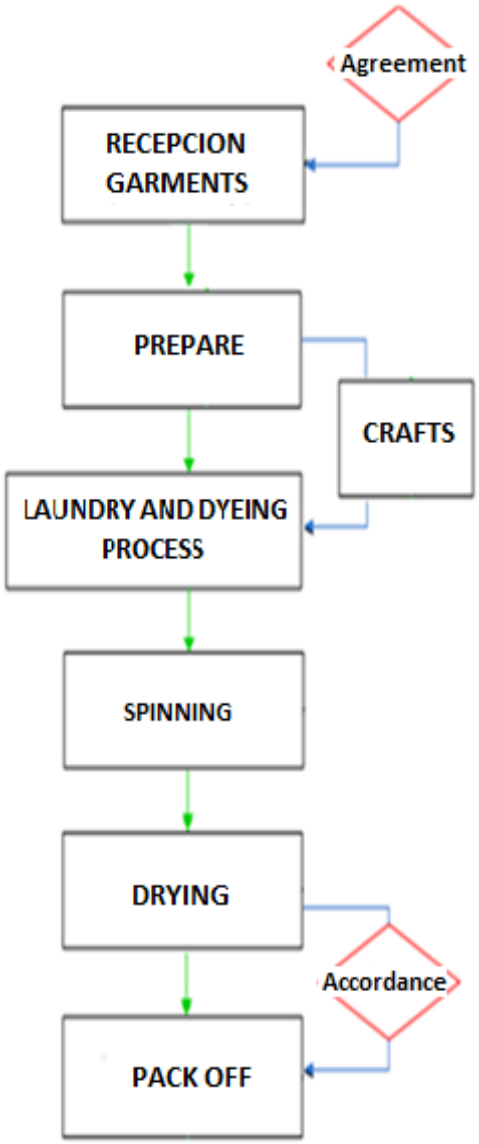
Atuntaqui

Micro Location

The project will be located specifically in the parish of Andrade Marin, streets Aug. 10 and David Manangón , there construction of approximately 100 ft2 which serve to implement the project will be located .

PROCESSES

Process flow chart



SELECTION OF MACHINERY

Rotary washer capacity 30kg

Frontal spin, sectioned basket, Chemical dosing, temperature and time control.

Industrial rotary dryer 15kg

Lateral rotation, temperature and time control. 15 Kg capacity.

15 Kg Spinning machine

Anchoring to the floor

Steam Generatoror

15 bhp. Pirotubular, Combustion diesel generates 200 kh/h steam.

Crafts sleeve. Crafts machines.

INSTALLED CAPACITY

Washer Capacity : 30 kg

Items / daily batches of work: 3 lots.

Working days in a month : 22 days.

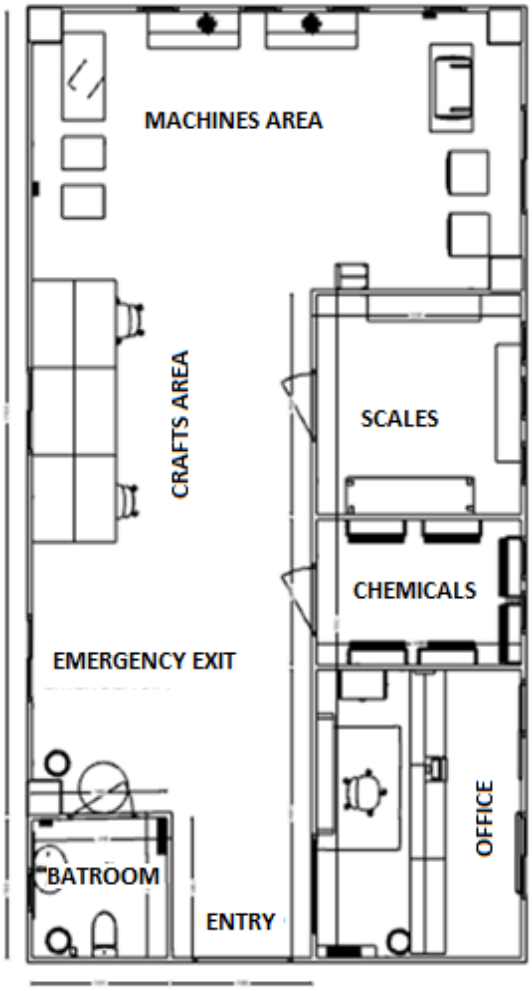
Then the company installed a month capacity of 5280 units.

Compared with the data of the supply of 4800 units , we note that the company will work with an efficiency of 90.9 % is acceptable and real.

Staff

Position	Quantity
Manager - Owner	1
Secretary - Accountant	1
Machine Operator	1
Seller	1
Total	4

LAY OUT – SPACE DISTRIBUUTION



ORGANIZATIONAL STRUCTURE

Company name

" Laundry for garments manufacturers AC Denim and Colors "

Economic Sector

Micro- enterprise raised is within the productive sector. The type of activity to be performed is the transformation of clothing for textile garments, according to the national classification of economic activities falls on the C1313 " FINISHED PRODUCT SERVICE TEXTIILES " section

Mission

Ace Laundry provides to textile manufacturers a laundry and garment processing with modern finishes, ensuring the best quality of service for this creativity and participation of human talent and experience involved in the company is encouraged.

Vission

Cater to the garment manufacturers in the province of Imbabura a technological alternative for the treatment and processing of their creations and positioned our services as the best alternative within five years.

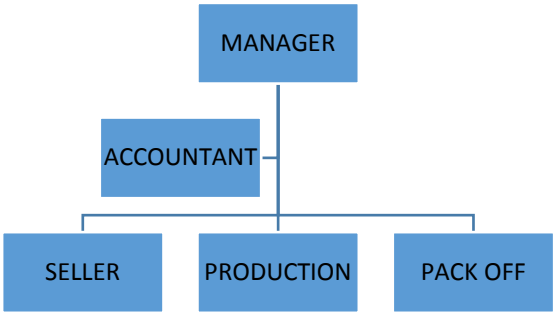
Objective

Satisfy the needs of garments transformation, through Laundry and Dyeing, to manufacturers of Imbabura province.

Company Type

The new company will have the form of sole proprietorship Limited Liability.

Organization chart



Industrial Safety and Environmental Impact

In an industrial laundry processing of garments we can identify various types of risks, the same should be minimized with preventive plans and action.

• Chemical Hazards type

• Risks Body

• Ergonomic hazards, psychosocial and organizational work.

Regarding the environmental impact , they will be met with local government ordinances

CONCLUSIONS OF TECHNICAL STUDY

- The project is presented as a viable alternative, to be held in a textile eminently industrial environment such as the city of Atuntaqui, the company will have an installed capacity of 5280 units per month production capacity, and also generate product innovation.

- The installation of machinery not have technical difficulties, it can be purchased in similar enterprises in other cities such as Quito and Ambato , and may even local manufacture.

- The location of the company is strategic, is very close to the medium and large garment enterprises, and physical space has basic facilities.

- Initially, only one worker will be required, since the processes according to the initial number of machines do not require constant action

CHAPTER VII

FINANCIAL REVIEW

DETERMINATION OF INVESTMENT

Fixed assets

The value of infrastructure is $ 5,000 plus the value of the land is $ 15,000 .

The total value for investment in fixed assets of the company which includes machinery, equipment , fixtures and office equipment is : 49055 USD.

ASSETS	
Item	**Value (USD)**
Ground	15.000
Build	5.000
Machinery	24.100
Operation materials	1.700
Office equipment	2.000
Furniture	675
Security equipment	580
Total	49.055

Production costs

According to the calculation of production capacity, the company can process 4800 garments per month, 57.600 garments in a year, working 8 hours in a day, 22 days per month.

For the calculation of production costs, costs of raw materials, utilities, direct labor are predetermined

Raw material

It considered as raw material to chemical inputs needed for garment processing, 4080usd an annual cost of projects ..

Basic services

Electricity

To calculate the cost of electricity, take the consumption value of each machine, and a fixed office estimated consumption, 2051.5usd annual consumption is calculated.

Water

945.6 m^3 is estimated to be consumed at a cost of 728.11usd a year.

Workforce cost

The company will start with one machine operator, the cost of labor is payment to the worker. Forward-looking statements are made based on inflation, the recent annual value is 3.67 %.

Production costs table

COSTS	
Item	**Value (USD)**
Raw Material	4080
Workforce	5353,19
Electricity	2051.47
Water	728.11
Manteinance	1032
Industrial Security	580
Total	**13824,77**

Production costs of enterprise value calculated for one year is $ **13,824.77** .

Gastos Administrativos

EXPENSES	
Salaries	17.654
Basic Services	600
Administrative depreciation	730
Financial expenses	2149,54
Advertising	1000
Total	22.133,94

The value for administrative expenses of the company is $ **22,133.94** annually.

WORKING CAPITAL

Working Capital (3months)	Value(USD)
Wages	1338,30
Basic Services	955,66
Chemicals	1020
Total	3313,95

The initial capital of the Company Working is **$ 3,313.95** .

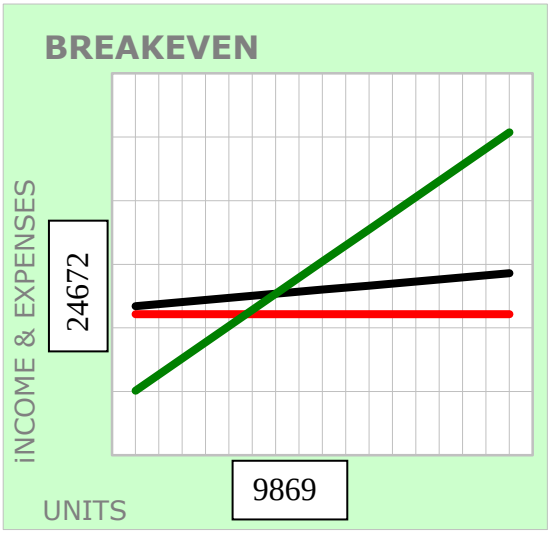
FINANCING

Item	Amount	Percentage
Own investment	25991,98	50%
CFN Credit	25991,98	50%
TOTAL	51983,96	

The annual value (first year) by financial expenses is **$ 2,149.94.**

Breakeven

A minimum turnover of 21533.94 USD , corresponding to 9,869 units processed in a year at an average cost of $ 2.5 is calculated.



Determination of Minimum Acceptable Rate of Return .

The rate of cost of capital or minimum acceptable rate is the annual profit rate to be applied to the product to carry out the installation and operation of the company. Should be taken into account capital funds and investment, where interest rates are an estimate of the cost of capital to increase the capital.

Item	%	Cost	Cost to capital
Own investmen	50%	7%	3,50%
Debt	50%	8,27%	4,14%
Rate risk		3,93%	3,93%
TOTAL			11,57%

NPV

The NPV updating the flows at the rate of cost of capital, that is 15.54 % , a positive result of $ 232,248.99 to 5 years, which supports the implementation of the project.

IRR

For the calculation of this financial indicator we used the following formula:

$$IRR = r_a + \frac{NPV_a}{NPV_a - NPV_b}(r_b - r_a)$$

r_a = lower discount rate chosen
r_b = higher discount rate chosen
N_a = NPV at r_a
N_b = NPV at r_b

NPV = $232.248,99

Substituting in the formula, obtained a IRR value of 142.45%, which supports the implementation of project and encourages investors to keep their money in the project is obtained as its opportunity cost is 7% and the project will offer 11.57 %.

CONCLUSIONS OF FINANCIAL REVIEW

- The total investment required for the installation of the plant is 49055 USD itself to be financed from own resources by 50 % and the rest with a credit of CFN that offers a very attractive interest.

- The working capital needed for normal operation of the company was determined to 3313.95 USD.

- According to breakeven must be processed at least 9869 garments in a year, so the company does not win or lose, this number of items processed generate an income of 24672.03 USD. Being the minimum volume of production required by other less than the installed capacity is determined that the operation is feasible.

- According to the results of calculation of NPV and IRR company it is fully profitable, so operation is feasible.

CHAPTER VIII

EVALUATION OF RESULTS

ANALYSIS OF IMPACTS

INDICATORS	TOTAL
Social Impact	2.5
Business Impact	3
Educational Impact	2.66
Environmental Impact	-0.75
TOTAL	7.41

General Impact = $\sum$ / # of indicators

$$General\ Impact = \frac{7.41}{4} = 1.85$$

This project will generate a level of positive average impact because you can see that with the implementation of the company formal jobs that will improve the standard of living of employees, workers and owners will be generated, and the supply of services will be increased to textile garment manufacturers in Atuntaqui city.

Furthermore, there is a low environmental impact of negative level, especially due to effluent generation. It is estimated according to the installed capacity of the company will generate about 3 m^3 of water that containing residues of dyes, indigos or dyes for cellulosic fibers.

CONCLUSIONS

1. The textile industry in Atuntaqui City is the most generator of jobs and social welfare of this canton and the surrounding area, however the textile sector lacks specialized services such as that proposed in this project. With the creation of the laundry of garments, innovation of entrepreneurs, who can diversify their products without having to rely on service companies in Quito or other cities it is encouraged.

2. The demand for jeans in the canton Antonio Ante in 2015 was of 137.613 units and is projected in five years will be 149,483 garments. The production of this type of clothing is an emerging and growth expectations, integrating the industrial market Atuntaqui a laundry able to process 48000 will still be an unmet demand for 74013 unit this year, then an alternative is necessary services such as laundry and garment dyeing are offered.

3. According to the survey results, there is a potential market in Atuntaqui of at least 10 companies, which often require different laundry services; 18 garment manufacturers would like to make jeans but consider limiting the lack of service. These facts justify the investment needed for the project.

4. The project is presented as a viable alternative will be developed in a textile eminently industrial environment such as the city of Atuntaqui, installation of machinery not have technical difficulties, is possible purchase used machinery in similar enterprises in other cities such as Quito and Ambato, and may even domestic manufacturing. The location of the company in the urban town of Andrade Marin is strategic, is very close to the medium and large garment enterprises.

5. The total investment required for the installation of the plant is 49055 USD itself to be financed from own resources by 50% and the rest with a credit of CFN that offers a very attractive interest. The working capital needed for normal operation of the company was determined to 3313.95 USD.

6. According to breakeven, must be processed at least 9869 garments in a year, so the company does not win or lose this number of units generate an income of 24672.03 USD. The minimum volume of production required is less than the installed capacity, it is determined that the operation is feasible.

7. With a NPV of 232.248,99usd to five years and an IRR of 142.45% the company is quite profitable, so the creation and operation of the laundry garment manufacturers in Atuntaqui City is feasible.

RECOMMENDATIONS

1. Implementation of the project given the prevailing market conditions and favorable data resulting from the study is recommended, as is the case of financing with low interest rate offered by the state through the CFN.

2. Maintain a constant updating and innovation on the services that the project is able to offer to the garment manufacturers so as to establish differences that generate added value on potential competition, to achieve this should be made constant market research to know the tastes and preferences of the applicant interested in these services as well as fashion trends.

3. It is recommended to take advantage of the economic situation of the country with respect to rising imports of luxury goods including garments. This situation should be taken as an impetus to increase and diversify local production, quality should be a differentiator that captures high market share.

4. It is recommended guide short-term financial strategies to limit as much as possible the costs and expenses without sacrificing quality of service and thinking of a return on capital within a period not exceeding three years.

5. It is further recommended, draw in another study, a comprehensive analysis of the environmental impact of the company, according to local government regulations. This is due to the use in processes, chemicals that generate polluting effluents.

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