



University of Minho  
Integrated Master in Informatics Engineering

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## **TuiChain: A Blockchain Platform for Higher Education Financing**

Business Case

*Projeto em Engenharia Informática*

a79077	Alberto Faria
pg41063	Alexandru Domente
a80261	Henrique Pereira
a82005	João Silva
a82053	Nelson Sousa
a82364	Pedro Moreira
a81135	Pedro Ferreira
a81064	Ricardo Caçador
a81919	Ricardo Milhazes
a80207	Rui Ribeiro
a81922	Tiago Sousa

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## Executive Summary

Tuichain is a product that promises to improve the world of student loans, both for students who require loans and for investors who lend them the money they need. With this platform students are not disregarded according to their possessions or which class they belong to. Everyone enters with equal funding opportunity regardless of their background.

Tuichain appears as a possible alternative to banks in terms of student financing, as well as an alternative to certain foundations that have been developed with the same aim of improving education. In this way, a value proposition is presented that takes into account the problems of both students and investors, in order to minimize their problems.

In addition, a deep analysis is made to the market, showing who is the target audience, the barriers to the platform, the platform's competitors, and also a PEST analysis.

Tuichain is a properly planned product with a whole business plan that proves it. For that, it structures a plan that passes through the value proposition, the channels used to pass the same proposal to the users, and the type of relationship between the platform and the client. For all this to work, the possible sources of income, the necessary resources, the activities and key partners, as well as the entire cost structure have been defined and proposed.

Finally, Tuichain is a product that shows itself to be viable, with a concise planning of gradual growth over the years, also counting on its expansion outside Portugal. It will only require an initial investment so that it can carry the expenses of the first years. However, it shows that it will have a reasonable financial health.

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# 1 Contextualization

The lack of monetary possessions is one of the main obstacles to higher academic education and professional specialization. The cost of higher education in a country like the United States of America is around 100,000 dollars [3]. Given these exorbitant figures, it is not expected that everyone will be able to bear such a financial burden. Besides, several underdeveloped countries lack social programs to support education, making access to higher education even more difficult. Despite the cost, higher education courses are becoming increasingly important for entering the labour market. More and more, companies are looking for people who are highly specialized in particular technical and scientific fields.

To cover the costs associated with education, students traditionally resort to loans from banks, to which they will have to pay an associated interest, possibly entering credit spirals (successive loans to pay off previous ones). Finally, many students are unable to borrow from these institutions because they represent a high-risk investment, *i.e.*, students are often disregarded.

Currently, there exist institutions that provide education financing through Income Share Agreements (ISAs). An example in Portugal is the *Fundação José Neves* [1], which establishes contracts with students so that their training can be financed. In return, the students, when entering the job market, pay a percentage of their salary for a certain number of years, to cover the financed amount. However, in this model, the capital available for student funding is limited to the capital of the institution originally providing the funds. [1]

There are also Lambda Schools that are based on ISAs but operate slightly differently from the *Fundação José Neves*, as they fund students to participate in the courses taught by their schools. Also, students only start paying back when they earn more than \$50000 annually, subject to a 17% rate of their salary. These payments are made for two years, or until they reach a ceiling of \$30000. [2]

Taking into account that there are still people who intend to obtain a higher level of education than they currently have and that there are contracts (ISAs) that put their education ahead of the capital needed for it, contrary, for example, to what is usual in banking institutions, there is now a clear opportunity to optimize the process of student financing, compared to current processes.

The opportunity arises with the defects of the other existing mechanisms for the same purpose, and with the will to improve the process for the parties involved in it. Thus, we gather points of interest and optimization, for a product with the same purpose as those previously discussed, being these points, the non-existence capital ceiling for financing, and the financing being possible to anyone, not being limited to a group of people or an organization. This allows any person to invest their money in a student's future, helping a cause.

An interesting question that may arise is: Why now? Why is this the ideal time to launch such a solution? The answer that education cannot wait is correct, however, what

moves us is the potential of Blockchain that allows us to address exactly the problem that we want to solve, taking into account the aspects that we want to improve, both the funding ceiling and its decentralization. Besides, it allows us to explore other functionalities that may be interesting for both students and investors.

Finally, it becomes appropriate to invest in this technology as it has grown more and more in recent years, and because it has the necessary infrastructure for our concept, as well as for the fintech industry.

## 1.1 The Portuguese Case

Initially, we intend to apply this system only to Portugal, so it is necessary to understand its whole context. In this country, compulsory education is financed, so only students who intend to enter higher education courses, such as undergraduate, postgraduate, master's, PhD and MBAs, should be considered.

Before proceeding, we have made a questionnaire, to ascertain whether Portuguese students feel difficulties in accessing higher education degrees and if they can be users of the system we propose.

We tried to spread the survey as much as possible between students, alumni or people who wanted to get college degrees so the answers were the closest to reality. It would not make much sense to put this questionnaire to citizens of basic education, for example. We managed to collect a total of 302 responses, of which 214 (70.9%) related to people between 18 and 25 years of age (Figure A.1).

As we expected then, the level of education of the people who answered our survey was divided between undergraduate students and the other half with high school students or masters students (Figure A.1). These 3 types of academic degrees are the ones that lead to more decisions regarding the continuity of academic education by students. Often, graduated students do not proceed to master's degrees due to lack of possessions. On the other side, some students finish high school and start working immediately as they do not have enough help to get a higher education course that brings together several costs in addition to tuition. Thus, the following responses allowed us to understand the reasons behind the choices of the citizens who answered.

The answers we got to our survey were mostly from people who were currently studying. There were 241 responses from students, of which 81.3% replied that they would like to continue studying to obtain a higher level of education and that they would have the means to do it (Figure A.2).

The important information here concerns the students who would not be able to continue their studies if they wanted to. About 40% of the students who would not like to continue their studies answered that the reason would be the lack of monetary possessions and the other part answered among several reasons such as lack of interest and job offers, which leads us to conclude an important point: almost half of the students who did not continue their studies not because they do not want to, but because of monetary, health problems or job offers. Regarding the latter, we can assume that, for example, a

student who receives a job offer after graduating can receive a much better offer with a master's degree, which would probably lead him to reconsider continuing his studies and even obtaining funding for that from the company itself.

To confirm what we thought, we took former students to answer more questions (Figure A.3). This allowed us to realize that more than half of them, about 65%, would have continued their studies if their education could have been financed. This percentage, although the sample is not the largest, allowed us to promote the use and importance of the platform we created right away.

## 2 Value Proposition

In this section, will be presented the customer segment and then the value proposition that solves users problems. The canvas that represents this section is figure [A.4](#).

### 2.1 Customer Segment

Before a solution to the problem can be proposed, it is necessary to know the target audience that will be the end-user of the product. What are the functions they perform, what difficulties they experience, and what they would gain from a solution to these problems.

These users can be divided into two different types, students and investors. Students are people who need funding for their college degree, while investors are anyone who wants to help a student pay for their course, and possibly profit from it.

#### 2.1.1 Customer Jobs

First of all, students want to have access to higher education by entering the best universities or technical schools. Besides, they can only raise their current degree, specializing in various fields of knowledge, or even just train to keep abreast of advances in certain areas of knowledge.

Nevertheless, their goals are generally common, i.e. students want to be as prepared as possible to enter the job market, to become financially independent as soon as possible, with better opportunities to benefit from a good salary.

On the other hand, there are investors, which as said before, can be anyone, who have the objective of helping students, even with a small amount, to pay for their studies.

#### 2.1.2 Customer Pains

As is well known, higher education courses and degrees are not free. The tuition fees that students must pay to attend the course they want are associated to them. These fees, depending on the context, may be too high for the student to support them. It is normal, therefore, to resort to banks for capital loans, however, it is also normal for banks to charge high-interest rates.

Many students cannot afford these charges every month, so banks may not lend them the capital they need because they are a high risk to the bank. Also, there is a certain funding ceiling, so the loans may not cover all the charges. If the student fails to pay the monthly fees to the bank, he or she may find themselves in a mortgage situation.

Some countries make no effort at all to illiterate the population, so it becomes complicated for students to move to another country to get the education they want.

As for investors, they don't have platforms where they can help students pay their fees unless it is simply to give money and never have any return. This way, helping someone is always an act of monetary loss.



### 2.1.3 Customer Gains

With a solution to the various problems, students would have access to the education they want, in the places they want, without any restriction. In this way, they would have more possibilities to have a better professional career.

For investors, the act of helping someone would no longer mean a monetary loss because students would pay back only when they could.

## 2.2 Value Proposition

After the analysis of the user segment, this section presents our value proposition that attacks the problems of users.

### 2.2.1 Products / Services

Taking into account the difficulties of users, we propose a platform based on blockchain technology, which brings together investors and students who need financing. Through this platform, students should be able to publish requests for funding, subject to the usual conditions of an ISA. Any individual may browse the platform for such requests and decide to finance, fully or partly, the tuition costs of one or more students.

The platform must ensure that when funding is raised for the student's entire application, the money is transferred to the student and the investors receive tokens representing the student's debt (the amount of tokens is proportional to the fraction financed). After the student makes the final payment (as stipulated by the conditions agreed upon at the time of the request's publishing), the full returned amount is transferred to the holders of the tokens corresponding to the debt in question, in proportion to the number of tokens owned.

With the operation proposed in the previous paragraph, it is easy to see that the aspects we propose to solve, can indeed be solved. Fundamentally, the capital ceiling for financing ceases to exist from the moment that the financing is open to any investor at an affordable price, that is, 1 token of the student's debt will initially be worth 1 dollar. The decentralization of financing is achieved from the blockchain to be used since an investor can directly finance the student without there being an intermediary institution in the process.

Besides the primary and usual functioning of the system, new functionalities can be inserted that may be interesting for the system activity, i.e. the tokens held by investors should also be able to be traded between potential stakeholders, thus forming a secondary market where it is possible to announce the intention to sell/purchase tokens. In this case, the value of the token will be defined by the market, through the existing supply and demand.

### 2.2.2 Pain Relievers

With this proposal, students, instead of borrowing from banks, can agree on an ISA contract, paying back when they really can. If they lose their job when they are in the payment phase, there should be no problem if that case is specified in the ISA. There is no capital ceiling associated with funding, as anyone can fund a student, which allows the student to ask for any amount.

As for investors, they can invest in a student, which depending on the salary, may return more or less than the amount that was initially invested. Besides, they can sell the parts they hold of the debt on the secondary market.

### 2.2.3 Gain Creators

Students publish their education debt for the world, which will be partitioned in multiple equal fragments (tokens). Lenders will buy these fragments, in other words, they own part of the debt. It's like buying actions from an enterprise. When students finish their courses and start payback to the network, the token owners of particular student's debt will receive that money, depending on the ISA contract.

The token owners could sell them to the interested ones, creating a secondary market. There are numerous reasons for people to buy and sell students debt, and in between, they can make some money. This platform will be built on top of Ethereum Blockchain that is widespread, so anyone in the world with an internet connection, can fund or be funded. It will be also, open and transparent to anybody, so everyone can lend some money to the students that need it. Therefore there's no capital ceiling for funding.

## 3 Market Analysis

### 3.1 Target audience

TuiChain's target audience is wide. To work our platform need students that are searching for financial help to complete their studies. In the year 2020 more than three thousand students finish their PhD's without any financial help<sup>1</sup>, this number only concerns the universities of Minho, Porto and *Universidade Nova de Lisboa*. In the school year of 2018/2019, almost three thousand new students started their PhD<sup>2</sup>. This number gives us a large number of potential candidates to our platform. We are dealing with a non-stop flow of clients because every year new people are starting their PhD giving us the business opportunity to help them.

On the other side of the problem, *Ethereum* blockchain has more than fifty thousand users<sup>3</sup> that's also a large number of potential investors to help the students registered in our platform. Besides a normal *Ethereum* dApp user, our platform can be of great interest for companies that want to recruit students with high technical skills, such companies may finance students in exchange for pre-signed employment contracts.

### 3.2 Barriers

Credibility and reputation are two of the main barriers to our platform to succeed. Being in the financial area means that we have to pass on confidence to our clients so that they feel secure when putting their money on our platform. To achieve this, goal partnerships can be made with regulatory authorities, the product must be certified by them and the whole policy of the company must be very explicit and public.

Reputation can be built on good values and transparency over the years. If we make an effort to satisfy our customers and keep them satisfied with a good product, they will certainly share the good experience and our reputation can grow further.

The cryptocurrency market can also be considered a barrier because there are a considerable number of people who are completely unaware of its existence or do not have enough knowledge to start using it. Some people tend to consider it unreliable because, in reality, they don't understand how it works. However, this preconception shows a decreasing trend, since by June 2020 the *ethereum* network had eighteen thousand more DApp users.

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<sup>1</sup><https://renates2.dgeec.mec.pt/>

<sup>2</sup>[https://www.dgeec.mec.pt/np4/estatglobal/?newsId=308&fileName=DGEEC\\_DSEE\\_2020\\_EE20182019.pdf](https://www.dgeec.mec.pt/np4/estatglobal/?newsId=308&fileName=DGEEC_DSEE_2020_EE20182019.pdf)

<sup>3</sup><https://consensys.net/blog/news/ethereum-by-the-numbers-june-2020/>

### 3.3 Competitors

#### Banks

Nowadays banks are the main entity to which people turn when they need financing, school financing is no exception to this rule. This fact makes banks our main adversary, however, the approach thought for our product is committed to being more benevolent and therefore more attractive to those seeking financing.

Anyone who asks for a bank loan is immediately attached to high-interest rates and must start paying their debt immediately. The problem is that students do not have the money to pay for the education they need at the moment they enroll it.

On the other hand, our platform people sign a contract where they commit to paying a part of their salary only when they start working. This approach relieves the financial pressure on people who are just studying at the moment.

#### Foundations

**Fundação José Neves** More recently, different approaches based on Income Share Agreements (ISAs) have emerged that considerably relieve payment conditions for those who are funded. In Portugal, the main one is Fundação José Neves.

For each candidate, a simulation is performed to find the best way of refunding the income. In this simulation the percentages of the salary that must be returned, the number of months in which the debt must be paid off and the maximum and minimum limit of the amount to be returned will be decided to safeguard that the student will not pay an amount that is too far out of line with the amount he has received. The foundation also guarantees that in the event of loss of employment or difficulty in entering the job market, the returns are pending without any prejudice to the candidates, and will be resumed as soon as these situations are reversed. For FJN to know the applicant's professional situation, the applicant will have to report his/her professional situation whenever necessary (lose a job, increase/reduce his/her salary, stop working for some time, etc.).

This foundation expects to finance 1500 students in the first 2 years<sup>4</sup>, however, the size of the market clearly exceeds this number, with even more people seeking school funding in these 2 years and that's the problem with these foundations. They do not have enough capital to finance all applications.

Investors are attracted by the possibility of making some profit by lending money which allows us to increase the capital available to finance students.

**Lambda School** This institution [2] also use ISAs, which are agreed with the students, where all have the same value (US\$ 30 000). Also, to be able to use this ISAs you have to be either a US citizen, a US permanent resident or a DACA (Deferred Action for Childhood Arrivals) recipient, which by itself is a disadvantage. They only offer courses that exist in

<sup>4</sup><https://observador.pt/2020/09/17/fundacao-jose-neves-investe-5-milhoes-de-euros-em-1-500-bolsas-para-estudantes/>

the organization (Data Science and Full Stack Web), which is not an accredited institution and does not offer a degree but a certificate of completion.

The way they finance student is by signing an ISA where the student agrees to pay between 0\$ and 30000\$ in 24th monthly payments based on the income. As long as his wage is above 50000\$ a year, 17% of the gross income is deduced. While the student is unemployed or is making less than the value stipulated, the payments are suspended.

By expanding this product to other countries, namely the USA, we will be giving a real opportunity to these students that may want to study in a accredited university or get, for example, the PhD that they really want. Consequently, a significant part of these students may want to use our product instead of seeking an ISA through Lambda Schools.

### **3.4 PEST Analysis**

#### **Political**

In terms of political legislation, our platform would have to be rigorously developed. As we are in the financial area the rules in force are restricted. Despite this, there are currently legal platforms in Portugal that allow us to invest money and collect profits such as Etoro, Coinbase, etc, a factor that gives a positive signal regarding the feasibility of our idea.

#### **Economic**

Economically speaking, the cryptocurrency investment market is growing with more and more people looking to invest their savings to increase their capital. This trend may influence more people to use our platform.

#### **Social-Cultural**

Today's society increasingly values school specialization, the increase in the number of graduates in Portugal does not escape this principle. This factor indicates the presence of a growing market in our field of action.

#### **Technological**

Nowadays the existence of blockchain technology allows us to leverage our business model, and expand it to anyone. In the same context, the ethereum network that already has a solid user base is the ideal place to install our platform and start our activity.

## 4 Model and Business Strategy

Defining a business model is a key activity to achieve success as an organization. A business model describes how an organization creates, delivers and obtains value [4]. To define our business model, we followed *Osterwalder and Pigneur's* approach. The attached figure A.5 summarizes this entire section.

### 4.1 The 9 Building Blocks

The 9 Building Blocks, as defined by *Osterwalder and Pigneur* [4], cover four of the major business areas: clients, offer, infrastructure and financial viability.

#### 4.1.1 Customer Segments

The customer segments block defines the target audience, including costumers and organizations, that a company pretends to serve. Without clients, a company cannot sustain its activity. A business model can define one or multiple customer segments. It's always important to understand their needs so that a company can build around them.

For TuiChain, there are two types of customers, mainly distinguished by their specific needs: **students**, that resort to TuiChain to obtain financing for their studies, and **investors**, that can use TuiChain as a beacon to help students achieve higher education and as a new platform for investing.

A multi-sided platform is a type of customer segment that's applied to business models that depend on both types of customers to be successful. That's coherent with TuiChain's logic, since students need investors to finance their studies, and investors need financial requests from students to be able to invest.

#### 4.1.2 Value Propositions

The value propositions block describes the set of products and services that create value to a specific type of client segment. A good proposition value means that, usually, customers will prefer your product over other products in the market, since yours satisfies specific needs that no other can. It doesn't mean that your product has to be innovative, it can be similar to other products but with additional attributes.

As for TuiChain, there are three main values:

- **Performance** - the TuiChain platform is an enhanced version of traditional loaning platforms in terms of the value that it represents to students, as it provides constant access to financing for their education since there is no capital ceiling involved (all the loans are provided by external investors).
- **Cost reduction** - as a lot of worldwide students need financing for their education, TuiChain gives them the possibility, not only to obtain financing but also to only

pay back the financing made when they have the resources to do so. This reduces students' costs immensely.

- **Accessibility** - sometimes, when students need financing, traditional loaning platforms do not accept them due to high risk associated with students in terms of payback. TuiChain enables all students to request financing for their studies.

#### 4.1.3 Channels

The channels block describes how an organization pretends to communicate with and reach their costumers to present them a value proposition. It raises awareness towards the product, helps to deliver a value proposition to costumers and provides post-purchase customer support.

TuiChain has defined two main channels to communicate through:

- **Partner and indirect** - to raise awareness towards our product, it makes more sense to use partner and indirect channels such as Youtube and Facebook, especially due to the high flux of people using them.
- **Owned and direct** - to give costumers the possibility of evaluating our value proposition, to access our product and to provide post-purchase customer support, we decided to use owned and direct channels. To be more precise, our website.

#### 4.1.4 Customer Relationships

The customer relationships block describes the type of relations that an organization establishes with its customer segments. It not only helps to acquire new clients but also helps to retain them. Additionally, it can increase sales. These relations can improve massively customers' experience.

Within the TuiChain organization, we want to create conditions for all costumers to contact us directly. Additionally, we pretend to create an environment where investors and students can express their concerns and problems in a public way so that we can help customers have a better experience. To achieve these objectives, we will use **personal assistance**, such as contacts via email, and **communities**, such as FAQs.

#### 4.1.5 Revenue Streams

The revenue streams block represents the money that an organization generates through its costumers. It is crucial to understand the value that each customer segment is willing to pay. This will help an organization to create the best revenue streams possible.

In the TuiChain environment, a lot of transactions will be made per day since the platform is based around providing funds and paying back loans. For that reason, it makes sense that we use **brokerage fees** as a revenue stream. Any other type of revenue stream like publicity doesn't fit our model, since the platform is meant to be a system that people can trust their finances on.

#### 4.1.6 Key Resources

The key resources block describes the actives needed to provide and create a good value proposition, to reach the market, to retain relationships with the customers and to create profit. This resources can be physical, intellectual, human or financial.

For TuiChain it is mandatory to have an **intellectual** active, the TuiChain software. Other than that, **human resources** are needed such as a legal department, due to all the legal issues involving contracts, and an IT department, to manage and create the TuiChain platform.

#### 4.1.7 Key Activities

The key activities block describes the most important things a company needs to do to achieve success. Very much like the key resources, they are required to provide and create a good value proposition, to reach the market, to retain relationships with the customers and to create profit.

For TuiChain, to create and provide a good value proposition, but also to retain customers and create profit, **platform management** is key. Also, to provide information about our value proposition and to reach new clients, **marketing** in an activity that must be applied and explored within our organization.

#### 4.1.8 Key Partnerships

To make our business model, we need partners. The key partners block describes those exactly. Key partnerships help reduce risk and optimize business models.

TuiChain is a blockchain platform for education funding. As it is based around blockchain and digital coins, we need a network that can provide us with all the functionalities around those areas. For that reason, the **Ethereum Network** is an indispensable partner that can guarantee the acquisition of particular and mandatory resources.

#### 4.1.9 Cost Structure

To guarantee all key resources and activities, costs will be incurred to the organization. The cost structure block describes the most important costs incurred to guarantee an operational business model.

TuiChain will need to spend monetary resources on **wages**, since they guarantee workers to manage, create and evolve the TuiChain platform. To **manage** the TuiChain platform, there will be costs related to storage and other operational activities. Additionally, the organization will have to spend money on **marketing** to reach new customers.



## 5 Economic and Financial Analysis

To make a financial analysis of our product we use the Excel template provided by the faculty. This file is divided into several parts that must be completed to obtain a good financial analysis. In this section, we will explain what our approach was in each of the parts, and comment on the final results.

### 5.1 Assumptions

First of all, it is necessary to establish the general assumptions of the project. These will be used throughout the analysis. Here are specified values such as tax rates, company start date, and currency used. Besides these values, we also decided that in the year 2021 we would only develop the product and would not sell any kind of service.

Unidade monetária	Euros
Ano inicial do projeto (Ano 0)	2021
Prazo médio de Recebimento (dias) / (meses)	30
Prazo médio de Pagamento (dias) / (meses)	30
Prazo médio de Stockagem (dias) / (meses)	15
Prazo de pagamento de IVA (trim = 4; mensal =12)	
Taxa de IVA - Vendas	23,00%
Taxa de IVA - Prestação Serviços	23,00%
Taxa de IVA - CMVMC	23,00%
Taxa de IVA - FSE	23,00%
Taxa de IVA - Investimento	23,00%
Taxa de Segurança Social - entidade - órgãos sociais	23,75%
Taxa de Segurança Social - entidade - colaboradores	23,75%
Taxa de Segurança Social - pessoal - órgãos sociais	11,00%
Taxa de Segurança Social - pessoal - colaboradores	11,00%
Taxa média de IRS	15,00%
Taxa de IRC	25,00%
Taxa de Aplicações Financeiras Curto Prazo	
Taxa de juro de empréstimo Curto Prazo	
Taxa de juro de empréstimo ML Prazo	
Taxa de juro de ativos sem risco - Rf (Obrig Tesouro)	0,25%
Prémio de risco de mercado = $(R_m - R_f)$ ou $p^0$	5,00%
Beta U de empresas de referência	100,00%
Taxa de crescimento dos cash flows na perpetuidade	0,00

Figure 5.1: Assumptions.

## 5.2 Services

Tuichain as a company has 2 services, student loans, and the sale/purchase of tokens in the secondary market.

### Loans

As a service, student loans are profitable through fees applied to each investment. When someone lends 1000 euros, for example, a rate of 7% is applied, leaving the company to profit 70 euros. We think this is a reasonable rate since in the future the investor can profit from the money he lent.

The fees for a doctorate or MBA may be between 2000 and 12000 annually, in this analysis, we will consider the average value of 5000 euros. As for the number of loans that we may be able to make available, we think it is reasonable to consider 200 in the first year considering that we are still a recent and not well-known company. With all this taken into account at the end of the first year of the service, we would be earning 70000 euros.

$$profit = (200 * 5000) * 0.07$$

It is expected that we will be able to grow considerably since the market is large and in the first year we finance a relatively small amount of students. However, in the future this growth is expected to decrease as the number of people requesting school funding is limited.

This service is applicable on a global scale, but we did not find it feasible to enter several markets from the beginning. We plan to start in Portugal in 2022 and expand to other countries in 2023. When this expansion happens we should have huge growth in the number of loans, since we are increasing the target audience considerably.

### Secondary Market

The secondary market is profitable through fees applied to each transaction, when an investor decides to sell a token to another investor for a certain price this sale is taxed at 7%, just like the loans. Assuming that in the first year 20% of the released tokens are traded at least once in the secondary market we would have a total of at least 20000 transactions.

$$nrTokens = totalLoaned = 200 * 5000 = 1000000$$

$$nrTransactions = nrTokens * 0.2$$

This allows us to obtain a total profit of 1680 euros in the first year. At first glance, it may not seem like much but the annual growth rates of this service may grow exponentially. This is because a token can be exchanged several times and over a long period.

Like the loans this service is applicable at a global scale, however, we only hope to start expanding in 2023.

### 5.3 Costs

The costs of our company can be divided into 3 areas.

#### Subcontractors

Our concept is critical and therefore we need assistance in several areas, for this, we will make available 1000 euros per month to hire financial and legal consulting services.

#### Office renting

As a company, we need an office to work in. Added to this are cleaning services, surveillance, electricity, water, and telecommunications. In the first 2 years, the plan is to get a small space sufficient to support team meetings and keep teleworking the general rule. The price to have all this should go around 5500 euros in the first year.

#### Technology

In terms of technological costs, it will be needed a web service capable of hosting our site, the price of one in amazon is around 90 euros per month. In addition to this, it is important to offer computers to all workers, the average price of a decent computer is around 1000 euros.

#### Marketing

The plan in terms of marketing is to contract a professional only in 2022 when we will start selling. So in terms of cost with publicity campaigns, we are prepared to spend around 500 euros monthly starting from 2022.

#### General growth

The costs in general will tend to grow as the company also grows. We expect that in 2024 when the company makes a big jump in the number of employees that costs will also follow this expansion.

### 5.4 Employees

In an initial phase, the team would have to be small, only the minimum necessary to develop the platform. A managing partner (CEO) with a salary of 1500 euros per month and 3 programmers being paid around 900 euros monthly. In 2022 a marketing specialist comes in with a monthly salary of 900 euros to help leverage the business and get our first customers. As time goes by more people come into the company to reinforce these areas and also to create new departments. As for salaries, these will also increase with the growth of the company over the years.

## 5.5 Need for investment

With the revenues and costs previously defined the company shows a deficit in the first 3 years. With cash-flows of -38332 euros in the first year, -67720 in second, and -99862 in the third. To fight this we need financing, we will then turn to a bank loan of 10 years with an interest rate of 7% in the amount of 100000 euros. This will allow us to start our business without problems and we think it will be bearable considering the growth expected for the company.

## 5.6 Final analysis

Taking all the above into account the project has a net present value (VAL) of 1321921 euros, a return rate of 110.50% (TIR) and a payback period of 4 years.

a perspectiva do Projecto (Pré-Financiamento = 100% C	2021	2022	2023	2024	2025	2026	2027
Free Cash Flow to Firm	-38 332	-29 388	-32 142	108 187	328 605	1 222 626	142 041
Taxa de atualização $R_u = R_F + B_u \cdot (R_m - R_f)$	5,25%	5,25%	5,25%	5,25%	5,25%	5,25%	5,25%
Factor de actualização	1,00	1,053	1,108	1,166	1,227	1,292	-
Fluxos actualizados	-38 332	-27 922	-29 016	92 792	267 785	946 636	109 978
Fuxos atualizados acumulados	-38 332	-66 254	-95 269	-2 478	265 307	1 211 943	1 321 921
Valor Actual Líquido (VAL)	1 321 921						
Taxa Interna de Rentabilidade	110,50%						
Pay Back period (arred ano inteiro)	4 Anos						

Figure 5.2: VAL, TIR, and Payback.

In general, we think the project is financially viable but requires some initial funding. Perhaps if we can start selling our services already in 2021 the payback period can be reduced and the initial investment smaller.

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- [4] Alexander Osterwalder and Yves Pigneur. *Business model generation: a handbook for visionaries, game changers, and challengers*. John Wiley & Sons, 2010.

## A Survey Results and Canvases

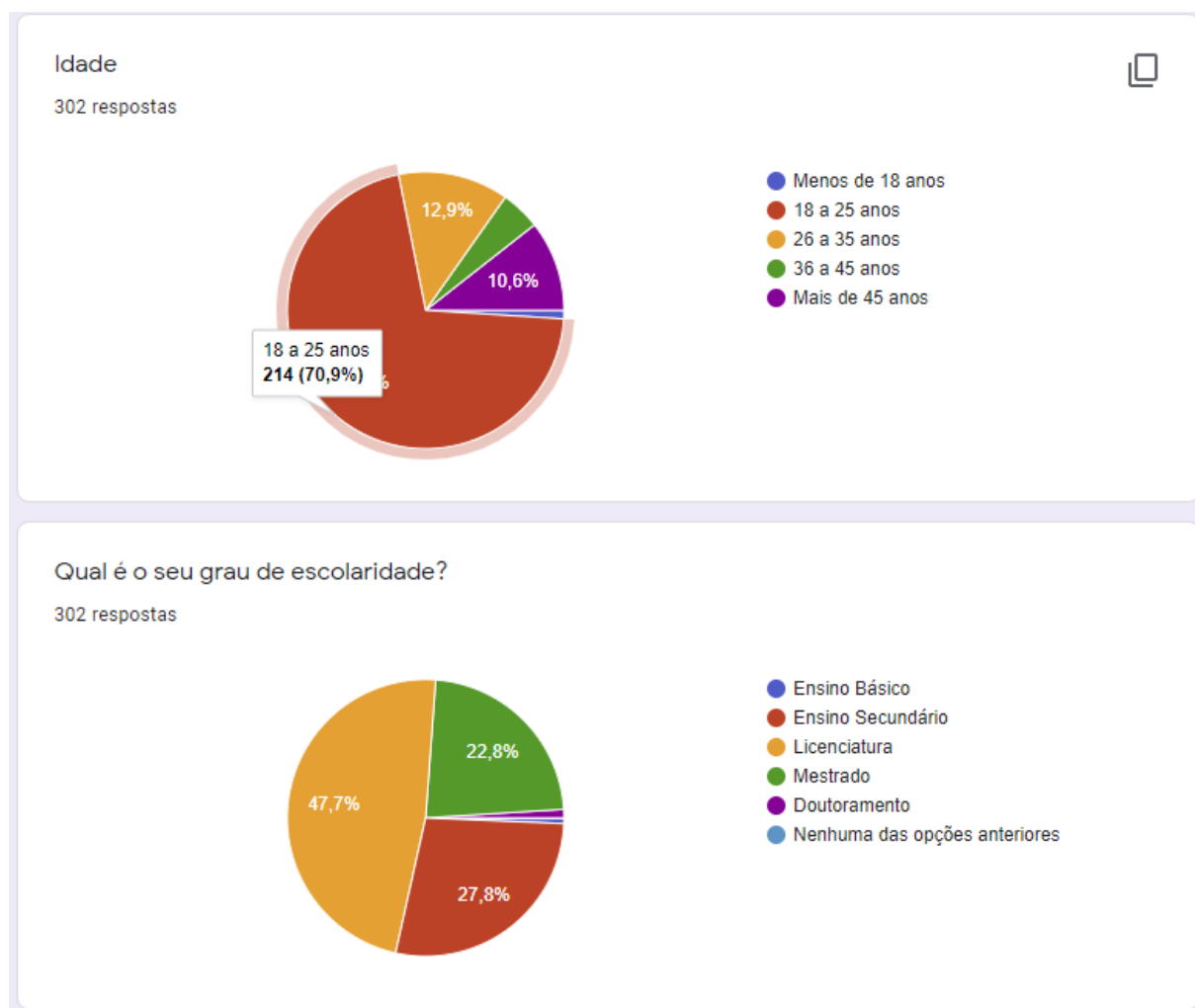


Figure A.1: Survey results.

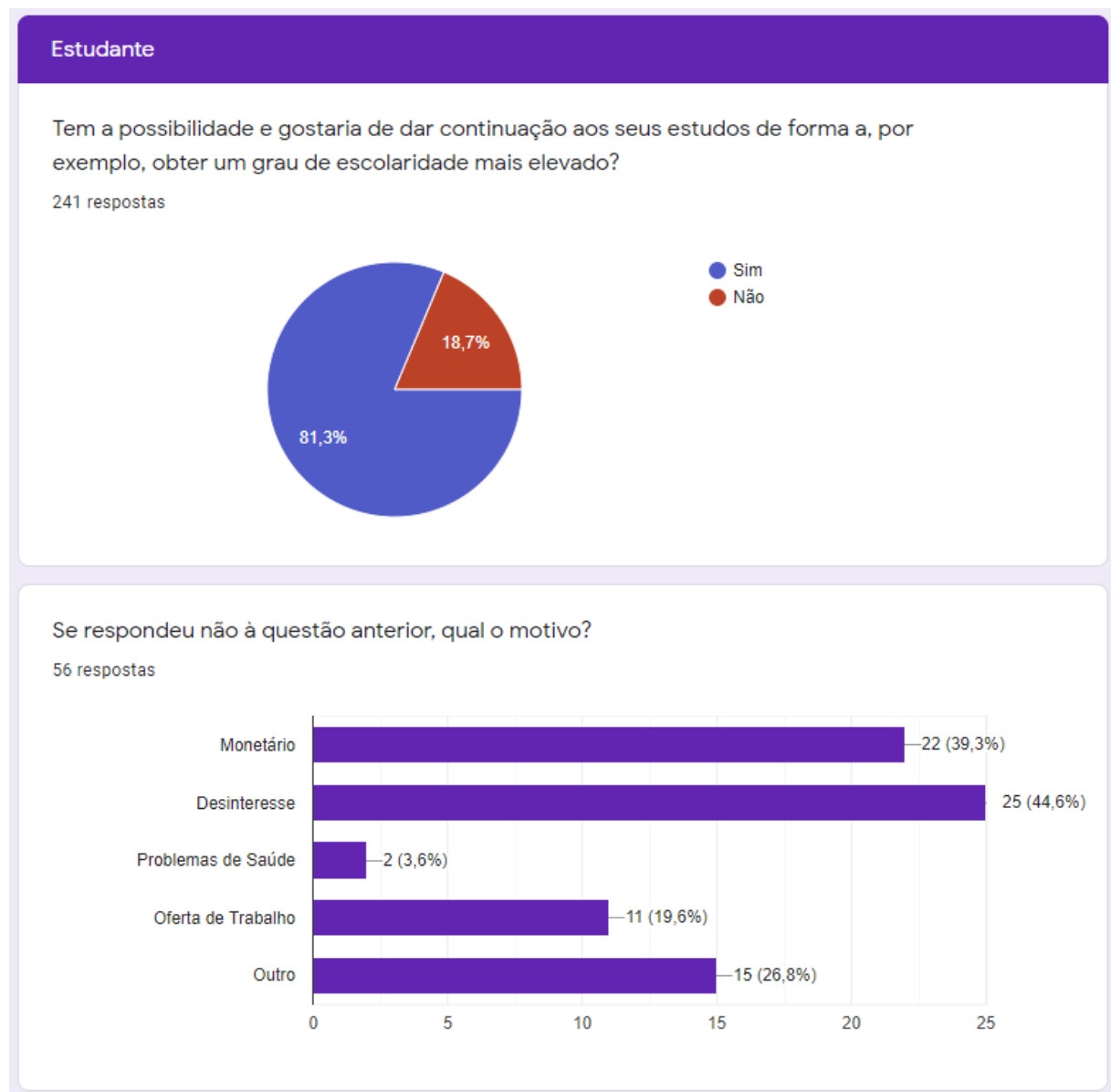


Figure A.2: Students survey results.

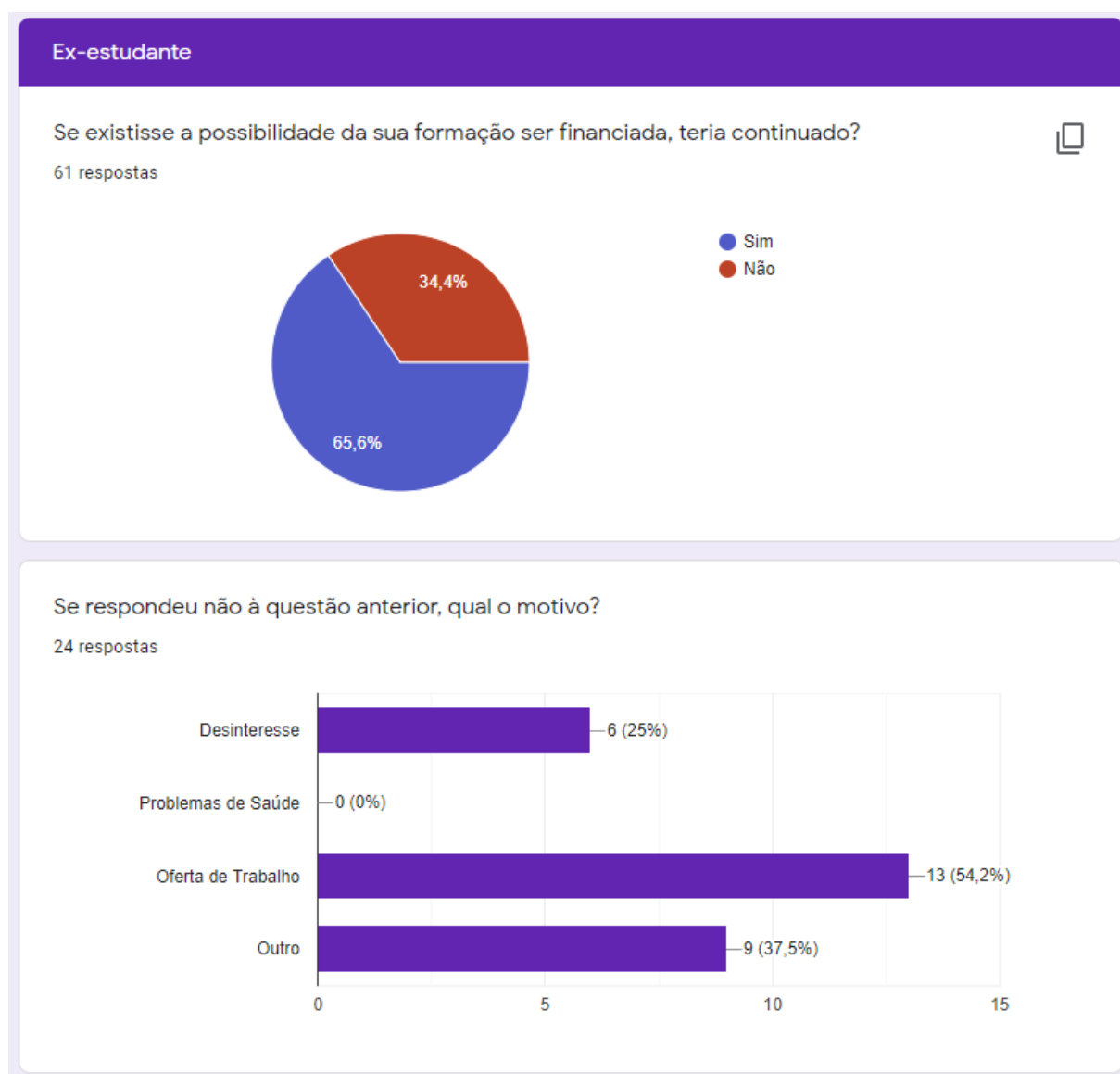


Figure A.3: Former students results.



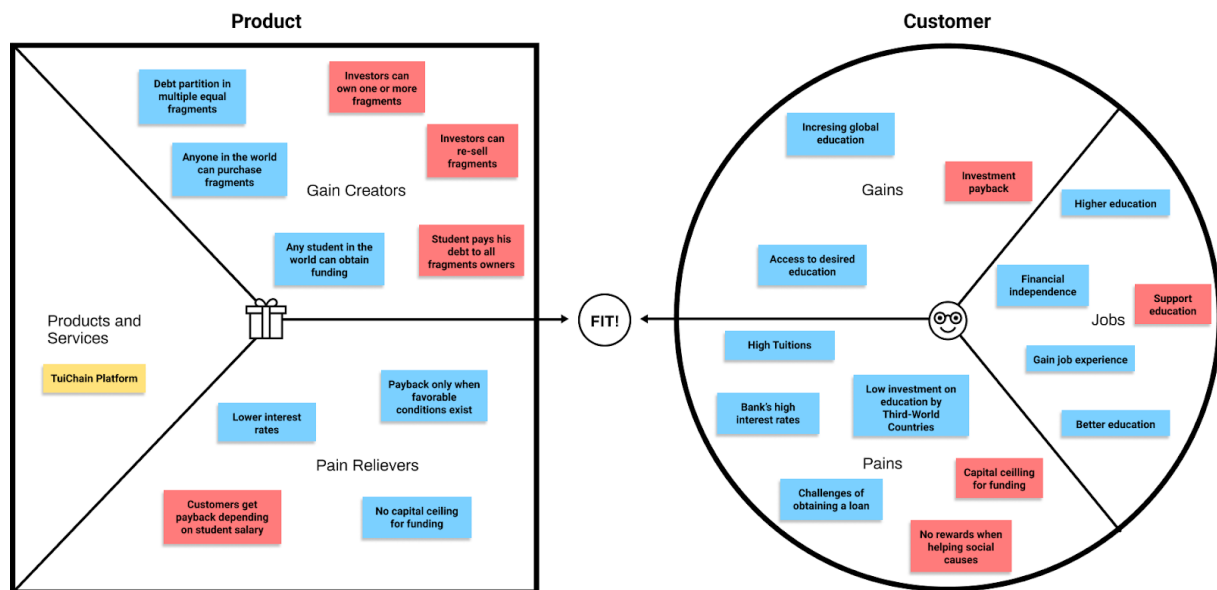


Figure A.4: Value Proposition Canvas.

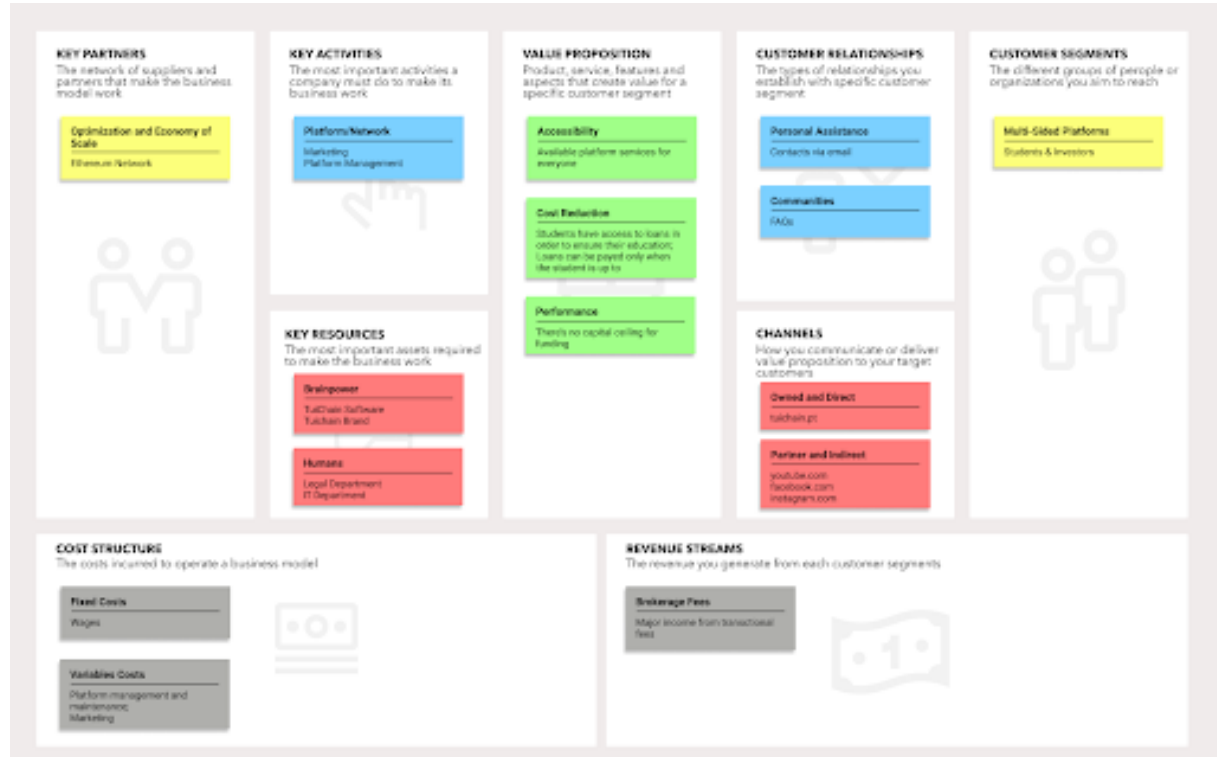


Figure A.5: Business Model Canvas.