UNIVERSIDADE D
COIMBRA

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CONVERSION FROM YEARLY TO MONTHLY SUBSCRIPTION

Internship report for the Master in Economics, specialisation in Financial Economics, supervised by Professor José Alberto Serra Ferreira Rodrigues Fuinhas and submitted to the Faculty of Economics of the University of Coimbra.

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stratio

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Preface

My master thesis talks about changing the annual payment to a possible monthly payment of SaaS(Software as a Service). The company where I did my internship the past 4 months sells subscriptions to transport companies.
The services consist of a system aimed at preventing and alerting any technical problems related to transport on the road. at this time, the company uses a business model that allows them to only sell services with annual base subscriptions.

My aim is to compare and reflect the most important differences attributed to a possible change and the opportunity of adding monthly contracts into the business model.

The data used in this thesis is mainly from the company itself and is used to create a forecast, as realistic as possible, for the next 5 years. One annual and one monthly model. This project was developed with initiatives of Mr. Paulo Bajouco, CFO at Stratio Automotive, and will be executed and analyzed by me, Cédric Martens in this master thesis.

Dr. José Alberto Fuinhas helped me with his experience and knowledge throughout the project. He managed to give me the right vision on the most important aspects of this Thesis.

Objectives and framework of the internship

The main objective and research question of this project is to obtain a proper analysis of having monthly subscription payment method instead of an annual subscription payment method. This is an issue that can be answered by the use of financial modelling and having the right data in hands which will be explained more clearly in the following topics.

I will forecast the following 5 years of the company with the help of Financial models in Excel.

I created two Financial models. The first Annual model (Appendix C) shows the future cashflow, Net Present Value(NPV) and Internal rate of Return(IRR) of Stratio Automotive between the period 2021-2025 based on an annual recurring revenue.

The second model (Appendix D) gives the future cashflow, NPV and IRR of Stratio Automotive between the same period but based on a monthly recurring revenue.
The objective is to show what kind of changes it will lead to in terms of cashflow and Customer success. If this would be a fortunate adjustment for the company regarding its business model or not.

Another objective is to do analysis for the company regarding specific suppliers in countries where Stratio Automotive will deploy their product in the near future. I had to search new suppliers for certain goods and services, purchased and consumed.

The first good the company wants me to search for is an Internet of Things SIM card that manages to send data from machine to machine and what is used in the device of the company, namely the Databox ST200. This SIM card is available in almost every country but it is a product that is sold by many different MVNO's(Mobile Virtual Network Operators).

The second good I need to search for is Certifications in countries where Stratio Automotive will deploy their product in the near future. This certification is needed to sell the device in a new country. If this certification isn't done, it is not allowed to be sold by law.
By executing these objectives, I need to approach the concerned enterprises that have the best fit in terms of pricing for the company. At the start of my internship I received certain margins which would be acceptable in my procurement.

Motivation and relevance

Having the opportunity to do an analysis on the company's preference of Procurement and its customer payment method, are projects that can help the company and myself develop in both specific ways.

One the side of Stratio Automotive the research can be relevant because of multiple factors. The company is able to receive a clear analysis, business model and a realistic additions and opinions at the present and possible future investments. It can be advantageous for Stratio Automotive use external comments and critics as a company to brighten its possibilities and present approach.

On the other side, it allows me to explore a new interesting and educational source in which I am able to understand ,learn and most of all apply the correct academical approaches regarding the financial model and procurement of this business.

Objectives/Research questions

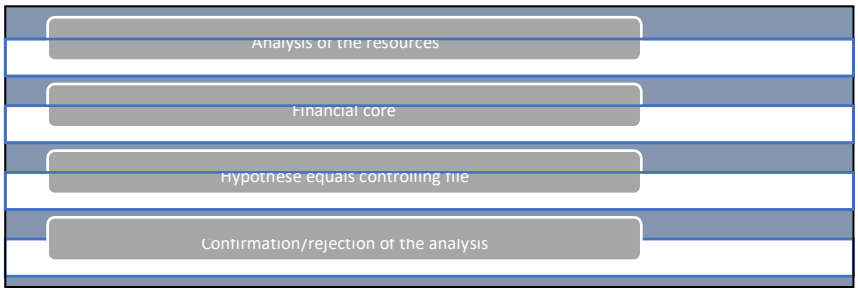
The customer pays a certain amount to receive the installed hardware device and the subscription to access the software. This software enables the customer to analyze all data that is available for his vehicle. The company asked if I would like to create a financial model that is able to show the impact of an adjustment to a monthly payment instead of an annual payment.

The research question is the following:
"The conversion from an annual to monthly subscription Suitable for Stratio Automotive?"

Important is that we know at every moment what are the exact costs and expenses which is for me available as a reference in the controlling file. More important is the ability to use this file in an optimal way for this research. The amount of data that is available should be sufficient when calculating the needed metrics.

The financial department uses the controlling file as the core document that can be seen as a record all Financial flows of the past, the present and the future. In this file, every single expense or revenue will be taken care of. I got the opportunity to work in this file on many different aspects what I will explain more specifically in this Project Work.

Approach methodology



Presentation of the host entity

Introduction

Stratio Automotive is a company that got founded by Rui Sales and Ricardo Margalho in 2015. The duo decided to invent a magnificent product that can create a future where transportation does not fail on humanity.

The main office of Stratio Automotive is located at Instituto Pedro Nunes, Coimbra. This is the location where most employees are used to work. The company has also a second office located in the Golden Hub in Lisbon where they have a smaller amount of workers active.

The Tagline of Stratio Automotive is: "No disruptions. No surprises. Zero downtime". As Sara Almeida, head of Human Resources explained me: vehicle defaults happen continuously across the globe every single day, and they naturally affect, most of all, the equipment that operates the most intensively, commercial vehicles which are usually trucks and buses. These are the vehicles in which a large part of the world population relies on for transport, and the ones carrying the food that supplies our supermarkets, medicines for our pharmacies, and almost everything our lives and the economy depends on.

The forced downtime faced by the transport industry poses a great operational challenge and creates a daily struggle for many people around the world working hard to avoid the effects of these unforeseen malfunctions. Whenever a vehicle is forced to stop, businesses and people are too, and costs start to build up. With the advances in autonomous technology, in vehicle safety, and in many other areas of the automotive industry, one might think reliability would also be rapidly improving. Unfortunately, little could be further from the truth. There hasn't been progress at all in terms of reducing the on-road failure rates. In fact we have been digressing. Vehicles fail more often now than they did a decade ago. And new technology is adding up to the problem.

Even on internal combustion engine vehicles, in technologies that have been maturing for decades, we see non-decreasing fault rates. And a true challenge ahead is in new technologies and products such as, for instance, traction batteries, electric motors, and other critical components of electric vehicles. The same is true for all the new powertrain technologies and new components that are becoming more and more complex.

To cope with the increasing fault rates, vehicle testing can't stop at the factory and test tracks anymore. Testing needs to become continuous throughout the vehicle's lifecycle. And the way forward starts with continuous visibility over the performance and behavior of each vehicle.

Telematics was at the beginning of this journey, enabling high volumes of vehicle data to be collected. Large investments were made on acquiring such vehicle data, and large companies already have large datasets today. Now for this data to be explored and leveraged, automation is required. Otherwise data and human resources would need to grow linearly together, which is not feasible (nor desirable) as engineering resources are not infinite, unlike growth in data volumes.

The principle is that there is nothing humans cannot solve. Enough people looking into a problem can solve it, regardless of its complexity. Humans are great at creativity, but computers are far more efficient at repetitive tasks. Looking through multidimensional and

large volumes of data collected from vehicles is one of those repetitive tasks. Mimicking the human brain to detect patterns and anomalies, together with enough computational power, enables an AI based computer program to run the analysis and give us the outputs we need instantly. And it enables us to do this at scale.

This is the field Stratio works on every day. Advancing and accelerating the creation and operationalization of new machine learning models in this field, and creating new tools and software applications to tackle the anomaly and fault detection problem.

Facts and figures

2015 - Stratio is founded by Ricardo Margalho and Rui Sales with the mission to fuse automotive engineering with scientific research, and apply machine learning to automate anomaly and fault detection, and a vision of a zero downtime future. Initial funding is secured by the founding team from the earnings of previous ventures.

2016 - A prototype version of the initial product (Stratio Foresight, explained in the next topic) is tested in a bus operator, which quickly gains interest and decides to purchase the service for a fleet of 50 vehicles.

By mid-2016 Stratio is awarded R&D funding by the European Union, through the SME Instrument, one of the most competitive research programmes worldwide. The equity free grant provides Stratio 1.1M€ to build the foundations of the company.

2017 - The year the first product, Stratio Foresight, was publicly announced and launched in Madrid, during FIAA, a main industry event. It is also the year Stratio is awarded for “Best new product” at the Buscon show, in Indianapolis, United States. Following Stratio Foresight release initial projects are started with a number of bus and truck fleet operators.

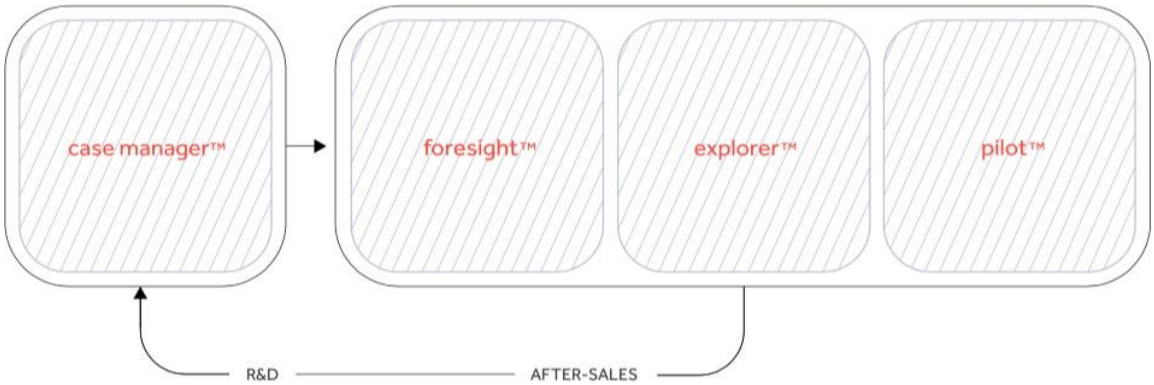
2018 - The first VC funding round takes place, adding 3M€ for product development and R&D. Stratio opens a new office in Lisbon and starts a dedicated Research team. Several projects are started in different markets, and the first OEM contract over 1M€ is signed.

2019 - As a result of the product development and R&D efforts the product suite is expanded with Stratio Explorer, Stratio Pilot and the Case Manager. Key projects are initiated in Europe with some large truck and bus operators and one of the top 10 truck OEM in the world. The company grows to 50 employees. Stratio opens new offices and expands commercial activities. A large investment in quality is performed to ensure products support growth in demand and customer satisfaction.

2020 - Customer satisfaction is the most important objective we continuously pursue. We expect our obsession towards service quality to result in expansions across our current customer base, as well as in the acquisition of new customers, including new reference customers in our field.

The product

The workflow shown in the following chart, covers the automation of anomaly and fault detection end-to-end, from agile data acquisition to accelerate research of new machine learning models, to the development of such models and software applications for the end users.



- Case Manager

Speeds up the training of machine learning models and allows automotive experts to contribute to the models' continuous enhancement.

- Foresight

Provides after-sales teams with an overview of the detected faults beforehand and enables servicing customers at the right time.

- Explorer

Data visualization tool designed to support the extraction of additional insights.

- Pilot

Enables the monitoring of driver performance and behavior, adding value to the end customer whilst providing extra context to analysts.

Databox

This is the main physical product of Stratio Automotive, which will be implemented in the vehicle for each subscription . Specifically designed to support AI and models for automated maintenance. It complies with all automotive specifications and gathers all information in the cloud to be transformed for customer's review. A clear summary regarding the Databox is given in annex(Annex A).

foresight™	pilot™	explorer™
Fault Detector	Fleet Manager	Data Navigator
uses artificial intelligence to detect anomalies, faults and potential breakdowns beforehand	eco-driving solution tested and validated by fleets, with better calculations through AI	explore and build tailor-made visualizations, extracting the full potential of the collected data
• Components health • Remote diagnostics • DTC codes and alerts • Maintenance plans • Reports & Dashboards	• Driver performance • Fuel consumption • Trips statistics • Tachograph analysis • Download tachograph	• Extract useful insights • Guide decision making • Oversee vehicle data • Access historical data • Customize dashboards

Organization

At this moment Stratio contains 48 employees divided over 11 different teams.
Each team has its own leader that takes responsibility and supervises the team members.

1. CEO
    - Ricardo Margalho
2. President, COO
    - Rui Sales
3. CFO
    - Paulo Bajouco

4. Onboarding Manager
    - Joao Ribeiro

5. Hardware Team
    - Humberto Rodrigues, Head of Hardware Engineering
        - Pedro Reis, Embedded systems Engineer
        - Joao Sousa, Embedded Systems Engineer
        - Mariana Monteiro, Embedded Systems Engineer
        - Gonçalo Marques, Embedded Systems Engineer

6. Software Team & IT
    - Hugo Valentim, Software & IT Manager
        - Pedro Salgado, Software Engineer
        - Diogo Duarte, Software Engineer
        - Bernardo Marques, Software Engineer
        - Joao Machado, Software Engineer
        - Mauro Simoes, Data Engineer Intern

7. Softare & Scrum Team
    - Artur Albuquerque, Software & Scrum Master
        - Joao Ferreira, Software Engineer
        - Pedro Pinto, Software Engineer
        - Daniel Pinto, Software Engineer
        - Rafael Faria, Software Engineer

8. Vehicle Integration Team
    - André Delgado, Head of Vehicle Integration
        - Hugo Paisana, Vehicle Integration Engineer
        - Ricardo Alegria, Field Installer
        - Pedro Ventura, Field Installer
        - Jorge Videira, Vehicle Integration Intern

9. Research Team
    - Rune Prytz, Head of Research
        - Nauber Gois, Data Scientist
        - Miguel Simao, Data Scientist
        - Tiago Brito, Data Engineer
        - Nuno Silva, Automotive Engineer
        - Roney Malaguti, Automotive Engineer

10. Sales Team
    - Miguel Franco, Enterprise Account Executive
    - Tiago Roque, SMB Account Executive
    - Pedro Vaz, Business Developer

11. Customer success Management
    - Marco Monteiro, Customer Success Manager
        - Tiago Alves, Customer Success Manager
        - Ricardo Caldeira, Customer Success Engineer

12. Product Management
    - Nunu Mendes, Head of Product Management
        - Elisabete Simoes, Product Designer
        - Margarida sa, Product Designer
        - Diogo Alves, Product Owner

13. Marketing Team
    - Mario Cruz, Marketing Manager
        - Francisco Ribeiro, Product Marketing Designer
        - Raquel Machado, Marketing Intern

14. Finance Team
    - Paulo Bajouco, Head of Finance and Quality manager
        - Tatiana Santos, Financial Assistant
        - Rui Rodrigues, Administrative Assistant
        - Cédric Martens ,Finance Intern

15. Human Resources
    - Sara Almeida, HR manager

The Finance department

Stratio Automotive introduced me with the integration and framing of the institutional strategy by giving me the time to focus on the company's confluence page. This page is a certain software where Stratio Automotive gathers information and allows new workers like me to learn and recognize the intrinsic values of the company.

Analyzing the routine of our financial department is an important part of my internship to deal with to understand all necessary practices that need to be done on a daily basis. My Manager Paulo gives me the opportunity to sit next to Rui, Tatiana and himself to understand the practices of the financial department better.

By the introduction to the sourcing and purchasing process according to the quality Procurement Procedure, I got the chance to access the content of Stratio on google drive and the knowledge that Paulo already had regarding the Procurement area.

Paulo Bajouco

The Chief Financial Officer and the Quality manager of Stratio automotive. Inside the finance department, he supervises Rui, Tatiana and me. He helps us with all doubts. He also takes the responsibility for the controlling file, but all other members of the finance department help updating this controlling file on daily basis.

Furthermore Paulo takes care of the forecasting, investors relations, approval of accounts, board meetings, presentation and Legal parts like contracts. Last but not least he helps the sales department with negotiation of contracts.

Tatiana Santos

The Financial assistant and in charge of all aspects regarding accounting. She manages the payroll together with Sara Almeida, HR manager. Tatiana also takes care of Grants and payment requests. With the use of expensify, She needs to approve travel expenses throughout the whole year. In specific there are two kind of expenses she need to work with on expensify, the costs that are needed on the work itself and and the costs that are needed outside work.

Rui Rodrigues

The financial responsible that is more focused on administrative work, documentation and mailing. Also he is responsibe for all the payments of the company, taxes, payments to suppliers. Rui also helps with invoicing and also to help other departments with organizing purchase orders.

Theoretical developments / literature review of subjects related to tasks performed in practice.

SaaS

Software as a Service is the way that Stratio Automotive decided to sell its invention. When the Sales team closes a deal, the customer will buy a recurring subscription. This recurring subscription allows the customer to access the software that Stratio Automotive provides. The SaaS Metrics on the other hand, is a specific group of calculations that shows the current overview of the present customers and which is available in the controlling file of the company. It shows us the total number of customers, net customers acquired, number of customers that churned, customer lifecycle, costs sales & marketing and the LTV/CAC(The Customer Lifetime Value to Customer Acquisition) ratio which measures the relationship between the lifetime value of a customer, and the cost of acquiring the customer.

Customer success

As stated by Mehta et. Al, customer success has a strong connection in Software companies that sell subscriptions. I will add the most important one in this project, namely the revenue driver, that has direct connections with the annual and monthly recurring revenue(p.46).

Churn rate

> *As stated by Mehta et al. in the book Churn is simply a measure of Euros that used to be part of the annual recurring revenue or Monthly recurring revenue that no longer are. Churn is also often used to refer to a customer that is no longer a customer. That becomes a customer who churned. In the broader sense of the reduction in ARR, these are referred to as churned Euros(p.46, Mehta et al., 2016)*

The revenue driver

The revenue driver is for example of great importance. We can divide this driver in 2 ways. The renewals are in other words the contracts that will be renewed after a year which improves cashflow and shows directly if there is customer success.
The upsells on the other hand, is the act of buying more services from Stratio Automotive. Proactivity, Success orientation, analytics-focused and prediction are other topics regarding customer success which we will not further explain in this project.

Financial Model

After collecting data of the Controlling file and receiving the initiatives of my manager Paulo Bajouco, it is important to work with the right data and metrics to achieve the right objective.

For these financial models I have chosen to use the metrics Net Present Value and Internal Rate of Return. The data collection and the initial road to become this metrics and the calculus itself are able to give me a clear overview on the research question of this project. This overview will succeed to find directly and indirectly answers related to cashflow issues, customer success and Behaviors of the company and its clients.

Net present value

To review the certain project and its effectiveness, I used the Net Present Value which is a discounted cash flow method that considers time value of money in evaluating capital investments. This method calculates the present value of cashflows of an investment project using the cost of capital as an appropriate discounting rate.

> *As stated by Simon benninga, To calculate the finance net present value of a series of cash flows using Excel, we have to calculate the present value of the future cash flows (using the Excel NPV function), taking into account the time-zero cash flow(Benninga S, 2014).*

$$NPV = CF_0 + \sum_{t=1}^{N} \frac{CF_t}{(1+r)^t}$$

(p.20, Ch.1, Benninga S.2014))

Internal Rate of Return

> *As Sawyer mentioned, the internal rate of return on an investment or project is the rate of return that makes the net present value of all cash flows (both positive and negative) from a particular investment equal to zero. In other words, IRR is the rate at which an investment breaks even. (Sawyer T.,2014).*

$$CF_0 + \sum_{t=1}^{N} \frac{CF_t}{(1+r)^t} = 0$$

(p. 16, Ch.1, Benninga S., 2014)

IoT

IoT or Internet of Things refers to the networked interconnection of everyday objects, which are often equipped with ubiquitous intelligence. IoT will increase the ubiquity of the Internet by integrating every object for interaction via embedded systems, which leads to a highly distributed network of devices communicating with human beings as well as other devices. Thanks to rapid advances in underlying technologies, IoT is opening tremendous opportunities for a large number of novel applications that promise to improve the quality of our lives. In recent years, IoT has gained much attention from researchers and practitioners from around the world. (Xia F. et al.,2012)

Certification

The product of Stratio Automotive, the Databox ST200 needs to be tested and certificated before it can be used and sold to the customer. This tests and certificate gives the chance to enter a new market depending on which country the certificate is connected to. This is a mandatory procedure that needs to be done for each and every country where the company decides to deploy its product. For example in Brazil we need to search for an ANATEL certification while in Mexico we need to search for an IFETEL certification. As shown (Appendix B), certification companies always need a product description or Data sheet. This enables the certification supplier to understand the product better and see which modules of the electronic equipment needs to be tested and certified.

Summary and systematization of the tasks carried out

Financial Model

Annual Model(Appendix C)

For the Annual Model, I used a simplified business model created with assumptions and advise of my manager. It follows the revenue and costs of the real controlling file with certain adjustments, given by Paulo Bajouco that is used in the present business model used by Stratio Automotive. They use an Annual recurring revenue which means that every contract is subscribed on a yearly recurring basis.

As shown in the model, I became a NPV of 437.852,12 € with a discount rate or 10% and a NPV of -245.451,20 € with a discount rate of 20%. This calculations allowed me to calculate the IRR of 16,41% which means that the Internal Rate of Return exceeds the cost of capital of the entire 5 year forecast.

The company would turn constantly profitable above Break-even in December 2023 by assuming this model.

Monthly Model(Appendix D)

I will use the recurrent and future subscriptions that are and will be sold and additional used data from the controlling file on a monthly basis instead of an annual basis.

As shown in the Monthly model, I became a NPV of 119.977,32 €
with a discount rate or 10% and a NPV of -754.083,07 € with a discount rate of 20%. This calculations allowed me to calculate the IRR of 11,37% which means that the Internal Rate of Return very little exceeds the cost of capital of the entire 5 year forecast.

The company would turn constantly profitable above Break-even in August 2024 by assuming this model.

IoT

I got a procurement task which had the goal to find IoT SIM cards which should cover data transmission in a country, in this case Arica. Each IoT SIM card should be able to have 300 Megabyte of Data.

To start a procurement analysis in a complete new area was not an easy process. I had to understand the definitions, abilities and pricing of these technologies to understand better the need of Stratio in terms of IoT. My first procurement analysis was for a contract proposal that needed to be made for the Company Mota-Engil. This company operates is multiple African country that would need our product on multiple heavy vehicles that should be able to cross borders of countries inside of Africa. As shown (Appendix A), I had to analyze providers in Angola, Ivory Coast, Ghana, Malawi, Mozambique, Rwanda, Tanzania, Uganda and Zimbabwe. For each country there are multiple Mobile Network Operators. Each operator has its own pricing what makes it interesting to contact all of them. The ones that are shown are the cheapest pricing with the best coverage per country.

Certification

I received the task to do an analysis for pricing of certification companies in Australia, Brazil, Mexico and Russia. I decided to create an excel sheet that gives me a quick overview to access the most important information. Per country I showed(Appendix D) the specific tests and certification, suppliers, e-mail of the desired contact person if Stratio Automotive is interested in the quote, if the Datasheet is sent to the certification company, if an Non-Disclosure agreement is signed, cost of the tests and certification, lead time and the time of validity.

Critical analysis of necessary, acquired and remaining skills

Controlling file

The controlling file was one of the the most important files to understand and to work with. I needed to maintain and strengthen the skill to work with each sheet and method that is applied inside this file. By analyzing this file I had to work with certain sheets which showed the actual real forecasts of the company.

In my opinion, the company showed predictions that were very optimistic in terms of future revenues, costs, etc. Stratio Automotive did assume for example that there will be in 2021 an increase of sales of 150% from roughly 1.000.000€ in 2020 to 2.500.000€.

Further in the controlling file I got to see the Purchase forecast of Databoxes, the initial product that is needed per service, for the near future in my opinion. The company expects to gain a 200% increase of services sold in 2021, what is in my opinion a bit too optimistic.

Recurring Monthly Revenue versus Recurring Annual Revenue

> *As Stated by Dawson, Monthly subscriptions with lower prices appear to be more friendly, and the lack of a heavy commitment reduces friction for new customers. While annual subscriptions do ask more of its client because of the higher value that has to be payed(Dawson T. 2020).*

Customer success

The philosophy behind this critical word is to focus on your customer its success and not your own(Mehta N. et al 2016). Customer success is a topic that we cannot avoid in this work. In SaaS companies, it is one of the important drivers that directly affects the recurring revenue and cashflow of the company.

Even though customer success is a manageable factor inside of a company in which people are able to invest, It does has two multiple approaches in this work regarding our two models.

When looking to the Annual Model (Appendix C) we use a churn rate of 3% of annual recurring subscriptions. This manages to secure more contracts upfront, increase cash flow and reduces an overall yearly churn rate (Dawson T. 2020). This because of the fact that when an annual contract is won, it means that the customer is immediately attached to Stratio Automotive for one complete year.

As opposed to annual recurring subscriptions, the monthly recurring subscriptions (Appendix D) only sell monthly contracts, which will immediately affect Customer Success and the Churn rate. As indicated by Paulo, the recurring monthly revenue should be subtracted by a churn rate of 20% monthly. Why is that? Because one client is not as determined to a SaaS as he is when agreeing to an annual contract.

The probability that a customer will churn after a monthly contract is likely higher than a customer who signed an annual contract because there is a difference in loyalty and commitment. When a company pays a higher value of a service on an annual contract, they are more loyal and able to adapt more on each other's needs. Stratio Automotive does have a Customer Success department which dedicates full time on loyalty and the customer its needs to keep or even reduce the current churn rate of 3% in the future .When comparing this to a monthly commitment, we can clearly suggest that the loyalty and adaptation of needs is of less importance and much more difficult to handle because of a lack of time.

Upselling is an important factor that can lead to increasingly strong profits. This is possible with a strong customer success department which can put fully committed effort into the customers. It is a difficult process which can be achieved by the right approach. Nevertheless is this process more easy to succeed on an annual recurring revenue because of again, time and loyalty. The longer Stratio Automotive is able to improve and adjust the service towards the customer's needs, the more probability there is to upsell the product and gain more profit per individual contract.

Summary of the contribution to the stage of knowledge and learning acquired in 1st Cycle and academic part of the 2nd cycle of studies

Supply & Demand in the Competitive Market

> *All sellers sell a quite identical service, and any individual buyer or seller isn't powerful enough on his or her own to affect the market price(Chapter 4, P. 94 , List & John A.).*

Because of this reason I do assume that Stratio Automotive takes part of a competitive market. The normal outcome results in the fact that buyers and sellers are price-takers.

Competition
In Portugal Stratio competes directly with Frotcom, Cartrack and Jaltest. At the same moment it also competes with the European variation named Viricity and worldwide with Geotab and Keeptruckin.

Behavior of the buyers
Stratio Automotive tries to apply a correct balance between the price of the service and the amount of the subscriptions that our clients are willing to pay for their service.
The quantity demanded varies between 10 subscriptions and 500 subscriptions. As seen over records of the past years, the amount of subscriptions that clients are willing to pay have a strong relationship with the profits of that specific client and on which scale they perform in terms of amount of vehicles that are actively in use.

When changing to monthly payment for a subscription of Stratio Automotive we need to underline the importance of the shift in behavior of the buyers. If the company asks a 20€ monthly fee which needs to be payed upfront, we will have a robust change in the quantity demanded. This because buyers are able to consume more subscriptions in a shorter time period for less money.

In this case, we can rely on the "Law of Demand"(Demand curves, P.96, List & John A.). Which tells us that the quantity demanded rises when the price falls. The subscription will be available for a shorter period of time, namely on a monthly basis instead of yearly basis. Because of the difference in period and price, there will be an automatically broader scope of clients in the market that are interested in closing a contract with Stratio Automotive. This change implies an acceptance of smaller companies that can enter the market, with a probable outlook to scale-up in the future.
This acceptance introduces a consumer surplus for Stratio Automotive which will be profitable in the forthcoming years.

Behavior of the Seller
The company decided to buy their product in batches, to reduce costs and to be able to have a stock for unexpected growth in terms of contracts.
The normal flow of obtaining a fully executed contract will start with a Proof of concept, to show the client that the service Stratio Automotive sells is effectively working. The next step is to manage to sell subscriptions for a whole fleet of the client. The more the better but this depends of how profitable our client is. Once a fully executed contract has been settled, the next step is to try to scale-up the subscriptions in the forthcoming years and avoid companies that will churn.

- **Making the goods**

Stratio decided to outsource the production of the databox. They contracted a manufacturer named HFA. This is a Portuguese enterprise, specialized in creating and assembling electrical components. Stratio pays a 84€ cost for each databox. Because of the fact that buying in batches reduces the cost significantly, the company decided to purchase minimum 1 batch and maximum 4 batches on a yearly basis depending on the contracts that are closed. Upon this hardware cost, there will also be more added

- **The cost of doing business**

The cost of doing business in a technological company has a lot of diverse divisions with a complex cost list. The payroll is without any doubts the most expensive one, but at the same time it is also the initial heart of the company. This cost is a big issue for a start-up in terms of generating positive cashflow.

variable costs per new subscription do accumulate when subscriptions scale, communication (€0,80), cloud cost (€3), new contracted people regarding installations and support (€1). That being said, Stratio has also to take in consideration the R&D that was able to create the existing mechanisms that are used at the moment.

- **The rewards of doing business**

The rewards that can be found in this business are the improvement of profits, cashflow and hiring new employees. This can only be done by closing bigger and better contracts. If business grows, Stratio Automotive is able to hire more workers which can result in again another milestone to improve each workflow and effectiveness of each team.

Balance of the value added by the traineeship for the training of the trainee and for the host entity

The main objective to show the difference in annual and monthly payment method is of great importance for the company and myself. The company is able to analyze and use these 2 models to see which approach is more acceptable with for example new assumptions that they would like to implement by themselves. I managed to use forecasting methods in a very practical way which I didn't had to do before I started my internship.

The procurement assignment(Appendix-A) of my internship was a very valuable task for the company which I completed in my opinion in a perfect way. I managed to hand in an overview for the company that took months of research. This can help them in the near future if they would like to start selling their software to African countries.

The certification assignment(Appendix-B) is also a valuable task for the company for the same reasons as the procurement assignment.

As I am a master student that was not able to speak Portuguese before, it was a very challenging period for me to try to integrate and succeed while doing this internship. I had to communicate with lots of Portuguese companies which allowed me to improve constantly.

Furthermore, I could be able to experience for almost two months a real work environment in the office of Stratio Automotive. I got a proper training from Paulo, Rui and Nadia which gave me a lot of dedication to hold on to these work ethics in the following two months where I had to work remotely.

Conclusion

The idea to explore this kind of project if a possible conversion to a recurring monthly revenue could be suitable, was in my opinion too early and too optimistic because of several facts.

We do need to consider the phase of the enterprise to understand and make any conclusion of this project. Stratio Automotive is a start-up and scale-up company that is not yet capable of turning a monthly break-even cashflow. Furthermore is it a company that already exists 5 years and which suffered a few setbacks in the past.

This indicates that this kind of different business model would be impossible to realize in the upcoming years. With an almost constant monthly cash burn in real life without including loans, it could be better to focus on other approaches that could be affordable in the near future.

The pandemic is also a very important factor which delayed a lot of expected profits for roughly over a year. To use the year 2020 as a fundamental resource of date, could be unfortunate and give less correct outcomes than in a normal year without pandemic.

Annual Model versus Monthly Model

The initial idea to create a converted model is interesting and adds value to Stratio Automotive for the future. Although it is maybe not the right timing, I need to admit that it could be a future adjustment for the company to maybe add the possibility to contract customers on a monthly basis. Nevertheless I do think that this step is soon to take, because of the fact that is will bring a lot of extra costs.

It is realistic to say that the current annual model (Appendix C) at this moment, is the best model to operate with. An annual recurring revenue gives Stratio Automotive the possibility to receive cash upfront or maximum with one month of delay. These contracts are for start-ups and scale-ups the safest way to receive good amounts of cash and to try to upsell in a more riskless way.

As shown, I assumed the differences in churning which does have a significant decreasing impact on the revenue compared to a monthly recurring in the first following years of revenue which I referred to in the topic theoretical developments. The calculations that were made showed also clearly that the annual model is more viable at the moment than the monthly model.

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Annex-A

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ST 200

- Automotive Grade Hardware
- Low consumption
- Secure authentication
- End-to-end encryption
- High Performance H7 ARM microcontroller
- Over the air updatable
- Edge processing for AI Algorithms
- Secure boot
- 1 kHz sample rate for selected signals
- Internal battery back up

Vehicle Compatibility	Heavy, medium and light duty vehicles - Diesel, petrol, CNG, hybrid and electric
Interface Compatibility	SAE J1708, SAE J1587, SAE J1922, SAE J1939, ISO 11898, ISO14230, RS232, OneWire
Voltage	Wide voltage supply allowing normal operation from 8 to 36 Volt
Consumption	5W in operation mode and 0.6W in stand by mode (30 days battery back up)
Storage	4.000.000 data points (96 hours driving)
General Components	9-axis inertial module, Real time clock, 12-bit ADC/4 inputs + 4 Digital outputs
Communication	LTE Cat 1, UMTS & EGPRS Module + WiFi b,g,n (802.1x) + Bluetooth 4.0
GNSS	Dual band Multi-constellation GPS, GLONASS, Compass, Galileo and QZSS
Dimensions / Weight	132 x 150 x 45 mm / 243 g

Compliance

Council Directives:

2014/30/EU EMC

2014/53/EU RED

2011/65/EC RoHS2

Covered standards/specifications

EN 301 489-1 V1.9.2 EN 55022:2006 + A1:2007

EN 301 489-3 V1.6.1 CISPR 25:2002 + COR1:2004 + ISH1:2007

EN 301 489-7 V1.3.1 EN 61000-4-3:2006 + A1:2008 + A2:2010

EN 301 489-17 V2.2.1 EN 61000-4-6:2009

UN ECE Regulation10 Rev 5:10-2014 ISO 7637-2:2004

ISO 11452-2:2004 + 4:2005 + COR:2009

ISO 16750-3 (2003)

EN 60068-2-6 (2007)

Safety tests - EN 60950-1: 2006 + A11: 2009 + A1:2010

Stratio databox™, our automotive-grade hardware product can also be integrated as part of the Stratio solution.

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Appendix-A

	Provider	Cost per MB	Fixed cost per SIM	Recurring Cost per SI	1 Time Shipping cost	SIM/country			Cost per month/vehicle
Angola	Unitel	€0.07		€2.00	/	571		€3,137.65	€5.50
Cote d'Ivoire	Gigsky	/	/		/	182		€627.90	€3.45
Gana	Netmore M2M	€0.01	€2.00	0,7	€10.00	10		€14.50	€1.45
Malawi	AIRTEL	/	/		/	191		€899.08	€4.71
Mozambique	Netmore M2M	€0.01	€2.00	0,7	€10.00	151		€218.95	€1.45
Rwanda	Telecom 26	€0.01	€2.00	€1.00	€10.00	37		€74.19	€2.01
Tanzania	Netmore M2M	€0.01	€2.00	0,7	€10.00	29		€42.05	€1.45
Uganda	Gigsky	/	/		/	112		€386.40	€3.45
Zimbabwe	Econet	€0.01	/		/	11		€28.60	€2.60
						1294	Fixed cost SIM chips	€454.00	
							Shipping cost (estimate)	€10.00	
							Total Cost	€5,893.31	
							Average cost per SIM	€4.55	

Bundle 1			
Angola	€5.50		UNITEL: Loyalty period of 24 months but only consumption is payed, costs stay the same over the period of contract
			100 MB price per sim in Angola = **€1.85**
Bundle 2	Should allow roaming		
Mocambique	151	€218.95	Netmore M2M: 0.70 cents monthly fee/sim + prices can change in future
Malawi	191	€899.08	Airtel
Rwanda	37	€74.19	Telecom26
		€3.15	
Bundle 3	Do not cross borders		
Cote D'ivoire			Gigsky
Ghana	10	€14.50	Netmore M2M: 0.70 cents monthly fee/sim + prices can change in future
Tanzania	29	€42.05	Netmore M2M: 0.70 cents monthly fee/sim + prices can change in future
Uganda	112	€386.40	Gigsky
Zimbabwe	11	€28.60	ECONET: NO additional costs

Appendix-B

	Certification	Supplier	email	Datasheet sent?	NDA signed?	Cost?	Lead time	certificate validity
Russia	EAC	Schmidt&Schmic	marina.weger@schmidt-export.de	Yes	No	€1,300.00	2 weeks	5 years
Russia	FAC certificationm Databox Customs Union EAEU declaration, FSS notification, local declarant fee, factory inspection fee	CSIA	quotes@csiassoc.com	yes	No	$8,625.00	4-6 weeks	6 years
Russia	EAC, FSS, FAC	Applus Laboratoı	carolina.delgado@applus.com	yes	No	$7,300.00	10 weeks	5 years
Russia	EMC decl.m Hygienicm MOC DoC	CETECOM	Sara.Schupp@cetecom.com	yes		€8,011.28	6 weeks	5 years
Russia	EAC, FSS, FAC	JNM	daniel@jnmam.net	Yes	No	€4,400.00	6-7 weeks	5 Years
Russia	EAEU DoC, FAC, FSS	Lenhardt	go@ib-lenhardt.de	Yes	No	€12,105.00	12	5 Years
Mexico	ST 200, IFETEL Homologation and Approval, Mexico $1,400.00 NOM-221/IFT-011 cellular testing (2G/3G) and registration of IMEI numbers, Mexico $1,950.00 NOM-208 testing (WiFi & Bluetooth) to obtain Certificate of Conformity for IFETEL submission, Mexico $1,700.00 ST 200, NOM Safety testing, review, and approval, Mexico $1,320.00 Legal Representation required (Cert Holder Services included at no charge), Mexico $0.00 Shipping & Importation of Samples (to be added to final billing), Mexico $0.00	LARCG		yes	No	$6,370.00		
Mexico	IFETEL, NOM	CETECOM	Sara.Schupp@cetecom.com	yes	No	€5,960.96	5-8 weeks	1 year
Mexico	IFETEL, NOM208	CTCadvanced	mail@ctcadvanced.com	yes	No	€6,500.00	16 weeks	6 months
Mexico	IFT	Applus Laboratoı	carolina.delgado@applus.com	yes	No	€5,409.00	12 weeks	1 year
Mexico	NOM019, NOM208, IFT-011 Part1, IFT-011 Part2, IFT Homologation	JNM	daniel@jnmam.net	yes	No	$16,000.00	12 - 14weeks	Permanent
Mexico	Type approval	Lenhardt	go@ib-lenhardt.de	yes	No	€7,300.00	10 weeks	1 year
Mexico	IFETEL, NOM208	CSIA	quotes@csiassoc.com	Yes	No	$8,850.00		
Australia		eleoscompliance	elie@eleoscompliance.com	yes	No	€2,187.00	3 weeks	Permanent
Australia		7Layers		yes	No			
Australia		TCA		yes	No			
Australia	Market access (type approval based on delta testing & full test reports)	CETECOM	Sara.Schupp@cetecom.com	yes	No	€2,253.95	4-8weeks	Permanent
Australia	ACMA	Applus Laboratoı	carolina.delgado@applus.com	yes	No	€1,620.00	4 weeks	Permanent
Australia	ACMA	JNM	daniel@jnmam.net	yes	No	$800.00	2 weeks	Permanent
Australia	Type approval	Lenhardt	go@ib-lenhardt.de	yes	No	€6,150.00	4 weeks	5 years
Australia	RCM and ACMA registration, Testing to AS/CA S042.1:2018, AS/CA S042.4:2018, and AS/NZS 62368.1:2018 AU/NZ standard(requires acceptable FCC or CE reports)	CSIA	quotes@csiassoc.com	yes	No	3250 for registration, 7200 for testing($)	3-4 weeks	5 years
Brasil	ANATEL	Versys	darles_leandro@versys.org.br	Yes	No	€2,473.07	2 Months	
Brasil	ANATEL	UL	regis.tanaka@ul.com	Yes	No	€2,984.00	?	
Brasil	Type approval	Lenhardt	go@ib-lenhardt.de	Yes	No	€29,400.00	10 weeks	2 years
Brasil	ANATEL	Applus	carolina.delgado@applus.com	Yes	No	€12,923.00	10 weeks	1 year
Brasil	ANATEL and testing	CSIA	quotes@csiassoc.com	Yes	No	€6,200.00	12-14 weeks	1/2 years
Brasil	ANATEL	CPQD	aalvesf@cpqd.com.br	Yes	No	€5,070.80	10 days (?)	

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Appendix-C

Annual model

	2021	2022	2023	2024	2025
Recurring annual subscription	3000	5910	9733	13941	18522
New anual subscription	3000	4000	4500	5000	5500
Recurring monthly subscription					
New monthly subscription					
Revenue					
Subscriptions	1.440.000,00 €	2.378.400,00 €	3.415.848,00 €	4.545.772,56 €	5.765.399,38 €
Assets					
Databox	330.000,00 €	453.200,00 €	509.850,00 €	566.500,00 €	623.150,00 €
Cost					
COGS	28.800,00 €	57.081,60 €	81.980,35 €	109.098,54 €	138.369,59 €
External	400.000,00 €	412.000,00 €	424.360,00 €	437.090,80 €	450.203,52 €
Salary	1.714.929,22 €	1.766.377,09 €	2.119.652,51 €	2.543.583,02 €	3.052.299,62 €
Others	91.712,16 €	100.883,37 €	110.971,71 €	122.068,88 €	134.275,77 €

Price per subscription(Anually)	240,00 €
Price per subscription(Monthly)	20,00 €
Cost Databox	110,00 €
Communication	0,80 €
cloud cost	3,00 €
Support	1,00 €

Assumptions:	Equal amount contracts but different Churn rate 3%
	Annual recurring and new contract only
	Current loans Excluded

		Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	FY 2021
Cash In hand 31 Dec 2020	500.000,00 €													
Inflows														
Recurring Annual Subscriptions		60.000,00 €	60.000,00 €	60.000,00 €	60.000,00 €	60.000,00 €	60.000,00 €	60.000,00 €	60.000,00 €	60.000,00 €	60.000,00 €	60.000,00 €	60.000,00 €	720.000,00 €
New Annual Subscriptions		90.000,00 €		90.000,00 €	90.000,00 €		90.000,00 €	90.000,00 €		90.000,00 €	90.000,00 €		90.000,00 €	720.000,00 €
Recurring Monthly Subscriptions														
New Monthly Subscriptions		- €	- €	- €	- €	- €	- €	- €	- €	- €	- €	- €	- €	- €
														500.000,00 €
Outflows														
Databox		82.500,00 €			82.500,00 €			82.500,00 €			82.500,00 €			330.000,00 €
Variable HW cost		2.400,00 €	2.400,00 €	2.400,00 €	2.400,00 €	2.400,00 €	2.400,00 €	2.400,00 €	2.400,00 €	2.400,00 €	2.400,00 €	2.400,00 €	2.400,00 €	28.800,00 €
External		33.333,33 €	33.333,33 €	33.333,33 €	33.333,33 €	33.333,33 €	33.333,33 €	33.333,33 €	33.333,33 €	33.333,33 €	33.333,33 €	33.333,33 €	33.333,33 €	400.000,00 €
Salary		142.910,77 €	142.910,77 €	142.910,77 €	142.910,77 €	142.910,77 €	142.910,77 €	142.910,77 €	142.910,77 €	142.910,77 €	142.910,77 €	142.910,77 €	142.910,77 €	1.714.929,22 €
Others		7.642,68 €	7.642,68 €	7.642,68 €	7.642,68 €	7.642,68 €	7.642,68 €	7.642,68 €	7.642,68 €	7.642,68 €	7.642,68 €	7.642,68 €	7.642,68 €	91.712,16 €
Cashflow		381.213,22 €	- 126.286,78 €	- 36.286,78 €	- 118.786,78 €	- 126.286,78 €	- 36.286,78 €	- 118.786,78 €	- 126.286,78 €	- 36.286,78 €	- 118.786,78 €	- 126.286,78 €	- 36.286,78 €	- 625.441,37 €

NPV & IRR Metrics

Year	Cashflow	Discount Rate 10% Discounted rate	Discount Rate 10% Present Value	Discount Rate 20% Discounted rate	Discount Rate 20% Present Value
2020	0	1	0	1	0
2021	- 625.441,37 €	0,909	- 687.985,512 €	0,833	- 750.529,649 €
2022	- 411.142,07 €	0,826	- 339.786,832 €	0,694	- 592.044,575 €
2023	169.033,43 €	0,751	126.997,315 €	0,579	97.820,269 €
2024	767.431,32 €	0,683	524.165,919 €	0,482	370.096,124 €
2025	1.565.667,44 €	0,621	972.156,298 €	0,402	629.206,629 €
IRR(Internal Rate of Return)	17,08	**NPV(Net Present Value)**	595.547,19 €	**NPV(Net Present Value)**	-245.451,20 €

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Appendix-D

Monthly Model

	2021	2022	2023	2024	2025
Recurring annual subscription					
New anual subscription					
Recurring monthly subscription	200	410	661	904	1140
New monthly subscription	250	333	375	417	458
Revenue					
Subscriptions	1.170.000,00 €	2.118.400,00 €	3.302.120,00 €	4.664.096,00 €	6.202.676,80 €
Assets					
Databox	330.000,00 €	453.200,00 €	509.850,00 €	566.500,00 €	623.150,00 €
Cost					
COGS	25.920,00 €	51.379,20 €	71.631,36 €	91.289,09 €	110.471,27 €
External	400.000,00 €	412.000,00 €	424.360,00 €	437.090,80 €	450.203,52 €
Salary	1.714.929,22 €	1.766.377,09 €	2.119.652,51 €	2.543.583,02 €	3.052.299,62 €
Others	91.712,16 €	100.883,37 €	110.971,71 €	122.068,88 €	134.275,77 €

Price per subscription(Anually)	240,00 €
Price per subscription(Monthly)	20,00 €
Cost Databox	110,00 €
communication	0,80 €
cloud cost	3,00 €
support	1,00 €

Assumptions:	Equal amount contracts but different Churn rate 20%
	Monthly recurring and new contract only
	Current loans Excluded

		Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	FY 2021
Cash In hand 31 Dec 2020	500.000,00 €													
Inflows														
Recurring Annual Subscriptions														
New Annual Subscriptions		- €		- €	- €		- €	- €		- €	- €		- €	- €
Recurring Monthly Subscriptions		5.000,00 €	5.000,00 €	5.000,00 €	5.000,00 €	5.000,00 €	5.000,00 €	5.000,00 €	5.000,00 €	5.000,00 €	5.000,00 €	5.000,00 €	5.000,00 €	60.000,00 €
New Monthly Subscriptions		65.000,00 €	70.000,00 €	75.000,00 €	80.000,00 €	85.000,00 €	90.000,00 €	95.000,00 €	100.000,00 €	105.000,00 €	110.000,00 €	115.000,00 €	120.000,00 €	1.110.000,00 €
														500.000,00 €
Outflows														
Databox		82.500,00 €			82.500,00 €			82.500,00 €			82.500,00 €			330.000,00 €
Variable HW cost		2.160,00 €	2.160,00 €	2.160,00 €	2.160,00 €	2.160,00 €	2.160,00 €	2.160,00 €	2.160,00 €	2.160,00 €	2.160,00 €	2.160,00 €	2.160,00 €	28.800,00 €
External		33.333,33 €	33.333,33 €	33.333,33 €	33.333,33 €	33.333,33 €	33.333,33 €	33.333,33 €	33.333,33 €	33.333,33 €	33.333,33 €	33.333,33 €	33.333,33 €	400.000,00 €
Salary		142.910,77 €	142.910,77 €	142.910,77 €	142.910,77 €	142.910,77 €	142.910,77 €	142.910,77 €	142.910,77 €	142.910,77 €	142.910,77 €	142.910,77 €	142.910,77 €	1.714.929,22 €
Others		7.642,68 €	7.642,68 €	7.642,68 €	7.642,68 €	7.642,68 €	7.642,68 €	7.642,68 €	7.642,68 €	7.642,68 €	7.642,68 €	7.642,68 €	7.642,68 €	91.712,16 €
Cashflow		301.453,22 €	- 111.046,78 €	- 106.046,78 €	- 183.546,78 €	- 96.046,78 €	- 91.046,78 €	- 168.546,78 €	- 81.046,78 €	- 76.046,78 €	- 153.546,78 €	- 66.046,78 €	- 61.046,78 €	- 895.441,37 €

NPV & IRR Metrics

Year	Cashflow	Discount Rate 10% Discounted rate	Present Value	Discount Rate 20% Discounted rate	Present Value
2020	0	1	0	1	0
2021	- 895.441,37 €	0,909	- 984.985,512 €	0,833	- 1.074.529,649 €
2022	- 665.439,67 €	0,826	- 805.181,996 €	0,694	- 958.233,119 €
2023	65.654,42 €	0,751	49.327,136 €	0,579	37.994,455 €
2024	903.564,22 €	0,683	617.146,517 €	0,482	435.746,632 €
2025	2.002.944,86 €	0,621	1.243.671,170 €	0,402	804.938,616 €
IRR(Internal Rate of Return)	11,37	NPV(Net Present Value)	119.977,32 €	NPV(Net Present Value)	-754.083,07 €