Final master paper

Master in Industrial Engineering

Design of a Startup Acceleration Programme

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Abstract

Many universities around the world have developed incubator and accelerator programmes to improve technology transfer within the university as well as enhance the university’s educational portfolio. Although several alternatives boost innovation in the UPC, none offers the full package of technology transfer combined with an improvement in the educational portfolio.

This work attempts to design a programme that can cover this opportunity and from which the ETSEIB can profit. The ETSEIB is one of the biggest sources of talent in Barcelona; an accelerator programme could complement the ETSEIB’s portfolio of educational services. In addition, the designed programme should help teachers with their interests and fears, as well as offer them a complementary service.

This work proposes a possible design of an accelerator programme for the ETSEIB. The programme design includes a proposal of a programme structure, a budget, and an implementation plan. This project should cater to two sets of possible users. The first are students and teachers who wish to launch startups, and who need training and mentorship. The second group comprises researchers with a product that could fuel a business, but these researchers do not wish to undertake such a project. This group needs a way to improve the technology transfer in the school and to earn profits on these projects without leaving the university.

To prepare this proposal for the programme and ensure that it is feasible and sustainable, the design follows the business model canvas framework. Preparing this proposal and deciding on the position of everything in the framework was made possible by linking the theory, the insights from professionals, and the analysis of the environment.

The theory has been analysed by conducting research on academic papers, books, and information from other sources. This review sought to understand the concept of incubator and accelerator programmes as well as the theory behind them.

Seven interviews were conducted with industry professionals associated with various types of programmes. The variety of opinions and experience has allowed this work to explore the divergences with the theory and recognize the real opportunities in this sector.

Understanding the environment where this programme would be implemented was just as important. This paper includes an analysis of the characteristics of the innovation environment of Barcelona and the UPC. It also includes the analysis of responses to a survey questionnaire that was distributed among a large percentage of ETSEIB teachers. The survey provides first-hand knowledge about the opinions of one of the major stakeholders of this programme.
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1. Introduction

The product life cycle is becoming shorter and shorter. The development of consumer electronics provides visual evidence of this. For example, there are new smartphones every year, as well as new tablets, smartwatches, and wearables.

Products now become outdated the day they are bought. Kiefer (1983) stated more than 30 years ago: ‘Companies apparently will not only have to contend with the fact that their products will become outdated faster and not last as long on the market, but also with the prospect that pressure to bring out new and better products will increase.’ This situation has made the product life cycle shorter; thus, the window of opportunity before the competition catches up has become smaller (Goyal, 2001).

The easy-to-use technology that is widespread in society today is experiencing a boom in innovation that was earlier dominated by corporations. Thousands of startups are being created every day to solve problems that a corporation may not be able to solve due to its limitations.

Twenty years ago, companies such as Google emerged. At the time, although creating a startup was not rare, it was not the norm. In contrast, 100 million new firms are being launched yearly worldwide (Mason, n.d.). The large number of new businesses is a response to the extensive development that is taking place. At the same time, it signals heavy competition. Not every company can become Google, Uber, or PayPal. Startups face the likelihood of success but there are high risks. This was demonstrated by Color, Wesabe, and SearchMe, all of them startups that raised a lot of money in the first rounds but eventually failed to deliver or continue (Hough, 2012).

Barcelona has become the fifth hub in Europe in terms of technological innovation (Jose Polo, 2017). Engineering students exposed to new trends and events in the city may have a high potential for changing both the emerging and established sectors. For these reasons, students and university staff from engineering schools face different challenges if they want to innovate. Two of the greatest challenges include not having a management background and which steps the company should follow in the beginning. Owing to the high competition, individuals (such as students and university staff) who lack experience in creating a business have a clear disadvantage when going to the market.

In the past 15 years, incubators and accelerators have been set up to close that gap among not only engineers but people with all types of backgrounds. The goal of such organizations, together with other entities such as venture capital or business angels, is to profit from possible growth in these startups. All these businesses rely on one or both of the following two paths: investment in the company or training within the company. Both methods are valid and any startups that lack
resources could benefit.

The present work analyses the different kinds of programmes for startups and the reality of the sector nowadays. This project aims to implement a sustainable programme in one of the most prestigious engineering schools in Barcelona, where the competition in innovation is significant. Furthermore, this work aims to link the three corners of the triangle formed by the stakeholders’ needs, theory, and experience.

1.1. Objectives

1) Main objective: Design of the programme

The main goal of this project will be to design an incubator or accelerator programme to meet the needs of the ETSEIB stakeholders. For this purpose, proposing a plan that is feasible and sustainable, and that brings value to its stakeholders is crucial. Apart from choosing the right programme, this paper also aims to plan the implementation and the programme, evaluate the costs, and choose the most suitable sources of revenues. When creating a startup, one of the main concerns will be a return on the investment for the programme.

2) Theoretical review and understanding why these programmes exist

The theoretical review will target the analysis and understanding of the characteristics of different incubator and accelerator programmes worldwide. The analysis will include programmes from public entities and private ones. Moreover, the analysis will cover why these programmes exist, why people use them, and what alternatives there are.

3) Trends in the sector and knowing the experience of professionals

The objective here will be to gain insights from staff at various kinds of incubators and accelerators in order to have as broad a perspective as possible. Some key insights could relate to current trends in the sector, the reasons startups fail, and the challenges of any incubator or accelerator programmes.

4) Environment analysis

This study also analyses the context and environment of the ETSEIB and Barcelona to understand what the main needs of the stakeholders are. In addition, it is essential to understand some of the entities around the ETSEIB and their stakeholders. This analysis will also focus on estimating the needs of entrepreneurship in the ETSEIB. Thus, it should include an approximation of the number of startup projects in the ETSEIB every year and how much the accelerators should
charge from them. In addition, the analysis will look at whether the stakeholders are willing to embrace these new services and help in their operations.

1.2. Scope

The theoretical analysis in this paper includes an analysis of incubator and accelerator programmes, as well as of trends and research in the field. It also includes an explanation on the main alternatives to this programme. This part does not include minor used alternatives or very specific ones. Moreover, this section covers other relevant topics that are necessary to understand the rest of the paper.

The insights for the sector have been obtained through interviews and, when possible, by looking at different types of programmes. The interview participants are mainly people working in Barcelona. The intention was to extrapolate their experience.

The paper analyses the main entities from a broad perspective and then surveys teachers at the ETSEIB. It is not within the scope of this paper to survey all the different stakeholders in Barcelona, nor all the interested parties in the ETSEIB. The reason is that it may be tough to obtain reliable data from some stakeholders, such as students, given the resources available.

Considering the design phase, the paper seeks to link theory, expertise, and the environment. Conducting a practical test and investigating the agreement of the stakeholders is not a part of this study. Moreover, during the analysis of cost and revenues, approximations have been made from the available data. In any case, the paper fully evaluates the cost and revenues based on empirical evidence.

This work does not intend to make any recommendations or offer criticism for other accelerator or incubator programmes. The reality differs in each business. So, the recommendation is based only on the knowledge expressed in this paper.

1.3. Methodology

This paper will consist of four main parts:

1) The first part will analyse the current literature from existing articles, information available from existing programmes, and other data accessible from the internet or a library. The focus will be on why these programmes exist and what alternatives there are. This part will also define the concepts used in the rest of the document.

2) Second, a series of interviews with professionals in the sector will be performed. These interviews will be studied and analysed. During each interview, the goal will be to
understand the position of the professional, their insights into the sector, and how to build a new incubator or accelerator programme from scratch. A summary of the key points relevant to the design will also be provided.

3) Understanding the environment where the activity will be developed is as important as understanding the theoretical and practical aspects. To understand the environment, it is necessary to understand the different stakeholders when creating the programme. First, an extensive analysis of the information available was performed. Then, a survey questionnaire was developed. This was answered by teachers of the ETSEIB and other people linked to the university. This provided an excellent way to size up the needs of startup creation in the ETSEIB.

4) To propose an incubator or accelerator programme for the ETSEIB, we will develop a business model for the programme with the business model canvas as a framework. This framework will allow us to extrapolate all the information previously analysed and create a sustainable programme. Also, after defining the final form of the programme, budgeting and planning will have to be carried out to understand the costs, opportunities, and value of implementing this programme in the ETSEIB.
2. Literature Review

This first section holds all the theory needed to understand the concepts of an incubator and an accelerator, as well as how they work. The later analysis of current programmes and trends focuses on not only how they work but also what differences there are among different programmes and how this is related to the success of the various kinds of startups.

In the current economy, driven by smartphones and new technology, the number of startups is rising every year. In 2015, with a 26% increase, 2,551 new startups were created in Spain in the first 10 months of the year (Fontanillo, 2015). This increase can be seen everywhere. For example, in the United Kingdom (UK), 80 new businesses are born every hour on average (Palmer, 2016). But what is a startup?

Investopedia (“Startup,” n.d.) defines a startup as ‘a company that is in the first stage of its operations’. Moreover, startups are usually a small group of workers with a product or service that is either not offered in the market or that the founder thinks is provided in an inferior manner. Startups do not have much history and, usually, their expenses exceed their revenues (Fontinelle, n.d.).

Startups by themselves do not have a lot of resources. This is because startups may not have enough clients and their operations are usually not refined. That is why startups look for support financially and educationally to continue with their operations and grow.

In this section, different programmes, methods, and indexes are explained to fully understand the startup options and how the interaction between actors is carried out.

2.1. Programmes that support startup development

When launching a startup, incubators and accelerators are the best options to kick-start the business. Participation in these programmes typically depends on the personal confidence of the startup founder. Both programmes help entrepreneurs to fine-tune their business model, create a credible store for investors, and train startups in execution skills.

On the other hand, these programmes also have some disadvantages. They can be distracting and may lose focus on the project. They may also be confusing as different mentors and investors can have different opinions (Deeb, 2014). Moreover, especially in incubators, sharing spaces with companies that have been in the incubator for under-performing issues can also be counterproductive.

Although they seem similar and have some similarities, the two programmes differ in important
ways. As the names suggest, accelerators accelerate existing companies, whereas incubators incubate disruptive ideas while seeking to build a business model out of them (Forrest, 2014).

Other entities support startup development. The most important among these are business angels, venture capital firms, and co-working spaces. Figure 1 shows the different programmes and resources that a startup can look for. Except for incubators and accelerators, the other possibilities are explained below.

**Co-working spaces**: Co-working spaces are on-demand offices that connect like-minded entrepreneurs. The key benefits of co-working spaces are access to legal and accounting services, as well as to human resources. They also offer other services and conferences. They do not invest money in the startup and usually charge for their services.

**Competitions**: Their main goal is to give startups exposure and support. During a contest, startups can validate their business model and their ideas. Moreover, winning a competition can bring cash or mentorship to kick-start the startup, or help it develop faster.

**Crowdfunding**: Crowdfunding does not offer any possibility of mentorship but is a good way to obtain funds for your startup. Moreover, crowdfunding processes allow startups to validate their business model if they are a business-to-customer (B2C) company. There are two types of crowdfunding. The first is reward-based, where the founder receives a reward depending on the sum they contribute. The most famous platform of this kind is Kickstarter ("Kickstarter," n.d.). The second one is equity-based, where the founder receives equity participation proportional to their involvement. The most famous one is Crowdcube ("Online investing, equity crowdfunding, business finance: Crowdcube," n.d.).

**Business Angels**: Business angels invest in startups in the early stages of development. The startups are usually in the pre-seed or seed stages of funding. Business angels are mainly individuals—usually entrepreneurs or former entrepreneurs—who wish to contribute to society by using personal funds to invest in a startup. Normally, the relation among business angels and startups is not merely financial. But, as former entrepreneurs themselves, business angels use their experience to help and mentor the startups they fund. The Halo Report (Knauss, Cain, & Williams, 2016) states that the median angel group investment is $127,000 in the United States (US), while the median funding round size is $950,000.

**Venture Capital (VC)**: VC firms are companies that manage the wealth of third-party individuals and companies, and invest with these funds. VC firms often aim for high returns but not at a significant risk. To achieve this aim, venture capitalists usually fund startups in a mature stage that need a boost through funds. In exchange for the funds, VC firms usually receive a high equity
stake in the company and a seat on the board of directors. The median VC funding round is usually more than $1 million (Pearlman, 2016).

Figure 1: What are your startup’s needs? Reprinted from Gust (Pearlman, 2016).

2.1.1. Incubator programmes

A startup incubator is a workspace where early businesses relocate, usually on a month-to-month lease. The key benefits of incubators for startups are shared knowledge and a lower fixed cost than renting space independently. Mentorship in incubators is provided through entrepreneurial investors and shared learning. Companies in incubators tend to be ventures founded by the same investor group (Deeb, 2014).

Startups in incubators are usually in the earliest stages of development. Incubators are typically sponsored by VC firms, government entities, and major corporations. The point of entry is either by an application process or through trusted partners (Forrest, 2014). Some general incubators do exist. But depending on the sponsorship, incubators can be specialized in markets or solutions. It is usual for incubators to develop an idea internally and then hire everything from outside to bring the concept to the market (DesMarais, 2012). The incubator model was born in the 80s and
is increasingly becoming outdated (Fidelman, 2014).

### 2.1.2. Accelerator programmes

A startup accelerator is somewhat different. Space is typically limited to three to four months. Cash investment from the accelerator is minimal, but graduating from an accelerator programme normally facilitates raising capital from third-party VC firms. Mentorship typically comes from entrepreneurs affiliated to the accelerator (Deeb, 2014).

Figure 2 illustrates where accelerators get their funds and who created them.

![Institutions that fund accelerators](image)

**Figure 2: Institutions that fund accelerators. Data retrieved from ‘How Accelerators Make Money to Manage Operating Costs’ (Mohan, 2015).**

Accelerators normally start with an application process. The selection process is tough; only about 1% to 5% of the total applications are accepted. After selection, companies receive an initial investment and access to an extensive mentor network in exchange for equity. Normally, the mentor network is the biggest value for enterprises (Forrest, 2014).

<table>
<thead>
<tr>
<th>Region</th>
<th>Investment</th>
<th>Number of accelerators</th>
<th>Number of startups</th>
<th>Mean per accelerator</th>
<th>Mean per startup</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worldwide</td>
<td>191,999,757 €</td>
<td>387</td>
<td>8836</td>
<td>496,123 €</td>
<td>21,729 €</td>
</tr>
<tr>
<td>Europe</td>
<td>37,533,632 €</td>
<td>113</td>
<td>2574</td>
<td>332,156 €</td>
<td>14,582 €</td>
</tr>
<tr>
<td>Spain</td>
<td>4,654,929 €</td>
<td>21</td>
<td>263</td>
<td>221,663 €</td>
<td>17,699 €</td>
</tr>
</tbody>
</table>

**Table 1: Accelerator investment 2015. ([Gust & Fundacity, 2016](#))**

The number of startups is growing worldwide, particularly in Europe and the US. Figure 3 presents the number of startups created in the US from 2005 until 2015.
The article ‘This Silicon Valley Accelerator Is the Model of the Future’ (Fidelman, 2014) mentions how accelerators, while different from incubators, have a better model for the current innovation environment. It states that, owing to the high competition, being the first in the market is important. Moreover, testing your advances regularly is just as important. Finally, one last clue mentioned in the article is that the biggest value that accelerators bring to their startups is a connection with the environment.

**New trends**

The accelerator model is a live entity; thus, it is continuously changing. The three main changes that are happening to the accelerator model nowadays are listed below (Tomkins-Bergh, 2015):

1) **Evolving upstream**: Some accelerators are abandoning their roles in sectors where the product development phase is long. They are moving upstream and transforming into seed funds rather than training entities.

2) **Expanding scope of services**: They are increasingly adding to the basic services, such as funds to do follow-on funding, co-working spaces, business support, and code academies.

3) **The growth of corporate accelerators**: Corporate organizations have realized the power of accelerators and are entering the sector in three ways: internally, outsourced, or partnership.

2.1.3. Common ground and comparison

Figure 4 provides a summary of the comparison between incubators, accelerators, angel investors, and hybrid programmes that are a mix of the previous three. In terms of duration, the longer one is the angel investor as there is no timeline; as long as the business angel is interested,
they will be linked to the company. Incubators are the second longest. Companies are created, developed, and launched from their laps. Usually, startups exit incubators when they have enough revenue to survive on their own. Accelerators are the shortest, as their aim is to speed up the startup’s development as much as possible within a short period and then only monitor the startup.

The most common form of the business model is through investment, although there are non-profit organizations, and usually incubators charge a rent to the startups. Except in incubators, the selection process is usually through competition as there are limited spots. In incubators, startups tend to enter at a very early stage of development, it is difficult to compete. Generally, the selection is made because the startups that cannot continue performing their operations, leave the site. As there is no investment, there is usually not much push to make the selection.

### The Four Institutions That Support Startups

<table>
<thead>
<tr>
<th>INCUBATORS</th>
<th>ANGEL INVESTORS</th>
<th>ACCELERATORS</th>
<th>HYBRID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration</td>
<td>1 to 5 years</td>
<td>Ongoing</td>
<td>3 to 6 months</td>
</tr>
<tr>
<td>Cohorts</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Business model</td>
<td>Rent; nonprofit</td>
<td>Investment; can also be nonprofit</td>
<td>Investment; can also be nonprofit</td>
</tr>
<tr>
<td>Selection</td>
<td>Noncompetitive</td>
<td>Competitive, ongoing</td>
<td>Competitive, cyclical</td>
</tr>
<tr>
<td>Venture stage</td>
<td>Early or late</td>
<td>Early</td>
<td>Early</td>
</tr>
<tr>
<td>Education</td>
<td>Ad hoc, human resources, legal</td>
<td>None</td>
<td>Seminars</td>
</tr>
<tr>
<td>Mentorship</td>
<td>Minimal, tactical</td>
<td>As needed by investor</td>
<td>Intense, by self and others</td>
</tr>
<tr>
<td>Venture location</td>
<td>On-site</td>
<td>Off-site</td>
<td>On-site</td>
</tr>
</tbody>
</table>

![Figure 4: The four institutions that support startups. Reprinted from ‘What Startup Accelerators Do’ (Hathaway, 2016b)](image)

**2.1.4. Graduates in Series A**

‘European Accelerators as Series A Engines’ (Roux, 2017) presents a series of data on how startups that graduated in accelerators have raised money in their first round of investment. In Table 2, Table 3, Figure 5, Figure 6, and Figure 7 show the fundraising of startups in Series A. Moreover, the article Compares the startups that went through accelerator and incubator programmes to those that did not.
Table 2: Series A rounds for European startups. Reprinted from medium.com

Table 3, there is a comparison not only with the concept of being a graduate of an incubator or accelerator but also geographically. The figure shows that graduates from these programmes raise less money than other startups, but also that the amounts raised in the US are larger, no matter if they went through an accelerator or not.

Table 3: Series A rounds geographically and whether they have used an incubator or an accelerator. Reprinted from medium.com (Roux, 2017)
Figure 5 illustrates two important things. First, it shows that the participation in Series A rounds is higher than the percentage of money raised. This is in agreement with the previous figure. Second, it shows that graduates from incubators and accelerators are getting a larger piece of the cake. This suggests that the presence and relevance of accelerators and incubators are increasing.

![Graduates from accelerators and incubators in series A compared to the total](image1)

Figure 5: Graduates from accelerators and incubators in Series A compared to the total.

Figure 6 shows that graduates from incubators and accelerators are becoming more important and participating in more financing rounds. Figure 7 demonstrates that graduates from accelerators are getting less funding on average. On the other hand, this figure also shows that, in 2013, there was a convergence and that such a convergence is beginning once again.

![Total amount raised in series A by accelerator and incubator graduates](image2)

Figure 6: Total amount raised in Series A by graduates from accelerators and incubators.
The article ‘European Accelerators as Series A Engines’ (Roux, 2017) mentions two possible theories to explain why graduates raise less money on average. The first theory is that due to accelerator and incubator programmes, startups have lower funding needs and may have invested previous capital more wisely. The second theory is that there is an adverse selection. The more confident founders and entrepreneurs do not need accelerators or incubators and can raise more capital.

2.1.5. Corporate programmes

In recent years, a new agent has appeared among incubators and accelerators. This is the corporate accelerator and incubator model. Such corporate programmes aim to attract innovation within the corporation by giving entrepreneurs the tools to work with on their own. These kinds of corporations also seek to capitalize on all the ideas and opportunities that are present in the company if the company has not been able to execute these ideas yet.

Corporate programmes offer many advantages for corporations, such as ensuring future business, attracting talent, transforming the core business, ensuring economic benefits, and training and upgrading internal staff, among others (Lindegaard, 2017).

Stefan Lindegard (2017) outlines some considerations and a framework for building a corporate accelerator. ETSEIB cannot be considered a corporate organization but it has some of the necessary traits.

In the article, the main considerations to build a corporate accelerator are as follows: find and strengthen important partnerships, act as a network connector among different stakeholders, establish a team with internal and external resources, identify the challenges and opportunities, know the reality of the environment, promote the execution of the innovation, act as a mentor,
and transfer the innovation clues learnt to form a repeatable and measurable process that can be replicated in other startups or within the company.

The article also provides a framework to develop the corporate programme. This framework is based on five pillars:

1) Internal network structure: All the internal stakeholders must be aligned and have a common goal
2) Networked business structure: Building an internal and external network of assets, resources, and information is essential.
3) Profitability: It must be profitability-driven.
4) Digital impact: There must be a strong digital focus.
5) No fixed framework: Although having some guidelines and structure is necessary, the accelerator must remain flexible and adaptable to the needs of the startups and the company.

2.1.6. How do incubators and accelerators finance themselves

The article ‘How Accelerators Make Money to Manage Operating Costs’ (Mohan, 2015) explains how accelerators and incubators can sustain their operations. There are several things to consider, such as:

- Most accelerators (61%) offer co-working space
- The accelerator staff ranges from one to five people, whereas the average is 1.8
- In the US, the average operating cost per accelerator is $400,000/year; in other countries, the average is €250,000/year
- The space and maintenance costs are 30% to 40% of the total costs
- The staff accounts for 40% to 60% of the total costs
- The costs of the programme and the marketing, for example, are around 20%

All previous costs, excluding the investments in the startup, represent only the operating cost. Normally, the investors in accelerators are willing to pay for investments in startups but not a fee to cover the operating costs. The article listed nine methods that accelerators and incubators use to cover their operating costs. These nine ways are more common for accelerators than incubators, as the latter can usually sponsor a large part of their operations by obtaining a fee from the startups. Here is a list of the nine methods mentioned in the article:

1) Sponsorship: Public or private sponsorship is the most common way to cover operating costs.
2) **Events:** Many accelerators use networking events and charge a fee for attendance. If the events are profitable enough, accelerators can cover a part of their operating costs. This mode is risky, though. It requires resources and time only to cover a part of the costs.

3) **Entrepreneur-in-residence programmes (EIR):** These are immersion programmes where corporate employees spend time in an accelerator to extrapolate the knowledge they picked up in the accelerators and the startups they had contact with previously. These programmes last between six and 12 months. The typical fee in the US is between $25,000 to $50,000 per employee.

4) **Grants:** Governments and private donors can offer grants to accelerators to promote innovation and entrepreneurship.

5) **Rentals:** Some accelerators charge a fee for the co-working space used by startups.

6) **Research reports:** Although this is not very common, some accelerators write reports in specific areas or market domains using their startup data. They sell these reports to corporations.

7) **Code academies and hacker schools:** Accelerators can raise cash from training programmes in these schools and academies, but these also serve as a source of talent for the accelerators.

8) **Innovation scouting for larger companies:** This service allows large companies to scout for talent from accelerators, while accelerators obtain a fee.

9) **Distribution, sales, design, and marketing consulting:** This service trains people in marketing and sales to be employed by the accelerators and become consultants for the startups. The service is cheaper than for other consultancy companies. This is a benefit for startups, as it allows accelerators to cover a part of their operating costs.

### 2.1.7. Building a university startup incubator or accelerator

This section is based on the article ‘How to Set up a Successful University Startup Incubator’ (Oxford University Innovation, 2014). Given the relevance of this article to this project, the paper provides a summary of the same. The article provides a set of recommendations on how an incubator or accelerator should be built in a university environment. The article highlights six main considerations.

1) **Think about your objectives:** One should adapt their structure to the goals of the university. If the university wants a profitable business, the big exit model should be the most suitable. But if the goal is to increase education or training, then accepting more ideas is not a problem, even if they do not succeed.

2) **Understand your clients:** Understanding the users and stakeholders is as important as anything else in defining the accelerator’s structure. Surveying some stakeholders may
offer a clue on how to implement the programme.

3) **The ideal incubator:** There is no ideal incubator, but having some successful incubators as models could benefit the result.

Some relevant metrics are listed below:

- University startup incubators support an average of 30 ventures per year.
- Tech transfer offices and entrepreneurship centres are the main hosts of the incubators.
- The number of staff varies from one to 12 people, but the core employees may be only one or two.
- The programme managers had an entrepreneurial or business background, and students and the alumni formed the source for getting staff.

4) **Be creative with your funding:** University incubators are usually free of charge for student participants. Thus, returns can be captured through equity investments, royalty agreements, or loans. Corporate sponsorships, public funds, economic development agencies, and alumni donors are other sources to look at for funding.

5) **Building your case:** The long-term benefits can be enormous but being beneficial in the short term is equally important. Encourage stakeholders to understand that there are several benefits, such as business retention, job creation, increase in tax revenue, increase in impact figures, student recruitment, career enhancement, and alumni engagement.

6) **Geared for success:** Good policies, along with well-tuned operational practices and processes, are mandatory to ensure long-term success.

### 2.2. Key Performance Indicators (KPIs)

All programmes that support startups need indicators to understand the development, performance, and potential of any startup. There are hundreds of thousands of key performances indicators (KPIs) but choosing the right one to understand the situation of the startup is mandatory not only for the startups but also for each business that has a stake in them, such as accelerators.

The articles ‘The Ultimate Startup Metrics Guide: 5 KPIs That VCs Recommend’ (Tyson, 2016) and ‘12 KPIs You Must Know before Pitching your Startup’ (Nadel, 2017) recommend a series of KPIs as being very relevant to get funding. Among the primary goals of startups after being in an accelerator or incubator programme is to get funding. So, the studied KPIs can be reduced to the ones in these two articles:

1) **Burn rate:** This KPI is the negative cash flow of a company. It determines how much money startups need to operate and grow.
2) **Runway**: Linked to the burn rate, this measures how much time the company has until it runs out of cash.

3) **Activation rate**: This metric measures the first experience of any potential customer. This can be measured in several forms, such as through returning visitors and time on websites, among others.

4) **Ratio of daily active users (DAU) to monthly active users (MAU)**: This ratio measures how many different users or customers there may be within a given time window.

5) **Customer churn rate**: This is the percentage of customers lost in a given time.

6) **Revenue growth rate**: It marks the percentage increase in revenue on a monthly basis.

7) **Customer acquisition cost (CAC)**: It is the amount spent on marketing, sales, or anything else to acquire one new customer.

8) **Customer retention rate**: This is the number of customers that repeated their experience during a given period.

9) **Lifetime value (LTV)**: It measures how much net value the average customer will bring to the company during the relationship.

10) **Ratio of CAC to LTV**: Considered one of the most important metrics, this measures the sustainability of a company. It is measured based on the extent to which the percentage of the total value brought by a client is spent in acquiring another client.

11) **CAC recovery time**: This measure how much time one may need to break even the investment in acquiring one new customer.

12) **Overhead**: This is a measure of the fixed expenses of the company.

13) **Profit margin**: It is the difference between the sale price of one product and its costs.

14) **Conversion rate**: This measures the ability of companies to sell products to its customers and their desire to acquire the company’s products.

15) **Gross merchandise volume (GMV)**: It is the overall value of the goods or services sold and purchased through a marketplace.

### 2.3. Other relevant theoretical background

#### 2.3.1. Prototype development

Prototype development is a key factor for today’s startups. The degree of development of the prototype is one of the most important things that startups must consider at each step of the process. There are many reasons for this. The level of the development of the prototype is one of the characteristics all institutions that support startups—such as accelerators, incubators, and others—use to assess whether they should support the startup or not.

The most common framework for assessing the reality of the prototype is the technology...
readiness level (TRL) scale framework developed by NASA in the 70s. The scale previously had seven steps. Now, it has nine levels of development (Innovation Seeds, n.d.; Mai, 2015). The levels are detailed below and summarized in Figure 8:

- **Level 1—Basic research, where basic principles are observed and reported:** In this level, investigations and paper studies are developed, and scientific research begins to be translated into applied research.

- **Level 2—Applied research, where the technology concept and/or application is formulated:** Practical applications have been formulated but everything is limited to analytical studies and experimentation. There is no proof of concept.

- **Level 3—Critical function, where proof of concept is established:** Active research and development is initiated. Laboratory studies aim to validate the analytical predictions. No integrated components are developed.

- **Level 4—Laboratory testing of prototype component or process:** In this level, all the components of the product are tested in the laboratory and developed. The basic components are integrated to establish that they work together. This stage comes just after the proof-of-concept stage.

- **Level 5—Laboratory testing of integrated system:** An integrated prototype is tested at this stage. The prototype is not fully operational but the test uses it in an environment that is close to the real conditions in which the system will work.

- **Level 6—Prototype verified:** At this stage, there is a working prototype of the product in an operational environment.

- **Level 7—Integrated pilot system demonstrated:** The prototype is working at the planned operational level. The design is virtually complete. The goal of this stage is to remove engineering and manufacturing risk in future stages.

- **Level 8—System incorporated in commercial design:** Now, the technology has proven to work under the expected conditions and in the final form. Usually, this is the end of the system development. The technology is ready for implementation at this stage.

- **Level 9—System ready for scale deployment:** The product is ready for commercial deployment.

- **Beyond Level 9—Market introduction:** The product is launched commercially and adopted by customers.
2.3.2. Design thinking, lean startup and business model canvas

There are many methods, processes, and frameworks for launching startups, and ensuring that the startups have everything covered. Although this paper does not seek to fully understand the process of development of businesses and startups, a number of concepts are used extensively by accelerators and incubators in their programmes. To understand the complexity of an accelerator or incubator programme, it is essential to understand these concepts in order to recognize the benefits and disadvantages of using a particular process to develop a startup.

The main concepts that will be defined here are design thinking, lean startup, and business model canvas. These concepts have been chosen because they may be mentioned or used during the development of this project. Moreover, they are among the most common concepts when developing a startup.

The goal of these definitions is not to develop the concept fully. Rather, the aim is to provide a clear idea of their scope, goals, and limitations. Other frameworks and processes exist, such as the experimentation manual (Hassi, Paju, & Maila, 2015), but only the most important ones will be explained.

**Design thinking**

Design thinking is a methodology that is often used to create ideas for a startup business, whether to develop products or improve current products or processes. They mainly help to understand and offer a solution to customer needs. Design thinking is based on how product designers work (Designthinking.es, n.d.). Design thinking involves five steps, as presented in Figure 9. In the figure, however, a sixth step has been added. This is the implementation step.
The five steps or phases are listed below (Avante, 2017; Designthinking.es, n.d.; Gibbons, 2016; Innovation Factory Institute, 2013):

1) **Emphasize:** Understanding all the users that will be affected by the solution is the first step of the process. The solution must adapt to their necessities and not the other way around.

2) **Define:** All the information generated during the previous phase should be reduced to the critical information that adds value and that is within our range of action.

3) **Idea:** This is the idea generation phase. The aim is to generate as many ideas as possible, without any judgement.

4) **Prototype:** In this phase, the ideas generated in the previous one are put to use. The goal is to see if the prototype of the idea is a feasible solution, and identify which ideas are better aligned to the goal.

5) **Test:** In this phase, the prototypes are tested on the relevant user. The aim is to observe the users’ reactions, as well as identify opportunities for improvement or redesign.

This is an iterative process. The goal of this process is to carry out the whole process in the different steps of the development of an idea. This process can be useful for those that focus only on the design of their idea and do not consider testing it on users.

![Figure 9: The five characteristics of design thinking. Retrieved from Design Thinking 101 (Gibbons, 2016).](image)

**Lean startup**

The lean startup methodology emerged out of the extreme uncertainty that startups face when creating a new product or service. One of the problems related to launching a new product or service is having the right answer from the beginning. However, it is difficult to predict the response to a product launch if the product has not been tested out in advance (Ries, 2013).

The lean startup methodology was born in the gap of knowledge that occurs when working in conditions of uncertainty. The methodology creates a feedback circuit of create–measure–learn, which allows dropping complex plans and assumptions to go directly to the things that work.
This methodology seeks to identify whether the project should pivot or continue along its path. The three main steps of the process are defined below (Ries & San Julián, 2012):

1) **Create:** This phase starts with two fronts—the hypothesis of value creation and the hypothesis of growth. To verify, the hypothesis created in this phase is the minimum viable product (MVP). The MVP is the minimum product that has the features the startup wants and that can obtain feedback from the customers. It is not a well-defined product, nor is it pretty, but it is the first product that can be shown to future customers.

2) **Measure:** As startups work under conditions of uncertainty, it is not easy to see the problems that occur or to gauge whether the startup is on the correct path. From this, problem innovation accounting is born. Innovation accounting relies on three pillars. First, one must establish the baseline. The MVP allows startups to gather real data from the growth model, the business model, and customers, among others. Second, one must tune the engine. Once the baseline is defined every new initiative, should pursue to improve one of the main growth factors. The third step is to pivot or persevere. Once the business plan starts to come together and is being tested, the startup must choose to either persevere if the indicators are good, or pivot and change the route slightly.

To assess if pivoting or persevering is the better option, a good set of indicators should be put in place. There are two types of indicators: actionable and vain. Both indicate something about the business, but have key differences. The actionable indicators are important for the growth of the business, while the vain ones usually measure actions that are not relevant.

It is also important to understand the duality between learning and optimization. Focusing on optimization without learning what the market needs could lead the startup to worthless efforts.

3) **Learn:** In order to apply changes to current models in the startups, it is important to learn. This phase comes after the need to pivot after not having satisfying results in the previous phase. Although pivoting implies a change, it is not a radical change. Pivoting is a controlled and structured correction of a new hypothesis from the product. There are several types of pivots, such as zoom-in, which means specializing in one part of the product, and zoom-out, which means adding a whole product behind your characteristic. Another is pivoting the consumer segment, which implies that the customers are not where it was thought they would be at the beginning. The types of pivots are endless. The common trait is that pivots do not involve a radical change. They simply use the feedback to adjust the business model.
Figure 10 presents the lean startup process:

Figure 10: Lean startup process. Reprinted from josecuellar.net (Cuéllar, 2015)

‘El Manual del Emprendedor’ (Blank & Dorf, 2012) defines two types of risk markets:

1) **Markets with risk in customer or market**: This is the risk that startups face when they do not know if their customers will adopt their product.

2) **Markets with invention risk**: Startups face this risk when all their success relies on the assumption that the product will work someday. In such markets, there is no fear of adoption while the product works. An example could be the cure for cancer.

In the second types of markets, although being the minority, the Lean Startup model does not work.

**Business model canvas**

The business model canvas (Osterwalder & Pigneur, 2010) is ‘a shared language for describing, visualizing, assessing and changing business models’. A business model provides the rationale on how an organization operates. The business model canvas is a blueprint for the strategy behind these operations in a business.

A business model canvas features nine building blocks, which are normally organized as follows (Cowan, 2014; Osterwalder & Pigneur, 2010):

1) **Customer segments**: An organization serves one or more customer segments. This block defines who these segments are and outlines their characteristics.
2) **Value propositions**: The value proposition is the need or problem that the business wants to solve.

3) **Channels**: Channels are the mean of interaction between the organization and its customers. There may be communication, distribution, or sales channels.

4) **Customer relationships**: Customer relationships are established and maintained differently for every segment.

5) **Revenue streams**: This block indicates how the money is entering the business.

6) **Key resources**: The key resources are assets that are needed to do everything else on the list.

7) **Key activities**: These activities are necessary for the startup to continue operating.

8) **Key partnerships**: Not all activities and resources needed to develop the business activities may be present within the organization. Hence, identifying key partnerships is essential.

9) **Cost structure**: Except for revenue streams, everything else has a cost. Therefore, this is where all these costs need to be identified.

The following paragraphs provide a brief description of how to organize every block.

There are five types of customer segments:

- Mass market, focused on one large group of similar needs
- Niche market, which targets very specialized segments
- Segmented, which distinguishes between segments with slightly different needs
- Diversified, which has two very different customer segments
- Multi-sided platforms, which seek to serve two or more independent customers

Although there are hundreds of types of value propositions, the most common ones are: newest among products or services, superior performance, more customization, more reliability, better design, more brand or status, lower price, lowest cost for the customer, less risk, more accessibility, and more convenience. The definition of channels is defined in Figure 11:

![Figure 11: Definition of business model canvas channels. Reprinted from 'Business Model Generation' (Osterwalder & Pigneur, 2010)](image-url)
There is a lot of variety in customer relationships, but the most common ways to manage the relationships with customer segments are: personal assistance, dedicated personal assistance, self-service, automated services, relationship through user (customer) communities, and co-creation of the value, such as in YouTube.

The standard ways of generating income—that is, revenue streams—for the company are: selling assets, charges, usage fees, subscription fees, lending, renting, or leasing, licensing intellectual property, advertisement, and brokerage fees. The most common pricing mechanisms are presented in Figure 38.

There are four key resources in any business: capital-intensive, intellectual property, human capital, and financial resources.

There are three main categories of key activities: production, platform (such as eBay), and network or problem solving (such as consultancies or hospitals).

The types of key partnerships may be limitless, but there are usually three main motivations behind these: optimization and economies of scale, reduction of risk and uncertainty, and acquisition of resources and activities.

The last block is cost structure. The cost structure can be designed depending on the goal of the business. There are two classes of cost structures in business models. The first one is cost-driven, where the most important aim is minimizing costs. The second one is value-driven, where the focus is more on the value created than on the cost. There are numerous of types of cost inside a cost structure, such as fixed costs, variable costs, and costs of economies of scale or economies of scope.

Overall, the business model canvas attempts to understand these nine blocks and put them together to identify possible problems. The typical business model canvas looks like the one in Figure 12.

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Figure 12: Business model canvas. Reprinted from "Business Model Generation" (Osterwalder & Pigneur, 2010)
3. Interviews and Insights of the Sector

A literature review is not enough to understand this sector. Building a successful startup is not possible through just theoretical knowledge. To fully appreciate the characteristics of this sector, a series of interviews were conducted with professionals in the field of incubation and acceleration. The goal of these interviews was to understand the work of the interviewees’ company, their connections to the environment, and how they supported startups.

3.1. Interview with Javier Marcipar (CIMNE Tecnología)

3.1.1. Key learnings from CIMNE Tecnología

The full transcript of the interview with Javier Marcipar can be found in 11.2.

CIMNE Tecnología is a public company with 100% participation by CIMNE. Meanwhile, CIMNE itself has 50% participation from Generalitat de Catalunya and 50% from UPC. As a public entity that carries out significant amounts of research on industrial applications, CIMNE faced a series of dilemmas that were solved by the unique model of CIMNE Tecnología. Their investigations were producing more research with industrial applications. CIMNE, at that point, was facing the problem that researchers would either leave to create their own companies or stay on with no motivation to do applied research.

CIMNE Tecnología is a company that transfers and incubates technology. This transfer + incubation model in CIMNE Tecnología was born mostly to tackle the problem of what they should do with the applied research that the investigation centre was generating. The transfer part of the company is in charge of ensuring that the technology developed in the centre ends in a company outside CIMNE. Meanwhile, the incubator part seeks to create the vehicle and the final destination of the transference—that is, the startup. In other words, instead of simply transferring the technology for some royalties, CIMNE Tecnología fully develops the applied technology generated to create the companies that receive the technology transfer.

This incubation and transfer is done in phases. The stages are set to allow specialized personnel to create a successful company more easily. The researcher is the departing point and supports the process of building a working prototype that solves a problem. The director or directors oversee the process of developing this prototype into a viable product, launching it in the market, and expanding the business. CIMNE Tecnología is the connector and manager of these agents. As a part of CIMNE, it has access to the technology and can do some market research on current prototypes that may have the potential to become the pivotal point of a new business. Also, as an incubator and, in the beginning, as the main partner of the launched company, CIMNE Tecnología
can choose the right director for the different phases of the company.

So, how does this solve the problem of CIMNE? The model allows researchers to receive money from their technologies. This money has a fixed component, such as royalties, intellectual property, or support service, plus a variable component, which depends on how the company performs. The model allows the researcher to avoid all the risks while maintaining an acceptable income and keeping the job. Thus, the model allows increasing the mean, reducing the variance, and eliminating negative values. The process is different than for researchers who go off to kick-start businesses based ideas by themselves. For CIMNE, this model is excellent. It allows the investigation centre to hold on its researchers as well as keep the researchers motivated enough to develop industrial applications. This also allows CIMNE to have an extra source of income.

The model is fascinating because the solution benefits everyone, thus eliminating the tensions that are normally found in public centres of investigation. This paper focuses on the design of an accelerator or incubator programme for the ETSEIB, which, as a university, is a public centre of investigation, where the researchers are the professors. For this reason, taking this model for the design of the ETSEIB programme to gain the favor of the administration and the professors of the ETSEIB is something to consider for the final design of the programme.

As a public institution, the ETSEIB could use the source of funding that CIMNE Tecnología is using—public money that comes from competitive funds. Another point that provides an idea for the accelerator programme of the ETSEIB is that the amount of money CIMNE invests is small, around €20,000. This is suitable for a public institution, as the ETSIEB may not have a significant sum of money to spare.

CIMNE works and finances itself by taking equity from the newly created companies, and expects to sell one every three years. To end up with significant amounts of equity at the end, CIMNE Tecnología usually starts with 100% of the company and keeps diluting this share until it reaches a 5–15% share. The usual sum of money that a software company incubated in CIMNE needs is €300,000–500,000 for development and €300,000–400,000 for market launch. In all, €600,000–1,000,000 is necessary to have a working business. For hardware companies, this amount is larger.

Finally, two main challenges arise from the nature of CIMNE Tecnología. First, a focus on product and not verification could be fatal. Second, there is the challenge of getting investors to understand the complexity of very specific technology and its utility. The exact steps that CIMNE Tecnología follows during the process are given in Figure 39 of Annex 0.
3.1.2. Other data from CIMNE Tecnología

This section analyses the data provided by CIMNE Tecnología. In 2011, the average income per university, in Spain, from licences amounted to €38,500. The average per university in the European Union (EU) is €2 million and in the US is €10 million. In the same way, the investment in technology transfer in Spain is lower than in the rest—the average in the EU is 2%, as against 1.3% in Spain. The GDP investment for the US was retrieved from the World Bank database. This stands at 2.75% (UNESCO, n.d.).

![Figure 13: Income and investment in technology transfer.](image)

The following figures present a summary of the state of the 16 companies created by CIMNE Tecnología and the sector of the 13 startups where CIMNE Tecnología is still present.

![Figure 14: Summary of CIMNE Tecnología's companies](image)

![Figure 15: Sector-wise distribution of CIMNE Tecnología's companies](image)
3.2. Interview with Judith Cruixent (EIT InnoEnergy)

3.2.1. EIT InnoEnergy

As the company in question was not explained during the interview, a brief company summary has been added.

EIT InnoEnergy was established in December 2009 in Budapest as a knowledge and innovation community by the EIT board. EIT stands for the European Institute of Innovation and Technology. EIT InnoEnergy is now present in six European zones: Benelux, Iberia, Alp Valleys, Sweden, Poland, and Germany. The company’s budget is €30 million annually. Its main concern and priority is sustainable energy. InnoEnergy operates with the three actors of the triangle of knowledge: industry, research, and higher education. InnoEnergy’s activities have a dual function. First, it plays a role in innovation and business creation projects; second, it offers different programmes of higher education, including master and PhD courses.

3.2.2. Key learnings from EIT InnoEnergy

The full transcript of the interview with Judith Cruixent can be found in Annex 11.4.

InnoEnergy provides business creation services and innovation mainly as an acceleration startup. The company does not offer any co-working space, and it invests in other companies to ensure their participation as partners. InnoEnergy’s participation is usually between €75,000 and €150,000. The company’s stake is around 10–20%. Its investments typically focus on four main areas: development of the technology, market development, team salaries, and financial networking. It works as a business angel and invests to be involved in the growth of the startup. The InnoEnergy programme lasts two years. The focus is on helping the commercialization process. However, with investment from InnoEnergy, the companies complete their products. EIT InnoEnergy finance itself with European funds and partners. The startup entrepreneurs in InnoEnergy are usually people who already have experience in the field. The startups here can be either software- or hardware-based.

InnoEnergy’s selection process opens once a year, though previously it was open all year long. The selection process has three main steps. First, the startup team makes a five-minute pitch and is subjected to 10–20 minutes of questions. This step is focused on identifying if the startup is in the right stage of development to invest in. The second and third steps are launched together once the startup passes the first step. The second step of the process is a due diligence phase where three external consultants analyse the business model, the market, the technology, and the team profile. With this information, the third step begins. This involves a 15-minute talk and
30–40 minutes of questions by a committee of InnoEnergy Executive Directors. The committee also asks for a minimum TLR. This may be 5 or 7 on the scale, depending on the project, as EIT InnoEnergy ask for a time to market of 18 months.

Here, InnoEnergy has the right to designate one counselor on the startup’s administration board. During the financing round, there are multiple options, such as dilution or not depending on the valuation and the possibility to increase the investment to have higher participation. The usual financing round in Spain involves less than €1 million.

After the two-year programme, the support is more indirect, and InnoEnergy aims to sell the company after five to six years. During the two-year programme, InnoEnergy offers coaching in eight main areas. The coach and mentors are usually paid by the hour. This payment structure allows InnoEnergy to adapt to the company’s needs. The average session can be deeper for some startups but the standard programme is two sessions per month.

Apart from acceleration, InnoEnergy offers education to boost innovation in the sector and serves as a talent pool for its startups.

3.2.3. Other Data from EIT InnoEnergy

The following data was provided by InnoEnergy but it was analysed and treated. Figure 16 shows how startups that went through the InnoEnergy programme are distributed in the different sectors. Figure 17 shows the number of applicants to the programme and the startups supported, as well as the programme’s evolution and the acceptance rate every year. The total external investment raised by startups in InnoEnergy during the period 2013–2016 was €47.34 million, which means an average of €253,500 raised per startup.
Figure 17: InnoEnergy Applicants and startups supported

<table>
<thead>
<tr>
<th>Year</th>
<th>Applicants</th>
<th>Startups supported</th>
<th>Acceptance rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>177</td>
<td>23</td>
<td>13%</td>
</tr>
<tr>
<td>2013</td>
<td>304</td>
<td>22</td>
<td>7%</td>
</tr>
<tr>
<td>2014</td>
<td>429</td>
<td>36</td>
<td>8%</td>
</tr>
<tr>
<td>2015</td>
<td>603</td>
<td>52</td>
<td>9%</td>
</tr>
<tr>
<td>2016</td>
<td>565</td>
<td>38</td>
<td>7%</td>
</tr>
<tr>
<td>Total</td>
<td>2078</td>
<td>171</td>
<td>8%</td>
</tr>
</tbody>
</table>

Table 4: InnoEnergy Applicants, startup supported and Acceptance rate

3.3. Interview with Paloma Mas (Plug and Play)

3.3.1. Key learnings from Plug and Play

Plug and Play was founded 11 years ago in the US by Saeed Amidi. Amidi, having worked in several businesses and developed contacts with several major startups such as Google, realized that investing in high-potential startups could be a profitable business. He started investing in PayPal, Danger, and Dropbox. After this, through the framework of open innovation, he created a company where not only startups could profit but also venture capitalists, corporate organizations, and others. Plug and Play started in the US, then expanded to Europe, Asia, and South America. At present, Plug and Play operates in 21 locations.

Plug and Play mainly operates in three areas. First, it serves as an intermediary between startups and corporate organizations. Second, for the more developed startups, it helps with startup development by using an acceleration model. Finally, Plug and Play also operates as an investor. The company specializes in software and does not usually accept hardware-based startups.

Plug and Play has two acceleration programmes:

1) Early stage: This is a four-month programme that focuses on the digital sector and digital sales. Startups receive mentorship in sales, market feed, and KPIs. During these four
months, the companies report their KPIs on a weekly basis. The programme can be carried out at Plug and Play installations or remotely. In return for 5–7% equity, the startups receive €15,000 in cash and €15,000 in the value of the programme. After the programme ends, Plug and Play has the option of investing up to €50,000 more for up to 3% more equity.

After the programme ends, Plug and Play follows the evolution of its startups on a monthly basis.

2) Vertical acceleration: This programme is three months long. Here, there is no exchange of equity and cash between Plug and Play and the startups. Plug and Play gathers several high-potential startups from a specific sector and in the maturation stage, and introduces them to the companies expensing the sector. Thus, Plug and Play receives a fee from the corporations. The main benefit for startups and corporations lies in understanding the innovation taking place in the other. The goal is to create partnerships, ensure cross-selling, or create a platform where startups can be bought.

To enter the first programme, the startup must meet three main conditions. First, it needs to have launched a product. This does not have to be a minimum viable product, but it must be a product nonetheless. Second, the startup must have a formal team with a technology and a business focus. Third, the startup must have at least one client that has liked the product. From different sources and scouting, Plug and Play selects 20 startups that meet the criteria. These 20 startups are then invited to present in front of mentors, teachers, and former CEOs. Between five and 10 projects are selected. There are usually two batches per year, with 12 to 15 projects entering each year.

Plug and Play offers co-working spaces to the startups in the programme, as well as discounts from different technology providers.

The main challenge that Plug and Play faces is finding good talent that can grow and ensure profits. Another challenge is for its reputation to keep growing. To attract high-potential startups, Plug and Play needs to have a good reputation.

There are three ways of applying to the programme: direct application, scouting, and recommendations. The number of applications in 2016 was 400. The main trait that Plug and Play looks for in a startup is a good entrepreneur. Even if the project is a good one, the entrepreneur holds the key to its success.

After five years in Spain, they have had exits in five startups, which implies a mean of one per year. Globally, they have a mean of 20 exits a year. As investors, Plug and Play invests between
€50,000 and €100,000, usually only in the first round. Its three main assets are the global network, a good selection process, and the fact that everyone in Plug and Play Spain has previously worked in a startup.

Plug and Play mainly assesses the performance of its startups through KPIs, which are adapted to each company. The biggest conflict seen in Plug and Play relates to problems with cash flows and treasury, as money is tight in the beginning. The second main challenge is selling to the first clients.

Plug and Play tackles financing through its participation in the companies, as it does not believe in fees, other than symbolic ones. The reason is that they believe that an accelerator that its income is through fees is not an accelerator; rather, it is more like a business school. The main trait of an accelerator is that there is a risk involved.

Apart from the interview, Paloma Mas delivered three pieces of information:

- The accelerator has invested €3 million in 72 startups over five years. The startups raised between €250,000 and €300,000 in the first rounds.
- The indicators and KPIs in the accelerator are secret but revolve around the return on investment (ROI).
- The processes followed are interview, follow-up, mentoring, and classes.

3.4. Interview with Juan Carlos Morales (Emprèn UPC)

3.4.1. Key learnings from Emprèn UPC

Emprèn UPC is a pre-incubator that is available to students and recent graduates from the UPC. Basically, it is a co-working space where entrepreneurs can share tips. The main condition for entering Emprèn UPC is having an idea. Emprèn UPC offers value by providing startups and entrepreneurs with a space to work, unite the team, and meet with possible clients and investors. It also provides some guidance. The amount of people entering the space presently allows Emprèn UPC to accept into the co-working space most projects that apply. The main selection criteria are that the project should be in the range of knowledge of the UPC (that is, mainly a technological one), and the entrepreneur should pass a test and an interview.

Emprèn UPC’s main source of financing is through public funds from UPC and Barcelona Activa. There is a secondary source involving a payment of €10 per person and per project. This is a symbolic payment to avoid bringing in people who do not work or who use the space for something else.
Apart from the space, Emprèn UPC also offers networking sessions and talks from professionals. It also maintains partnerships with other accelerator and incubator programmes such as Yuzz. The aim here is to offer training, although this training takes place at other installations; Emprèn UPC is only a point of connection to the training programme. The main training given is related to business and market development. Emprèn UPC also helps people with technology problems in their prototypes, helping entrepreneurs to meet professionals in the field who could help.

The main users of Emprèn UPC are students with technology, information and communication (TIC) degrees such as telecommunications and informatics. The time spent in the space is relative, but there is usually a six-month agreement with the possibility to extend it for up to six months more. The usual team is more than one person, but there are cases where one-person projects have been accepted.

In the opinion of Emprèn UPC, if the budget was not a constraint, a little training in the beginning to clarify ideas, as well as identify the startup’s main strengths and weaknesses, could make a difference in how projects develop and the probability of success. Apart from providing the chance to invest some money in startups, it could also help startups to develop their business in an easier way.

The focus group is entrepreneurs who are completing the last legs of their studies—these are mainly final-year master or bachelor students. Emprèn UPC is heavily reliant on the structure of the UPC. Moreover, its workforce is limited. Hence, Emprèn UPC constantly has to ask for favours from other actors.

3.4.2. Additional information about Emprèn UPC.

Emprèn UPC provided access to its records of activities in 2016 (Espai Emprèn UPC, 2017). The following data is extracted from there. Other data can be found in 11.6.2:

- During 2015–2016, the co-working space pre-incubated 40 projects that created 13 new startups. These startups have created 53 new employment positions.
- The space nowadays has:
  - 21 projects, of which four are startups
  - 114 people that want mentorship and information about entrepreneurship
  - 65 entrepreneurs: 60 males and 5 females
  - 8.5 months as the average residence of a project
3.5. Interview with Joaquim Ferrer (Grupo Intercom)

3.5.1. Key learnings from Grupo Intercom

Grupo Intercom was born in 1995 as an internet service provider. In the year 2000, after this division was bought, the company realized the potential of the internet business. Before the year 2000, they had started to incubate three businesses: Infojobs.com, Softonic, and noticias.com. Upon realizing the potential of this internet business, they started to incubate more businesses from that year on. They had a clear objective: to translate all the things that were on paper at the time to the internet. As the company had a very clear idea about what was the next step, at first it did not look for an entrepreneur with ideas. Rather, it looked for good entrepreneurs who could use the ideas provided by Intercom. Since then, Grupo Intercom has incubated 50 companies from scratch and 20 others through participation in them.

The model was to give the entrepreneur a salary that was below the market average, but with participation in the company, thus making the entrepreneur responsible for the startup’s failures and successes. Once the business grew, the entrepreneur team could be substituted by a management team that had more experience in big business.

At the beginning, Intercom was the financial muscle of the business. It supported the entrepreneur beyond what was necessary. Afterward, Intercom internationalized the incubator model and, after brief success, realized that the incubation model no longer works. Its main mistakes have been:

- Being too patient, although being too aggressive can also make you lose some opportunities
- Being the only financial muscle
- Not recognizing that technology innovation cycles are getting shorter. Companies have to be more attentive. Being able to see that what works today might not work tomorrow is mandatory
- Very big participations in the startups.

Intercom has always offered co-working spaces, although it does not know if these add value to business. However, it states that the co-working spaces has increased the company’s network and created new ideas even after other projects failed.

In the past programme, Intercom followed their startups and provided mentoring. The model was to accompany projects and give more freedom as the business progressed.

During this time, 20% of Intercom’s startups proved successful, 40% created some value but could not be called a success, and 40% either failed or did not deliver as expected.
Intercom’s financing model is through the income it receives from participation in startups, usually in the form of dividends or exits. The plan to leave is not fixed, but from the second to the fourth years of development, it is important to start having connections to see if diluting to accelerate the model can be the next step.

Here are the future plans of Grupo Intercom given its past experience:

- Become an acceleration model, rather than an incubator
- Fast time to market
- Maximum seven to eight projects at a time and an average of five projects at all times
- A team with a clear idea, not necessarily a prototype
- A team that covers the following three areas: management, finance, and technology
- High participation of the entrepreneur team in the company
- Participation between 10% and 20%, but not as low as 3–5% as then there is no point in investing time
- Start with small investments at first. People will come together if they have fewer resources but may get comfortable with a lot of resources. Small investments are important, but not zero investments. In the latter case, the entrepreneur may lose focus on the business just in trying to finance it.

3.6. Interview with Oriol Bes (Founder Institute and Reimagine Foods)

3.6.1. Key learnings from Founder Institute and Reimagine Foods

Oriol Bes is part of two businesses dedicated to innovation:

1) **Founder Institute**: This is an accelerator programme for startups in the technology sector. It aims to transform a technological idea into a business. Founder Institute is an accelerator of persons with ideas, and not companies. It operates just at the beginning where entrepreneurs have the most doubts and do not know how to kick-start their project. Founder Institute structures and poses deadlines to help entrepreneurs advance. Apart from that, it gives training, organizes talks by experienced entrepreneurs, and provides the entrepreneurs in the programme with mentors who can guide them. Although it accepts all types of technology-based startups, in Barcelona the focus is mainly on the digital sector; 90% of the mentors there are from the digital sector.

The cost for the entrepreneurs is €900 and giving away 3.5% in participation. In addition, if during the following year of the formation the startup receives €100,000 or more, Founder Institute will
receive €4,500. A third of the income is invested in the institute, another third goes to the mentors, and the remainder goes to other participants who have completed the programme.

To enter the programme, there is a pyrotechnic test to measure the entrepreneurial mindset of future participants. In each round, between 20 and 30 people enter the programme. The selection criteria are based on the grades in the test. Those with the highest grades enter the programme. There are two batches of participants each year. The programme is four months long. In each batch, between five and 10 people complete the programme. The majority of times some participants leave the programme on their own, but there are cases in which the mentors think that the idea is not viable.

The average age in the programme is 34 years, but the participants' age may range from 23 to 50 years.

After the programme ends, there is no structured follow-up. Although a follow-up is meant to happen every two months, it is up to the participants to organize it. The 3.5% participation is more for the returns than for the participation. The goal of giving returns to graduates and mentors is to encourage them to develop a good relationship and develop the business together. The mentors in the programme have all been entrepreneurs and have created their own startups.

2) **Reimagine Foods**: This is a profit-oriented company that looks to bring innovation to the food sector. To do this, Reimagine Food has created the Prometheus programme. The programme focuses on presenting mature startups to companies in the sector. In each round, five companies are chosen from around the world. These companies undergo training to present themselves better. In the selection process, the first shortlist includes 20 startups. But this is reduced to the five best ones. After preparation based on knowing the sector deeply, Reimagine Foods arranges meetings between the startups and the companies. In the last round, there were 40 visits. These visits are from companies, former CEOs, and investors. The primary goal is business development and sales development through networking and introducing the startups to potential clients or partners. There are not too many failures in this programme or startups that do not complete the programme. That is because the focus is on startups that are more mature, and this programme only seeks to boost business and sales. The mentors here are usually people with experience in the field.

Demographically speaking, the people in more mature startups are either in their 20s or in their 50s.

Apart from the programmes, the interviewer has in-depth knowledge about the ETSEIB. For this
reason, he emphasized that due to the students’ engineering background, any accelerator in the ETSEIB should have more of a business focus. They should use methodologies such as design thinking and lean startup to ensure that any technological feature that is implemented covers a need. On the other hand, the main advantage of ETSEIB students is that they are good at developing the minimum viable product as they have the necessary technological skills.

### 3.6.2. More information about the interview

Apart from the interview, Oriol Bes provided the following data:

- In Spain, Founder Institute has accelerated 31 startups, and globally more than 2,000.
- Reimagine Food has accelerated 20 startups.

The website of Founder Institute provides a glimpse of the programme they follow. The programme is distributed over three-and-a-half months and comprises different sessions. A summary of the curriculum as of June 2017 is given below (“Founder Institute: World’s premier idea-stage accelerator and startup launch program,” n.d.):

- **Orientation:** This session provides an introduction to the course. Its aim is to let participants meet each other and understand the goals of the different sessions.
- **Vision and ideas:** The session goal is to know how to analyse startups’ ideas in a structured manner.
- **Research and customer development:** This session emphasizes the importance of customers and understanding how to do market research.
- **Revenue models:** This session seeks to understand different financial models in different startups. Later, the participants will apply one financial model to one of their ideas.
- **Naming and positioning:** The startups’ marketing notions will be explained and implemented by the participants.
- **Mentor idea review:** This session provides the first stress test of the participants’ ideas. The participants have to make a pitch for three minutes, after which professionals and CEOs will evaluate the ideas. The evaluation criteria are the participant’s customer understanding and idea potential.
- **Startup legal and intellectual property issues:** This session informs the entrepreneurs about the basic notions of handling legal and intellectual property matters.
- **Team and advisors:** This session offers clues on best practices for hiring employees and co-founders. In addition, it shows how to allocate equity among the workforce.
- **Product development:** A road map and clues about how to develop or complete development of the product will be given.
- **Mentor progress review:** A second major test is carried out here. The test is like the first one. A group of professionals and CEOs will analyse the participants’ progress after a three-minute pitch.

- **Sales and traction:** This session explains how to carry out the first sales. The participants will need to complete their first sale during this session or secure their first client if the product is not ready.

- **Branding and marketing:** The goal of the session is to understand that the latest strategies available for branding and marketing on the new platforms are the key to a company’s success.

- **Bootstrapping and fundraising:** This session explains how to structure and where to look for investment. In addition, it provides information on how to manage cash flows and finances.

- **Graduation:** This celebrates the completion of the programme.

### 3.7. Interview with Oriol Pascual (IQS Tech Factory)

#### 3.7.1. Key learnings from IQS Tech Factory

IQS Tech factory is an incubator of the IQS School. This incubator promotes innovation in scientific-technical science and industrial science. It avoids digital startups, such as ecommerce businesses or apps. The programme normally faces high demand, so there is no specified process or path. It helps entrepreneurs to search for intellectual property and financing. The mentorship process involves meeting with the entrepreneur and developing an action plan together.

The projects at the IQS Tech Factory are 30% IQS projects and 70% external ones. There are students among the entrepreneurs here. They may have an idea or a prototype but do not know how to commercialize or grow a business. However, the majority of entrepreneurs here are people with professional experience. The IQS Tech Factory does not receive anything in return for being part of the programme, nor does it ask for equity participation or a fee. At the same time, it does not offer any co-working space. However, IQS projects have space to work in the centre. Nowadays, this programme is a cost centre for the IQS as it does not generate any income. There are plans to change this through partnerships with companies within the industry. The future strategy relies on four pillars: First, is the promotion of scientific-technic entrepreneurship; second, entrepreneur support; third, managing the relation between startups and corporations for corporate ventures; and fourth, technological transfer to the market in the form of spin-offs or royalties.
At present, the IQS Tech Factory has 21 projects, each with a functional prototype that is protected with a patent. Usually, the startups meet the mentors every two weeks, and they set goals for the period between these meetings.

Another differential aspect is that the programme is very personal and work is done on each project separately. The organization has seen some success in its startups and only one of the startups has not developed during its time in the programme. The expected mean time for startups that are part of the programme is three years. The programme also helps startups to connect with investors. It even prepares and accompanies startups to the financing rounds.

In the opinion of the interviewee, entrepreneurs must be flexible, adaptable, and highly responsive. Being a slow responder or inflexible can cause any business to fail.

The organization has done a trial with an accelerator programme in Cambridge and developed its own accelerator programme, called IQS Next Tech, which will be available this year. This is a programme for 10 startups, with eight standard sessions and some follow-up sessions.
### 3.8. Summary of the interviews

The following table presents a small summary of the interviews conducted:

<table>
<thead>
<tr>
<th>Interviewee</th>
<th>Company</th>
<th>Type of business</th>
<th>Main value proposition</th>
<th>Funding</th>
<th>Main challenge</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Javier Marcipar</td>
<td>CIMNE Tecnología</td>
<td>Transfer technology incubator</td>
<td>Transfer technology without risk to the researcher</td>
<td>Participation</td>
<td>Selling/maintaining product focus</td>
<td>They hire the entrepreneurs</td>
</tr>
<tr>
<td>Judith Cruixent</td>
<td>EIT InnoEnergy</td>
<td>Energy accelerator</td>
<td>Training, guidance, and investment</td>
<td>Participation</td>
<td></td>
<td>Master programmes, large network, very sector specialized</td>
</tr>
<tr>
<td>Paloma Mas</td>
<td>Plug and Play</td>
<td>Digital accelerator</td>
<td>Training, guidance, and investment</td>
<td>Participation</td>
<td>Treasury and selling</td>
<td>The team is the most important</td>
</tr>
<tr>
<td>Juan Carlos Morales</td>
<td>Emprèn UPC</td>
<td>Pre-incubator and coworking space</td>
<td>Co-working space and some training</td>
<td>Subventions and symbolic fees</td>
<td>Team</td>
<td>Recommendation: Accelerator with resources to invest and mentoring</td>
</tr>
<tr>
<td>Joaquim Ferrer</td>
<td>Grupo Intercom</td>
<td>Corporate incubator, shifting towards accelerator form</td>
<td>Training, ideas, guidance, and investment</td>
<td>Participation</td>
<td>Right product</td>
<td>Check the market, do not take large participations, small investments</td>
</tr>
<tr>
<td>Oriol Bes</td>
<td>Founder Institute/Reimagine Foods</td>
<td>People accelerator/Vertical accelerator</td>
<td>Training and networking</td>
<td>Fee, participation and return on investment/ Fee</td>
<td>Focus on product and not on customer</td>
<td>Structured programme, the network is very important</td>
</tr>
<tr>
<td>Oriol Pascual</td>
<td>IQS Tech Factory</td>
<td>University incubator</td>
<td>Training and guidance</td>
<td>University covers costs</td>
<td>Focus on product and not on customer</td>
<td>On demand, not structured</td>
</tr>
</tbody>
</table>

*Table 5: Interview summary*
4. Environment

4.1. Barcelona, Catalonia, and Spain

The accelerator and incubator programme will be designed for the ETSEIB. The ETSEIB is in Barcelona, which is the capital of Catalonia. Barcelona is also the second-largest city in Spain.

The following data is mainly provided by Emili Aldabó from Barcelona Activa. Some of this data is also available in ‘Startup Catalonia’ (‘Barcelona & Catalonia Startup Hub,” 2017).

Barcelona has become the fifth-largest innovation hub in Europe. In numbers, this means more than 11,000 employees and more than €370M invested in Barcelona startups.

Of the investments made in Barcelona-based startups, one out of four is in its initial phase, while the other three are in the A, B, and C series of the financing rounds. The five biggest trending sectors for startups are software, ecommerce, tourism, Big Data, and ehealth.

Catalonia attracted 71% of the total VC investment in Spain.

4.2. The School, ETSEIB

The Escola Tècnica Superior d’Enginyeria Industrial de Barcelona (ETSEIB) was founded in 1851. In 1971, the ETSEIB and other technical schools, they founded as then Universitat Politècnica de Catalunya. The school covers over 47,000 m², has 2,401 bachelor students, 574 master students, and 410 teachers (ETSEIB, 2017a, 2017b).

The school provides different types of engineering programmes, such as the Bachelor’s Degree in Engineering of Industrial Technologies and the Master’s Degree in Industrial Engineering.

4.2.1. Survey

To assess the needs and capacity of the ETSEIB, the main tool used in this paper was a survey of the ETSEIB teachers, some UPC teachers, and some collaborators of the university. The complete survey in the languages in which the questionnaires were sent can be found in Annex 11.10.1.

The survey has four main areas of exploration:

- First, there were demographic questions. Although the vast majority of teachers who the survey was send to and who responded were from the ETSEIB, there were people who answered the survey from other schools in the UPC. There were also questions regarding
which department the person works in and if they have an organic position. The goal of these questions is two-fold: first, to understand the innovation perception and need from the different departments and, thus, sectors of science and technology in the ETSEIB; second, to understand the influence and the experience of the people who answer the survey.

- Second comes the biggest set of questions. This section seeks to understand the environment the teacher has been exposed to. These questions aimed to find out if students are interested in innovation, where they search for help, and if there is any response from the teachers, either positive or negative.

- The third attempts to find out if teachers, and even researchers, could use or participate in activities in an incubator or accelerator programme. It seeks to find out if some teachers did not launch their technologies in the market because they did not know how to do so.

- The fourth section is a residual one. These questions have not been answered by the vast majority of the surveyed people, as most of the questions were optional. This section aims to understand the opinions and possible paths of innovation in the ETSEIB.

4.2.2. Analysis of the survey

The survey was answered by 100 people, of which 72 were ETSEIB teachers. This distribution is presented in Figure 18. As regards the people to whom the survey was sent, the ‘No’ answers are probably from assistant personnel within the UPC. As there are 410 teachers in the ETSEIB (ETSEIB, 2017a), 17.56% of all teachers in the ETSEIB participated in this survey. The large percentage gives credibility to the survey and its results.

The analysis will be centred on the ETSEIB teachers, although insight and data gleaned from other parties will also be considered. To understand the results of this survey, it is important to know the background of the respondents. For this, two main questions are important: which
department or institute they are from and whether they have any organic responsibility. The results for only the ETSEIB teachers of these two questions can be seen in Figure 19 and Figure 20. The results for the total pool of the survey are in Annex 11.10.2, as well as in Figure 41 and Figure 42. The figures show representation from almost all the departments in the school. More answers were received from the departments that had more teachers. The tendencies in the figures with the answers of the full sample are more or less the same.

In the question about the organic position, almost a third of the teachers from the ETSEIB that took part in the survey admitted to having some kind of organic responsibility. This can indicate a slight bias, as 33% of organic charges is a relative large number. For the same question with all the data, the proportion of people with organic positions diminished to less than 25%.

![Figure 19: Survey Question: 2. From which department/institute of the ETSEIB are you part of or do you teach for? (only ETSEIB teachers)](image-url)
Figure 20: Survey Question: 3. Do you have any organic responsibility in ETSEIB? (only ETSEIB teachers)

Figure 21 represents the answers to the question ‘Would you be interested if ETSEIB had its own accelerator or incubator?’. Only 7% oppose to this initiative, while 36% are interested. The majority of 54% responded with ‘Maybe’, which means their interest would depend on the type of programme and its implications.

Question 5, ‘Why would you be interested if ETSEIB had its own accelerator or incubator?’, was an open question. For analysis, the answers were collected in groups and labelled based on the general idea behind them. This question was also an optional one. Only 27 ETSEIB teachers responded, which represented 37.5% of the ETSEIB teachers. This part of the survey was mostly answered by people who had answered ‘Yes’ or ‘Maybe’ in the previous one. Only 7% said that the accelerator or incubator was not useful for the school. The biggest group is a group of teachers that believes that the more services the school has the better. The rest of the answers are divided between whether the accelerator will help students, researchers, or both. The same answer for
the full pool showed nearly the same percentages. However, here there was another group accounting for 6%, which did not know what an accelerator was. This 6% was at the expense of the group that believed the accelerator would mostly help researchers.

![Diagram](image)

**Figure 22. Survey Question: 5. Why would you be interested that ETSEIB had its own accelerator/incubator? (only ETSEIB teachers)**

Figure 23 shows that almost a third of ETSEIB teachers have received a petition to help tutor a project for a startup. When including the full pool of answers, the percentage remains similar.

![Diagram](image)

**Figure 23: Survey Question: 6. Did you ever receive a petition to help or tutorize a project for the creation of a company/startup? (only ETSEIB teachers)**

Figure 24 and Figure 25 show the demography of those seeking help or tutoring from the teachers. In both cases, master students submit more such petitions. However, teachers are less inclined to ask other teachers. In both cases, bachelor-level students form the group with the second-highest presence. But in the ETSEIB answers, there is a greater presence of PhD students compared to bachelor-level students. This data was corrected because one responded with ‘No’ to this question, but answered all the following questions as if he/she had answered ‘Yes’; therefore, this answer was changed to ‘Yes’. The two figures are the result of a sorting
process, as in the survey it was possible to choose more than one group. The direct graphs from the survey can be found in Annex 11.10.2 and 11.10.3.

Figure 26 shows how many times the teachers receive petitions per year they receive.

The chart in Figure 27 has been developed based on the answers to Questions 7 and 8. The chart states the number of petitions per group. It has been developed by considering a series of assumptions. First, answers of ‘Once’, ‘Other’, and ‘Irregular’ were assimilated as being zero petitions per year. Second, the answer ‘More than once, but less than once per year’ was assimilated to be 0.5 petitions per year. Finally, the teachers could choose more than one group when answering which group made the petitions, but under the conditions that the volume of
petitions was similar. To take that into account, we distributed the number of petitions that the teacher had per year into the different groups. For example, say, the teacher had received petitions from bachelor and master students, and then stated receiving petitions twice a year. The result for that teacher has been counted as one petition from a bachelor student and one from a master student per year. A total of 24 petitions are received each year.

Figure 27: Group-wise distribution of petitions per year

Figure 28 shows the results of Question 9. This question sought to find out the possible usage of an accelerator for research within the ETSEIB. Here, the majority answered ‘Maybe’. The ‘Yes’ and ‘No’ answers were almost equal in volume.

Figure 28: Survey Question: 9. Would you be interested in using an accelerator/incubator in the ETSEIB to give exit to project developed in the department? (only ETSEIB teachers)

Another important aspect relating to the entrepreneurial spirit of the teachers is knowing if they fear having to leave the university to launch a company. Figure 29 shows that this fear is present. Only a small percentage felt they could handle both things at the same time and 31% did not have this fear. The remaining 25% answered ‘Maybe’, which could mean that their reaction would depend on the company they launch as well as on other factors.
In Figure 30, Figure 31, and Table 6 provide the results to Questions 13 and 14. The first figure states what the teachers will be interested in having an accelerator. Most of them would not want to participate. Among those who do, some would prefer to do talks, some would mentor, and some would do both. The next figure highlights how many hours the teachers may be willing to devote each week. Finally, in the table there is the average time teachers are willing to spend on the accelerators a week, and the same average but neglecting the teachers who does not want to participate in the accelerator. For coming up with this average, we assumed three things. First, there were those who responded with less than one hour a week but said that they did not want to participate. We assumed that they wanted in fact to dedicate zero hours a week. Second, among the ones who wanted to participate, we assume the average would be around 0.5 hours a week. The last assumption is that, those teachers that answered ‘depend’, the assumption was that the average was 0 hours a week.
14. how many hours a week would you be able to dedicate per week?

![Bar chart showing the average hours a week per teacher.]

Figure 31: Survey Question: 14. how many hours a week would you be able to dedicate per week? (only ETSEIB teachers)

| Average hours a week per teacher | 0.875 |
| Average without non-participating | 2.25 |

Table 6: Average hours a week per teacher

Figure 32 shows which areas the teachers think could use an incubator or an accelerator. Apart from energy, automotive, and construction, the other sectors named are mostly software-oriented ones. So, it is clear that the digital industry is a big part of our society.

15. What types of projects have you seen that could use the incubator or accelerator?

![Bar chart showing the types of projects seen by teachers.]

Figure 32: Survey Question: 15. What types of projects have you seen that could use the incubator or accelerator? (only ETSEIB teachers)

Other qualitative questions

Apart from Question 5, which was a qualitative question, there were six other qualitative
questions. But extracting quantitative data out of them has proven to be not useful. Moreover, due to the low participation in these questions, it is difficult to extract any conclusion. Some of the main ideas will be presented in the following paragraphs.

Question 10: ‘Why would you be interested in using an accelerator or incubator in the ETSEIB to exit a project developed in the department?’

There were multiple answers referring to how the use of an incubator connected with some other organization of the university could add value. Another recurrent answer was that it could be useful to link the UPC, the students, and the teachers.

Question 12: ‘Is there any other reason that discouraged you from launching a company for a viable project? Why?’

There were two main answers. The first was that the area of research did not involve any practical application. The second was that some teachers preferred to remain at the university either because they did not have experience in running a business or they were comfortable at the university.

Question 14: ‘Why would you be interested to mentor a project or do talks for startups in the possible accelerator or incubator?’

There were two main answers here as well. One group was not interested because they lacked entrepreneurship experience. Another group of teachers had such experience and said that they would gladly help.

Question 16: What characteristics in your opinion should an ETSEIB incubator or accelerator have?

The summary of the answers suggests that the management of the programme should be independent of the school, and the incubator or accelerator should have a network of contacts with professionals in the industry who can help.

Question 17: ‘What kind of project should it potentiate?’

All the answers were in the line of sponsoring the most viable projects that could yield returns to the ETSEIB.

Question 18: ‘Other comments’

There were almost no answers to this. The only relevant answer explained that before
implementing this kind of programme, a series of studies should be performed to ascertain its viability.

4.2.3. Conclusions of the survey

This survey is relevant due to the high percentage of answers it received, compared to the actual number of people in the ETSEIB. Moreover, a series of points were found that are relevant to the design of an incubator or accelerator programme in the ETSEIB:

1) Teachers, as one of the main stakeholders in the university system, are mostly interested in having an accelerator in the ETSEIB. They think it can help both teachers and students to deliver more practical applications to the world.

2) A third of the teachers have received a petition to mentor a project for a startup. The surveyed teachers received a total of 24 petitions a year, of which 10.5 petitions were from master students. Extrapolating these numbers with the 410 teachers in the ETSEIB, we have a total of 137 petitions a year, with 59.8 petitions from master students.

3) Only 19% of the teachers declared that they would be interested in using an accelerator. About 60% were undecided. This takes into account that many teachers worry that launching a company could mean having to leave the university where they are comfortable. This could mean that something that offers the best of the university and the best of business creation could change the balance to an answer of ‘Yes’ in terms of being interested to use an accelerator.

4) Although they are not in the majority, a group of teachers is willing to participate in activities with an incubator or accelerator programme. They are willing to devote 0.875 hours a week. Extrapolating this to the total number of teachers would bring the number to 358.75 hours a week.

5) The digital sector is very much present in the minds of all the teachers, from ecommerce and blockchain to optimization software. On the other hand, energy, automotive, and construction are also key areas where the teachers feel an incubator or accelerator could be useful.

6) Teachers will value a programme connected with the industry and with a large network. In addition, having a different management team from the university seems to be important to the teachers. Finally, a set of teachers consider it important that the projects on the incubator or accelerator programmes are viable and profitable for the ETSEIB, apart from being an educational tool.
5. ETSEIB Acceleration Model

Based on the analysis as well as the insights from professionals in the incubation and acceleration sectors, it is necessary to make a structured development and synthesis to understand the best programme that fits the ETSEIB.

The first step is to develop the analysis in a business model framework. The goal of this approach is two-fold. First, it is an exercise to understand the business plan that startups must develop. Second, and more importantly, the objective is to develop a working programme as well as a sustainable one that will add value to the main stakeholders in the ETSEIB.

In developing a business plan, the business model canvas is used to identify not only the stakeholders but also the relations between them. While developing the framework, considering the analysis of the theory, the experience, and the environment.

5.1. Customer segments

Customer segments form the starting point of any business plan. In this case, customer segments are the stakeholders who receive value directly from the incubator or accelerator programme.

5.1.1. Customer segments – Literature review

The typical incubator and accelerator programme is focused on serving customer segments, thus, normally startups in any kind of development that needs mentoring and training. But there is a new trend where these programmes are diversifying and serving more than one stakeholder. To make their operations more sustainable, accelerators are diversifying by offering a set of new services.

Some of the services developed are consulting services, training for company employees, and coding academies. These services serve a set of segments, such as companies, developed startups, and students who lack interest in innovation, which are not interesting segments for a project developed in the ETSEIB. There are reasons for this. In the beginning, the programme will not have the network to capture the interest of companies in the services. It will not have the expertise to serve as consultants to the startups. It also may not have many coding experts who can train outsiders.

At the same time, some new kinds of programmes are being created, such as university programmes and corporate VC. These programmes aim to serve the entity behind the programme, whether a corporate organization or a university. Apart from being the owners of the programme, the universities and corporate organizations must also be served by it. As stated in
Section 1), a university incubator or accelerator must add value to the university. This is why the ETSEIB should be considered a customer segment of the programme.

5.1.2. Customer segments – Insights from the professionals

During the interviews, different types of customer segments were identified:

- Entrepreneurs with ideas or projects but at a very early stage of development: This segment was present in Emprèn UPC, IQS Tech Factory, and Founder Institute. Most students in the ETSEIB will have profiles matching this segment, as they probably will not have a developed project. Moreover, the large participation of UPC students in Emprèn UPC suggests that there is a clear gap to be filled for the students.

- Entrepreneurs with settled startups and some progress: This segment was present in the pure accelerator programmes, such as Plug and Play and EIT InnoEnergy. This segment may include some of the teachers in the ETSEIB but not the vast majority. Thus, the designed programme should not focus on this segment.

- Mature startups: This segment was present in Reimagine Food and Plug and Play. Giving value to this segment needs a large pool of mature and successful startups. The programme must also provide a large network of contacts within the relevant sectors. Initially, the designed programme would not meet either of the two conditions. For this reason, attending to this segment will not provide any value.

- Researchers or companies with projects executed by third-party entrepreneurs: This segment is present in Grupo Intercom and CIMNE Tecnología. Programmes working with this segment tend to choose the entrepreneurs that it wishes to work with. In the case of CIMNE, this facilitates the technology transfer in the research centre; meanwhile, the researcher maintains his role as a researcher and receives an income for this research. The existence of CIMNE Tecnología proves that university researchers need programmes to potentiate the exit of university research into the business world. The ETSEIB has more than 400 teachers, the majority of whom are researchers. For these reasons, an accelerator in the ETSEIB must attend to the needs of this segment, even if it is not the primary focus.

- Companies: IQS Tech Factory, Plug and Play, and Reimagine Food focus on big companies. These programmes aim to implement returns from the companies in exchange for giving them access to the innovation and business opportunities that the startups are developing. To earn profits from this segment, it is necessary to have a large network of startups and companies. This segment is not appropriate for the ETSEIB programme for two main reasons. First, the programme will initially lack an extensive network. Second, as the university also represents a customer segment, the companies
and startups could make it difficult to carry out everyday operations, and may even create unnecessary problems.

5.1.3. Customer segments – Environement

The teachers’ responses to the survey questionnaire revealed that many of the petitions for help with a startup came from master or other students. The survey also revealed that the teachers believed students could profit from such initiatives. In this case, an accelerator should focus on the student segment.

The survey also revealed that teachers may want to use an accelerator programme, depending on how it was designed. It was found that some teachers had fears about launching a company as they may have to leave the university. Although the teachers can do both things, and some are willing to do this, most of them do not want to take the risk. The survey stated that the teachers should also have access to the possibilities that an accelerator offers but should not be the focus of the programme.

A large percentage of the teachers agreed that the university should profit in some way from such a programme. They stated that one of the main reasons to implement these programmes would be to improve the services and the prestige of the university. The survey results indicated that there is a need to provide some returns to the school in the form of educational improvement or profits.

5.1.4. Customer segments – Proposal

To sum up, the programme in the ETSEIB should have a diversified strategy in the customer segments. There should be three main segments:

- Entrepreneurs: They include students and teachers who do not fear launching a company on their own and who are at a very early stage of development of their project. Some exceptions can be made to adapt the proposed programme to some entrepreneurs—mostly teachers—whose projects are in a slightly more advanced stage of development. This segment will be the focus of the programme.
- Researcher mindset: This includes teachers who do not wish to launch a company but who have some research that could be applied to launch a product or service. This segment is not the focus of the programme but is a segment that must be served.
- ETSEIB: The school is a customer as the programme should give value to the school.
5.2. Value proposition

5.2.1. Value proposition – Literature review

The main value proposition in all the incubator and accelerator programmes is the constant support to the startup and the guidance required to achieve its goal. This should be the most important value proposition given to the entrepreneurs in the programme.

Training is more common in accelerators than incubators. The right training helps entrepreneurs to expand their skill set rapidly. Normally, training helps the entrepreneur to avoid taking unnecessary risk and making common mistakes. Besides, the ETSEIB is an educational institution. So, training should be a part of the programme in order to provide the right alignment and improve the current educational portfolio of the ETSEIB.

One of the value propositions in incubator and accelerator programmes is the co-working space. This space provides an opportunity for startups to build a network while getting a space to work. This resource is expensive as space is normally scarce but it should be a part of the programme, especially considering the limited resources of students.

Other entities provide different value propositions, such as having in-house consultants or legal advisors. Such resources should not be included in the programme at the ETSEIB as the school has no expertise in these areas. Moreover, it will be a centre of cost and the return on the investment for adding these services is not guaranteed.

Another common trait of accelerator programmes is that most of them provide funding to the startups to facilitate the beginning of their operations. This normally speeds up the process. The need of this value proposition in a university programme is not clear but it should not be disregarded.

5.2.2. Value proposition – Insights from the professionals

Most of the programmes covered through the interviews have a co-working space for their startups. Most of the programmes provide this space as a first office either free of charge or in exchange for a small fee. The interview with Juan Carlos Morales shows that a space like this can help student entrepreneurs. These spaces allow students to professionalize their project, as well as meet customers and investors. Owing to the nature of the entrepreneur segment, a co-working space is needed.

Another intrinsic value is the network these programmes have. Large networks help startups to obtain mentors, insights, investment, and customers. A network like this is difficult to build but it
is a key resource that should be a part of the programme.

Plug and Play stated that as part of their co-working space, they offer startups a set of ‘perks’ in the form of discounts or services included in the programme. These rewards are helpful to startups in the beginning and are normally provided through sponsors or partners. At the beginning, the possible network of the programme would not be very large. For this reason, these rewards could be included in future. For the moment, however, it should not be included as it will be costly and inefficient.

All the programmes covered either give support and training or only support. The ones that do not provide training would include it if their budget allowed it. This means that training and support are mandatory for any programme that wants to succeed and attract good projects. The programme in the ETSEIB should provide these two value propositions for the entrepreneur segment.

Some of the programmes we looked at funded their startups while others did not. The main reason behind funding was to speed up the process or obtain a higher stake in the company. However, obtaining a higher stake should not be the goal for the ETSEIB programme owing to the possible monetary restrictions as a public entity. On the other hand, speeding up the startups’ development process is a legitimate reason to offer funding. Joaquim Ferrer said that although providing a lot of fund to startups is not the best idea, a moderate amount allows the entrepreneurs to focus on their business. For these reasons, some funding to cover the expenses could be added to the programme’s value proposition.

Another value proposition is provided by CIMNE Tecnología. This programme facilitates technology transfer out of the university by hiring the best entrepreneurs to direct startups that have developed out of research projects, in exchange for giving returns to the researchers. This value proposition could be attractive for our programme, especially for the researcher mindset segment. CIMNE also offers accounting services, legal advisory, secretarial services, and more. These other services would not be a part of the ETSEIB programme as they add to the costs. In addition, CIMNE does not allow researchers to participate in the startups. This is because CIMNE Tecnología wields the power and decides which projects should be pursued. The programme in the ETSEIB would not work like this as monitoring all projects within the school would be expensive. The researchers would need to approach the accelerator programme. So, giving them participation in the company will work as an incentive. Offering participation and royalties would eliminate the need to have a contract with the researcher. In CIMNE, the programme has to pay returns to the researchers from the beginning. This would alleviate the startup costs.
5.2.3. Value proposition – Environment

The teachers stated in the survey that the main value proposition of any programme for the ETSEIB should be to improve the prestige and educational portfolio of the school. Moreover, the programme should be implemented only if it is not a liability for the ETSEIB.

5.2.4. Value proposition – Proposal

The previous section shows that three customer segments should be satisfied. As each segment has different needs and expectations, the value proposed to them cannot be the same.

1) Entrepreneurs

The value proposition to this segment has been stated repeatedly in the interviews. This segment is technologically focused. It needs support to understand that product development and running a business are not the same. For this, the main value proposition to this segment is divided into four main areas:

- Training: All the interviewees state that to overcome a lack of knowledge in some areas, engineers will need extra guidance on how to develop a business and capture clients, among other things. Understanding the different models of startup development, such as lean startup, design thinking, or tools like the business canvas, is mandatory to level the ground against the competition for ETSEIB students and teachers.
- Support: Students may be capable of developing prototypes and having some insights. But they would usually need support from experts in the area, which could be easily found in the ETSEIB. Moreover, getting guidance and assistance when a problem arises would also be meaningful.
- Co-working space: Students usually lack the resources to hire an office. So, having a space to meet clients and carry out team work is essential. This is the main value Emprèn UPC gives and it is working very well in the UPC community.
- Networking: Those without experience and contacts in the sector can have a hard time defining and validating their product. Finding the first clients and suppliers can also be a challenge in the absence of connections. The ETSEIB, being an interconnected entity, could provide support in this regard.
- Funding: Being able to fund the best projects will give a boost to startups and ensure returns on the investment faster. Entrepreneurs will benefit from focusing on developing the business and not worrying about the initial funding. This was stated in the interview with Joaquim Ferrer, who made it clear that, in his experience, the lack of funding can block ideas. On the other hand, too much funding can discourage innovation.
2) **Researcher Mindset**

This segment comprises researchers who have some research or an idea with practical applications but who do not wish to launch a company on their own. The value propositions an accelerator can give are listed below:

- **Technology transfer and intellectual property:** Researchers may develop a practical application but may not want to launch a company. Yet, they might still want their practical application to find use outside the laboratory, which would bring them prestige as the developers. In addition, providing clues on how to protect intellectual property is a great value for this segment.

- **Profits without risk:** This segment wants to monetize its findings. This can be done through royalties or by providing them with a stake in the company.

- **Participation:** Although not fully committed to the project, this segment can take up assessment positions if the project becomes a startup.

3) **ETSEIB**

The school must obtain some value from the development of an incubator or accelerator programme. The values proposed for the school could be the following:

- **Improving the education portfolio and prestige of the school:** As seen in the survey and in the theory, universities want to provide better educational systems. Nowadays, university prestige is more important than ever. Proof of that lies in the number of rankings available for universities. In addition, the ETSEIB is one of the leading schools of engineering. So, it has to adopt new trends and not remain a laggard.

- **Extra income:** Having extra income to cover part of the operating costs is a major concern for the university. Although it may be difficult to draw profits from the beginning, the incubator or accelerator programme could be profitable in the long run.

- **Satisfy its stakeholders:** The ETSEIB is a community of more than 3,000 people. It is run through democracy. Being able to please students and teachers will help in the governance of the school.

### 5.3. Channels

Channels are the means through which a business can contact the client or deliver its product.

#### 5.3.1. Channels – Insights from the professionals

In five out of the seven programmes considered in this paper, most participants arrive by applying to the programme or speaking to the programme staff. To facilitate this, the programmes usually
have a webpage and are announced or recommended by its partners. The ETSEIB programme should have its own website. An announcement should be made on the ETSEIB’s website to give exposure to the programme. All programmes at the ETSEIB have an office where the interested participants can contact the staff for information. Having an office space for the direction staff should also be a channel.

5.3.2. Channels – Proposal

In services like this, channels are not that important. In our case, the contacts will be:

- Entrepreneurs and researcher mindset: The contact for these two segments will be through the business website, school website, and office meetings.
- ETSEIB: The channels will be meetings and direct contact between managers from the ETSEIB and the programme.

Being visible and knowing the business is mandatory whether the good sold is a product or a service.

5.4. Customer relationships

Customer relationship is how a business handles an ongoing relationship with its target segments.

5.4.1. Customer relationships – Insights from the professionals

During the interviews, three main customer relationships methods were noted:

- Mentoring: This process is the more common one. Normally the mentor, who may or may not be an employee of the programme, is the link between the programme and the startups. The mentor provides guidelines and direct support to the startups and reports to the programme. This type of relationship is common because it is also the most effective. For this reason, at least during the development of the programme, mentoring should be the chosen manner to connect with the participants.
- Online mentoring: Plug and Play uses this method for startups that do not want to move to Valencia. There is no reason to implement this method in the ETSEIB, as all projects accepted will be from the school itself.
- Report: Nearly all accelerators use this method to control the KPI of the startups and their evolution. This method could be implemented for startups when completing the programme. But as most of the participants will either work or study in the ETSEIB, it should not be implemented at least during the programme. The reporting of the KPIs and other details should be done through the mentor to facilitate and clarify the data flow.


5.4.2. Customer Relationships – Proposal

In this case, the handling of the relationships will be as follows.

- Entrepreneur and researcher mindsets: The relationship with these segments will be through mentoring and a follow-up process, as well as by connecting with them through the community of participants in the accelerator. The interviews suggest that being attentive to the evolution of startups is important for not only the startups themselves but also the accelerator as it provides a way to minimize risks.

- ETSEIB: The relationship will be through dedicated personal assistance with the managers of the ETSEIB. The concept of a business model canvas explains that dealing with individual customers who have different needs necessitates personal relationships. Therefore, the relationship with the ETSEIB, which is the most important relationship, would be through a personal assistance method.

5.5. Revenue Streams

Revenue streams are the methods through which the business handles its operations and, if possible, generates profits.

5.5.1. Revenue Streams – Literature Review

The literature presents various forms of revenue streams for the incubator and accelerator programmes.

- Participation in the startups: This is the most common revenue stream. As equity is expensive, obtaining equity for the programme is a good way for the ETSEIB to become profitable.

- Fees: The fees can make the programme exclusive but it can also be a side revenue stream. Fees should not be disregarded but they should not be the main source of revenue.

- Monetizing side services: Most of the side services have been discarded in the value proposition. Hence, the only side service that can be monetized is the co-working space. Monetizing this space is a common practice. As space is scarce in the ETSEIB, monetizing this service is necessary.

- Monetizing relationships with corporate organizations: Becoming a corporate partner or an outsourcing programme can provide some income to incubators and accelerators. This may not be an adequate revenue stream for the ETSEIB programme, as it is already linked with the ETSEIB. Linking the programme in intimate relationships with more than one entity could lead to management problems and conflicts of interest.
5.5.2. Revenue Streams – Insights from the professionals

Paloma Mas said that the best accelerators rely on participation to be the leaders. Meanwhile, Juan Carlos Morales said that although they do not participate, they add value worth 1–2% of the equity. Joaquim Ferrer added that accelerator programmes are moving towards asking for a small part of the equity in return for the acceleration and not just the investment. These three interviews emphasized that not asking for equity represents a loss of value.

The Founder Institute is the only programme interviewed that asks participants to pay more than a symbolic fee. This could discourage many potential participants as an upfront fee of €900 is a limitation for students.

The ETSEIB programme should ask for equity for two reasons. First, this is the model. Not asking for participation could make the programme seem less attractive and old-fashioned. It may even mean a loss of revenue from losing out on both startups and the equity. Second, asking for high fees is not an option as our main segment is students with limited resources.

Plug and Play and Emprèn UPC do not rely on fees but charge token amounts for the use of their co-working space and other services. The fee here has two objectives: First, it underlines the commitment of the participants, and second, it mimics some expenses the entrepreneurs will have once they leave the programme. The ETSEIB programme should have a symbolic fee to improve the commitment of participants, as entering in this early stage also carries a lot of risk. The symbolic fee would also be a deterrent to students who wish to use the space for activities not related to startups, such as studying for exams or completing school projects.

Charging companies a fee for the service of connecting them to startups is a revenue stream explored by IQS Tech Factory, Reimagine Foods, and Plug and Play. Although this is a valid source of revenue, it would not be a part of the ETSEIB programme’s revenue streams. There are two reasons for this: First, to monetize each contact, a large network is needed. This is why IQS Tech Factory has not implemented it yet. Second, it would mean adding a customer segment and service into the programme. This could reduce the effectiveness of the other services and create internal problems.

Javier Marcipar of CIMNE Tecnología said that CIMNE received income from participation in startups and researchers received income from the royalties. As in the value proposition, it has been decided that the researcher’s mindset segment will receive participation on the startups created from their projects. This would allow the ETSEIB programme to take participation on the royalties for the technology license. This should be implemented. If the programme can effectively increase the technology transfer in the school, it could be a great source of revenue.
5.5.3. Revenue Streams – Proposal

In this case, the revenue streams are different from each segment.

1) Entrepreneurs:
   - Participation in startups: As Paloma Mas said in the interview, the best accelerators have to rely on equity participation in order to be as good as the industry leaders. Moreover, Juan Carlos Morales added that although they do not participate, they add value worth 1–2% of the equity. In his interview, Joaquim Ferrer said that as an accelerator programme, they are moving towards asking for a small part of the equity in return for the acceleration and not just the investment. This is why, for the entrepreneur segment, this project will ask for 5–10% equity. These are more or less the numbers that InnoEnergy asks for. The differences are that InnoEnergy invests more money in the startup whereas the ETSEIB accelerator will enter at an earlier stage of the process.
   - Symbolic fees: As explained in the interview with Juan Carlos Morales, his accelerator charges a fee, because giving away space is expensive and the students could end up using the space for other things. In addition, the interview with Oriol Bes made it clear that people were less willing to jump into something if they had to pay for it. For these reasons, access to the programme and use of spaces would have a symbolic fee to ensure the commitment of the entrepreneur. However, this fee would not be as large as the one charged by Founder Institute.

The exact numbers for this section will be given in the sections on Planning and Budget.

2) Researcher mindset: Only one source of income will be considered here. That is a participation in either the startups created or royalties from the technology transfer.

3) ETSEIB: The ETSEIB will be the source of revenues, as it will help cover the operating cost directly or through subventions.

Other forms of revenue streams are public funds from the Generalitat de Catalunya, and endowments from individuals and institutions.

5.6. Key Resources

The key resources are all the necessary resources needed to run the business. The key resources are linked with the resources needed to deliver the value proposition. In this case, one key resource involves all customer segments. This is the database of the network of investors, companies, and mentors.
Other key resources will be:

- For the entrepreneur and researcher mindset segments: The resources needed to perform all operations for these segments are UPC or ETSEIB equipment, space for startups, space for the office, and the UPC and ETSEIB brands to link the accelerator to these prestigious institutions.

## 5.7. Key Activities

The key activities are those activities that must be carried out to deliver value to the customer segments.

- **Entrepreneurs:** The key activities for the entrepreneur segment are programme management, as well as mentor search and management. As noted in some of the interviews, the mentor should be not only willing to help the project but also capable of giving advice and connecting to people from the sector.

- **Researcher mindset:** The main activity with the research mindset is contact management or intermediation, thus connecting researcher knowledge to startups or big companies. In transfer technology, as seen with CIMNE Tecnología, being an intermediary between the business and the research is one of the key activities. It can lessen the risk and incompatibility of researchers.

- **ETSEIB:** The main activity in this area is producing viable startups to promote the work done in the school.

## 5.8. Key Partnerships

The key partnerships in a business model are those people or institutions that are not segments but that are necessary for the business to prosper. In this case, partnerships are extremely important because having more and dedicated partnerships is better for the programme.

The partnerships are also exclusively for the entrepreneur and researcher mindset segments. Some of the partnerships that will be needed are:

- **Institutional:** These are partnerships with the different stakeholders in the university. These also include the ETSEIB. Even if it is a customer segment for the other segments, it is a key partnership. There is also the UPC, the UPC alumni, and Emprèn UPC. These institutions could add value to each of the segments if they are involved in the programme. The UPC and the ETSEIB are the main partners to ensure that the programme works. In addition, UPC alumni and Emprèn UPC can help with looking for mentors and/or extra space for the startups if needed. As mentioned in the interview with Juan Carlos Morales,
Emprèn UPC’s having partnerships with the rest of the school is helpful for developing everyday operations.

- **Investors:** Maintaining partnerships with investors is mandatory for both segments, as investors give feedback on the project and provide the funding for the startups. The main investors include business angels and VC firms. Almost all the accelerators represented in the interviews have some kind of contact with investors, as investors not only fund startups but also help finance the programme structure.

- **Companies and corporate VC:** Maintaining contacts with big companies is as important as building links with investors. Both Reimagine Foods and Plug and Play have specific programmes for building contacts between startups and established companies. Even IQS Tech Factory is wondering if it can sustain its cost structure by making the established companies its direct customers.

- **Governmental institutions:** Partnerships with Generalitat de Catalunya and Barcelona Activa can be very profitable. They can help cover expenses through subvention and increase the startup’s network. Interviews with Javier Marcipar and Juan Carlos Morales make it clear that these public institutions are willing to promote such activities. Moreover, the document ‘Barcelona and Catalonia Startup Hub’ (2017) mentions the willingness of public institutions to promote entrepreneurship.

### 5.9. Cost structure

#### 5.9.1. Cost structure – Insights from the professionals

Juan Carlos Morales of Emprèn UPC showed that the main cost of a programme that uses the university space is the salaries. The ETSEIB programme, despite being a separate entity, would operate within the ETSEIB premises. Hence, the cost of maintenance and space should not be part of the costs. However, as in Emprèn UPC, it would have to pay the salaries.

All the programmes that fund their startups stated that the funding is a big part of their budget. So, the ETSEIB programme could also provide some funding to its startups. Hence, this will also be a cost.

Mentor-related expenses can be of three types. First, mentors may be paid for the hours worked, like in EIT InnoEnergy. Second, mentors could be paid from a common pool formed by the profits generated from the startups, like in Founder Institute. Third, the mentors may not be paid. The mentors in the ETSEIB programme should be paid as this would increase their performance and willingness to participate. Hence, the expenses of having mentors should be added to the cost structure. The form of payment is described in the budget section.
5.9.2. Cost structure – Proposal

The cost structure is also common through the different segments as the costs are generalized. The main costs of the business will be:

- Salaries of the staff in the incubator or accelerator
- Maintenance of the space and website for the incubator or accelerator
- Mentor expenses
- Funding of the companies

5.10. Business model canvas framework

This section presents a framework of the previous points. The aim is to visually understand the relations among the different stakeholders and the activities present in the final proposal. The final proposal, stated in Figure 33, aims to fully satisfy all actors in the environment while focusing on the key activities each actor should take on. Moreover, the goal while using this framework was not only to develop an accelerator or incubator model but also to create a sustainable entity that could add value to the community and especially to ETSEIB stakeholders.

In the canvas, green represents the entrepreneurs, red the researcher mindset, and yellow the ETSEIB. In addition, black represents all three at the same time, and violet when it affects entrepreneurs and the research mindset.

Key points of the model:

The programme is a hybrid between an accelerator and an incubator. Given current trends and the insights from the interviews, it is clear that an accelerator is the best-performing approach. But as it is a university programme, being able to support ideas from the beginning and for longer periods is also important.

The accelerator will have to serve the following segments: entrepreneurs that want to develop an idea, teachers with a researcher mindset who have an idea but do not want to launch a company, and the ETSEIB as the one entity to which the accelerator has to give value. The selection of these three segments is sustained by the theory where it was clear that any incubator or accelerator in a university should add value to the university. Moreover, even the surveyed teachers stated that an incubator should help students and teachers, and add value to the ETSEIB. The survey results also highlighted the fear of teachers to leave the university or could hold the technology transfer in the ETSEIB. Finally, the interviews made it clear that there are not only young people with ideas but also older professionals who wish to experiment. So, serving both groups is mandatory.
The business model of the accelerator relies on three things:

- Giving support, space, and mentorship to entrepreneurs in exchange for equity in their company. Most of the accelerators interviewed are following this model. Even a pre-incubator like Emprèn UPC is generating 1–2% value for startups.

- Acting as an intermediary between researchers and startups or companies to promote technology transfer in exchange for participation in the royalties or company shares. The aim is to act as an intermediary while diminishing the fear stated by the teachers in the survey while profiting.

- Improving the educational portfolio and services of the ETSEIB in exchange for economic support to the programme. As stated in the survey, the teachers said that improving the educational portfolio is mandatory for any university nowadays.

The remaining points are summarized in the canvas in Figure 33. The exact planning of the program and the budgeting will be included in the following sections.
Figure 33: Business Model Canvas, Final Proposition
6. ETSEIB Acceleration Programme

This section explains the planning of the programme and the main process that the participants will follow. An explanation is given for the value proposition that will be delivered to the customer segments. As mentioned, there are three customer segments. Of these three, only the ETSEIB will not go through the programme as the value delivered to it is not the programme by itself.

6.1. Board of directors

The program will have a board of directors apart from the management and the rest of the staff. The goal of this board will be to supervise the work done by the managers as well as evaluate the current portfolio of startups.

The board will meet at least once every three months. The purposes of these meetings are:

- Evaluate the current portfolio of projects, their potential, and their costs.
- Assess the performance of the manager.
- Allow or deny more funding to the startups.
- Review projects from the current research in the ETSEIB, to scout for new opportunities for the researcher mindset segment.
- Review selection criteria.
- Review programme current strategy and purpose.

6.1.1. Members of the board

The board of directors will be constituted by five chairs. The main stakeholders and partners of the programme will be able to designate four out of the five chairs in the board. There are five chairs to avoid having draws in the votes.

1) **The manager**: The manager will occupy the first chair. As in most of the organizations the highest employee in the business, most of the times called chief executive officer (CEO) is part of the board of directors of the firm.

2) **ETSEIB Chair**: One of the chairs will be occupied by a designated member of the ETSEIB direction. The ETSEIB is the main stakeholder, partner and also client of this program. For these reasons, one of the chairs will be occupied by ETSEIB to make sure the program is working for the interest of the school.

3) **UPC Chair**: The UPC direction will appoint the third chair. The UPC as the university, which the ETSEIB is part of, also has enough interest in the programme to be able to appoint one of the members.
4) **City Council or government Chair:** This member sitting in this chair will either be appointed by the city council or the government. As seen, in the interviews, the government and the city council are very dedicated to promoting innovation. Moreover, as the university is public, the program will manage public funds, that is why having a designated member of the government, can give access to more resources.

5) **Private sector chair:** The last chair will be given to an expert working in the innovation sector for the private sector. This member has the purpose to give the private sector view to the other four members all coming from the public sector. This chair will be appointed by consensus of the other chairs. This chair is the only one that will have time limitations. The limitations are to prevent the other members to constantly change the appointed member and to avoid giving the chair in perpetuity. The appointed member will be member of the board for five years, not extendable.

### 6.2. Researcher mindset Segment

This segment has already been explained to be different from the typical entrepreneur segment. Here, the researchers have an idea or a project but cannot rely on themselves to create a business out of it.

This programme will not have a fixed structure as it can be highly seasonable. The programme for this segment will be set up on demand. It could be variable and flexible.

The data from the survey indicated that the teachers surveyed received 2.5 petitions from other teachers and 3.5 petitions from PhD students each year. We can extrapolate the data to 34.2 petitions in the whole of ETSEIB in a year. As an assumption, we will use the data regarding the fear that some teachers have of leaving the university. This could be an indicator of how many teachers would use the accelerator as a customer with a researcher mindset. In responding to this question, 43% answered that they had this fear, while another 25% answered with ‘Maybe’. We will assume half of those who responded with ‘Maybe’ are possible customers. Thus, this represents a total of 55.5% of the teachers. The final calculation suggests that there could be 18.8 possible projects a year in this segment.

Of these 18.8 possible projects, as seen in the selection process in InnoEnergy where the people applying also have experience in the sector, the acceptance rate may be around 8%. This means that from the 18.8 possible projects, startups would be created out of 1.5 projects; therefore, one could expect between one and two projects a year.

Overall, this means that one to two projects a year could become a startup. For the rest of the projects, the programme will help allocate licences among other startups and companies from the
network. Management of these one or two projects will be carried out by the accelerator staff until an entrepreneur candidate is found who could take the place of the startup director. The major pool for choosing these directors should be the participants in the programme for the entrepreneur sectors; the managers will know them and they will have been educated in-house. As the accelerator will be the creator of the startup and the entrepreneur will be placed after this, the idea is to ensure a 30% stake for the researcher, 25% for the accelerator, 20% for the entrepreneur team, 15% for the ETSEIB, and the other 10% for the accelerator to allocate to future staff or retain depending on how much investment is carried out.

For the remaining 16.3 projects on average, they may become licenses to other companies or startups. In this case, 25% of the licence profit and royalties will go to the programme, 15% to the ETSEIB, and the rest to the researcher.

The percentages of these royalties and equity have been calculated through comparison with the ones given for CIMNE Tecnología, but by adapting the data to a different structure. Moreover, it is necessary to factor in the recommendation of Javier Marcipar to avoid giving too much equity to the entrepreneur, at least at the beginning.

6.3. Entrepreneur segment

The entrepreneur segment will be the most numerous customer segment, and thus the core business of the incubator or accelerator. In order to estimate the size of the programme, we have obtained the possible numbers of applications to the programme by two means:

- Using the survey data from the teachers, we have extrapolated that the total number of petitions was 137. Taking out the 18.8 petitions that will go to the other programme, this leaves us with a total of 118.2 possible projects a year.
- Extrapolating the data given by Emprèn UPC, as well as considering the difference in the dimensions between UPC’s north campus and south campus, the number of petitions given a similar ratio of petitions per student will total 57.5 petitions per year, but only for the students.

As these two sets of data are quite different, instead of selecting the ones entering the programme by a percentage of the total amount of petitions, it may be more useful to select the number by ascertaining how many participants the programme could actually take.

6.3.1. The programme

The programme will consist of four main phases. These four phases will be distributed into two accelerator phases and two autonomous ones. The idea is to leave projects to develop when they
are young, while pushing them to foster entrepreneurial development. The following scheme is mainly for students who have no experience in the sectors. The path taken by professors with experience could start at different points. A Gannt of the program can be found at the end of the section in Figure 35.

1) Phase 0: The selection.

The expected number of petitions for the programme is between 57.5 and 118.2 petitions per year. Although in each phase there will be criteria for screen non-performing projects, a selection must be made before the start.

No more than 30 people should join the programme. This means 30 people, not projects. Although the limit is by people, the selection will be done by project. The reasoning is similar to the ones used by Founder Institute and Emprèn UPC. Though they are slightly larger, those programmes expect to lose more participants than the others.

The selection will combine the process used by Emprèn UPC and Founder Institute. Applicants to the programme will be asked to undergo a psycho-technical test and an interview. This selection process will ensure two things. First, it will ensure that the candidates have the right mindset to put in the hard work that a startup involves. Second, it will ascertain that even without the prototype the participants have a feasible idea.

One of the main conditions is that this programme will start in the earliest stages of the startup development. Juan Carlos Morales stated that having some kind of training before starting the development work can help more startups succeed. It will be similar to the intention of Founder Institute, although the programme will accelerate projects and not people.

Although there is no technical condition for the project before entering, there will be three main KPIs to continuously evaluate the point of development of the project throughout the programme. Other KPIs could be added depending on the startup. But these three will be the main conditions:

1. TRL: This KPI will measure the state of development of the product or service. This method is widely used for selecting projects. However, as this programme will be at the beginning, the KPI can indicate the evolution of the project.

2. CAC: This KPI is the cost of acquiring one more customer. In all startup development models, this means knowing the customer and the cost of acquiring this customer.

3. Ratio of CAC to LTV: This KPI is the measure of sustainability of a company. Paloma Mas said that most of their KPIs in Plug and Play are related to the return on investment. Thus, this ratio
approximates the return on investment per customer.

In general, people should complete all the previous phases or at least the requisites before moving to a later phase of the programme.

2) Phase 1: Jump into the business

This first phase with 30 participants will last two months. The main goal of this phase is to incentivize the participants to think about the customers. As mentioned by Oriol Bes, Juan Carlos Morales, and Paloma Mas, technical backgrounds are very product focused; therefore, teaching participants about the lean startup model, design thinking, or the business model canvas could save time later on. Moreover, as explained by Juan Carlos Morales, a slight training at the beginning is what Emprèn UPC would add to their portfolio if they had the budget.

In this phase, four sessions will have to be completed:

1. Introduction and orientation: As in the Founder Institute model, there should be an initial class orienting the participants and talking about the essentials. In this session, the KPIs will be explained. Moreover, meeting the mentors and starting to create relationships is the key of this session.

2. Product development and business models: There should be a session discussing how to develop a product by using the lean startup model, design thinking, and business model canvas.

3. Market research, customer development, and empathizing with the customer: Even if the startups do not have their first clients, they should know what their customers might want and where to find these customers. This session is also part of the Founder Institute programme.

4. Basic finance: This session gives information on where to find investors, as well as introduces the basic financial tools, like those used in accounting. A startup needs this knowledge to move forward. This session aims to tackle a key problem. Both Joaquim Ferrer and Paloma Mas said that one of the typical problems of startups related to finances.

The participants in this phase will have to give 2% of the equity of the startup created and pay €200 per project. These constraints are used to quantify the value of the programme and to force a symbolic fee that encourages the participants to engage in the programme.

In order to narrow things down, a maximum of 15 projects or 20 people will continue to the following phase. In addition to this limit, there will be the following demands on the KPIs. The TRL should be between Level 2 and Level 3, preferably the latter. The CAC should not be numbered.
but at least should be bounded. The ratio of CAC to LTV is not important in this stage.

3) **Phase 2: Develop the product**

The second stage is an autonomous stage where the startups are given the time to fully develop their product and start talking with the first clients. This phase should last three months; in projects with lots of hardware, the process could last longer. But in the latter case, Phases 3 and 4 will take place in the following years.

From this point on, participants will have the opportunity to access a co-working space for up to a year. This space will have a cost of €50 per project, plus €20 for each participant team numbering more than three. The cost of this should be comparable to the prices charged by Emprèn UPC, while considering that there is less space in the south campus and there would be more mentoring.

The participants will have to give 1% more of their equity to participate in this phase.

There will be no limit on the number of people or projects who pass this phase. But there will be some requisites in the KPI:

- **TRL**: This should be level 6. It would depend on the nature of the project, or the time taken to be in Level 6 could be negotiable.
- **CAC**: The CAC should be more than 0 and less than infinite, to prove the first client has been found or at least the first contacts have been made.
- **Ratio CAC to LTV**: Similar to the CAC, this ratio should be more than 0 and less than infinite, to prove that the startup not only have contacted customers but also knows a possible revenue stream.

4) **Phase 3: Become an expert**

This phase is an accelerator phase involving another two months of courses. This part will also consist of four sessions to push the startup further.

1. **Sales and revenue methods**: The first session will be based on methods of selling as well as the different revenue methods available. This session is based on the programmes of Founder Institute, InnoEnergy, and Plug and Play. It is done at this point and not earlier. By now, the startup has a prototype of the product, knows that the clients sell this product, and is open to feedback. This will make it easier to choose the right approach.

2. **Investment methods**: This session will be devoted to understanding the type of investors as
well as their expectations. This session is essential to understand the different options the startup has, including business angels, VC, and corporate VC, among others.

The following two phases are extracted from the Founder Institute curriculum. This session focuses on the theory and new trends in accelerator programmes.

3. Legal: This session will be devoted to understanding the multiple options when legally forming the business. Knowing the different options in intellectual property is equally important.

4. Branding and marketing: This session is devoted to helping participants understand the value of a brand, and the power of marketing to increase sales and revenue.

5. Operations (optional for hardware startups): This session is devoted to understanding the different possibilities when producing and the partnerships needed. The presence of this session is based on the insights provided by Javier Marcipar, as it was clear that producing and competing with big companies on economies of scale is not easy.

To participate in this phase, participants will have to give an additional 2% of their equity. This programme will not have a symbolic fee as the participants will have already completed all the processes. The payment for the co-working space will have to be made though, as it is independent from this phase. To graduate from this phase, the following criteria must be met:

- TRL: Should be between 7 and 8. Exceptions can be made.
- CAC: CAC multiplied by the number expected customers (NEC) in the following months should be less than current assets (CA). With this CAC, startups assures that they are able to expand their business without compromising their long-term assets.
- Ratio CAC to LTV: around one. Considering that the discount rate, is usually >0%, if the average customer stays for more than one year, a 1:1 rate is already giving profits.

5) Phase 4: Start of operations

This phase is another autonomous phase involving support and mentoring. It is similar to Phase 2. This phase will last for three more months at the most. The cost will be 1% equity.

- TRL: 8 or 9
- CAC: CAC multiplied by the number expected customers (NEC) in the following months should be less than treasury and prepaid expenses. Therefore, there is no need to touch the balance sheet structure to obtain new customers.
- Ratio CAC to LTV: Less than one.
In Figure 34 and Figure 35, it is exposed the flow/decision chart and Gantt of the programme:

**Figure 34: Flow/Decision Chart of the programme**

**Figure 35: Gantt of the programme**
7. Planning

The implementation of the programme will mainly consist of assuring the key resources and partnerships about the continued functioning of the programme. The steps will be as follows:

1) Speak with the ETSEIB to ensure that the school is interested and willing to be the main partner of this new venture.
2) Speak with the UPC and the Generalitat de Catalunya to ensure that the UPC agrees with the venture and that both entities are willing to become partners.
3) Once the partners are onboard, the next step is to hire a programme manager who will manage the everyday operations.
4) Start building the major resources needed for the programme—that is, the database of investors, companies, and mentors. This also includes looking for and convincing other key partners.

The following steps of the implementation deal with the operations, ensuring the channels, defining key activities, and evaluating cost and revenues.

5) Definition of the exact resources needed for the programme, as well as the costs.
6) Look for alternative revenue streams for the beginning, besides of the income from ETSEIB or the UPC.
7) Implement a coordination protocol with the ETSEIB, which is the most important customer segment and the key partner for the other segments.
8) Implement the programme website to open the first communication channel for the other segments.
9) Announce the programme to start with promotions and attract interested parties.
10) Definition of the space needed, including for office and co-working.
11) Installation of the office in order to open the most important channel of communication.
12) Start a programme pilot.

A possible schedule for the implementation of this programme is present in the Gantt in Figure 36.
Figure 36: Gantt of the programme implementation
8. Budget

The budget is a key aspect when planning and designing a new venture. In this work, it is necessary to divide the budget into two parts. The analysis budget includes the cost of the work as well as what should have been the payment if the work was carried out by an external consultant. The second part is the budget of implementing the final proposal.

8.1. Current development costs

This section will focus on the cost of developing this paper. The costs have been divided into three main areas. The first and most significant one is the personal working hours devoted to develop this project. This includes all the hours spent on the main task, such as writing the report, analysing, and planning. It is assumed to have a price of €25 per hour of work.

The final part monetizes the hours spent by the tutors to develop their work. The task assigned to the tutors mainly involves monitoring and guiding the project as well as correction of the work. The assumed price is €70 per hour of work by the mentor.

Extra costs such as access to paid publications have been avoided in order to keep the budget as low as possible. Moreover, it has been neglected amortisations and office material as they are insignificant to the total costs.

<table>
<thead>
<tr>
<th>Tasks of the student:</th>
<th>Hours</th>
<th>€/hour</th>
<th>€</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning the paper</td>
<td>20</td>
<td>25 €</td>
<td>500 €</td>
</tr>
<tr>
<td>Literature review</td>
<td>60</td>
<td>25 €</td>
<td>1.500 €</td>
</tr>
<tr>
<td>Analysis of data</td>
<td>10</td>
<td>25 €</td>
<td>250 €</td>
</tr>
<tr>
<td>Research for interviews and data from professionals</td>
<td>30</td>
<td>25 €</td>
<td>750 €</td>
</tr>
<tr>
<td>Interviews</td>
<td>15</td>
<td>25 €</td>
<td>375 €</td>
</tr>
<tr>
<td>Transcription of the interviews</td>
<td>90</td>
<td>25 €</td>
<td>2.250 €</td>
</tr>
<tr>
<td>Planning and writing the survey</td>
<td>20</td>
<td>25 €</td>
<td>500 €</td>
</tr>
<tr>
<td>Sending the survey</td>
<td>10</td>
<td>25 €</td>
<td>250 €</td>
</tr>
<tr>
<td>Survey analysis</td>
<td>20</td>
<td>25 €</td>
<td>500 €</td>
</tr>
<tr>
<td>Final proposal making</td>
<td>30</td>
<td>25 €</td>
<td>750 €</td>
</tr>
<tr>
<td>Master project writing</td>
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<td>25 €</td>
<td>2.000 €</td>
</tr>
<tr>
<td>Grammar correction</td>
<td>30</td>
<td>25 €</td>
<td>750 €</td>
</tr>
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<td><strong>Total</strong></td>
<td><strong>415</strong></td>
<td><strong>10.375 €</strong></td>
<td><strong>10.375 €</strong></td>
</tr>
</tbody>
</table>

Table 7: Master project development costs
Tutors tasks:

<table>
<thead>
<tr>
<th></th>
<th>hours</th>
<th>€/hour</th>
<th>€</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mentoring</td>
<td>30</td>
<td>70 €</td>
<td>2.100 €</td>
</tr>
<tr>
<td>Correction</td>
<td>30</td>
<td>70 €</td>
<td>2.100 €</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>4.200 €</td>
</tr>
</tbody>
</table>

Table 8: Master project mentoring costs

<table>
<thead>
<tr>
<th>Total Costs</th>
<th>€</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development costs</td>
<td>10.375 €</td>
</tr>
<tr>
<td>Mentoring</td>
<td>4.200 €</td>
</tr>
<tr>
<td>Total</td>
<td>14.575 €</td>
</tr>
</tbody>
</table>

Table 9: Master project Total Costs

8.2. Programme budget

This section is dedicated to the finances of the programme. Therefore, the section will analyse the cost structure and revenue streams.

8.2.1. Costs Structure

The cost structure as already said, will consist in salaries, maintenance of the space and website, mentor expenses and funding of the companies.

Apart from the cost structure, the investment will be in new equipment, preparing the space, and setting up the website. We have assumed that the space will be simple without meeting rooms; therefore, 120m² should suffice. Of this, 20m² will be for the office and 100m² for the co-working space. The minimum space per employee in an office should be 3.5m² (Vera Hervás, 2014); thus, with 20 entrepreneurs, the minimum space should be 70m², and with a coefficient of security for other spaces of 1.4, the approximate space is 100m². Other equipment needed will be three computers for the staff, as well as 20 tables and 30 chairs. A cost of €20 per m² has been assumed to prepare the space. In the following table, the different investments are quantified.

<table>
<thead>
<tr>
<th>Item</th>
<th>Costs per item</th>
<th>Number of items</th>
<th>Total cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equipment</td>
<td>1.000 €</td>
<td>3</td>
<td>3.000 €</td>
</tr>
<tr>
<td>Website</td>
<td>150 €</td>
<td>1</td>
<td>150 €</td>
</tr>
<tr>
<td>Tables</td>
<td>200 €</td>
<td>20</td>
<td>4.000 €</td>
</tr>
<tr>
<td>Chairs</td>
<td>100 €</td>
<td>30</td>
<td>3.000 €</td>
</tr>
<tr>
<td>Preparing the space</td>
<td>20 €</td>
<td>120</td>
<td>2.400 €</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>12.550 €</strong></td>
</tr>
</tbody>
</table>

Table 10: Investment table

Within the operating costs will come the expenses of hiring one manager for the programme, two assistants, and two interns. The number of staff has been chosen considering that both in the
theory and in the interviews the staff in these kinds of programmes is between one and four. That is why a staff of five has been selected, where two are interns who would work part-time.

The funding of the companies will be €2,000 on average. This will not be delivered to the companies upfront, but only given when needed. The €2,000 figure has been chosen for three reasons. First, €2,000 may not be enough to start a company, but it is enough to set up a website and legally form a company. Second, as the source of funding is the ETSEIB, the amount of funding will be limited. Third, Juan Carlos Morales and Joaquim Ferrer both stated that the providing a small amount of funding is better than nothing and it can encourage startups to work better. In future stages, if the accelerator works, the average funding given could be incremented.

Finally, the mentors will not have a direct salary or payment. The mentors will be paid out of the profits based on a pre-approved share. Therefore, all mentors will receive a payment from the profits of the accelerator. The current allocation is 33% for the mentors. This means the mentors will receive a portion of this 33% proportionally to their hours of involvement in the programme. The reason for working like this is to alleviate the cost structure of the programme, similar to the way Founder Institute is working. The idea of not giving something in return to the mentors has been discarded, as it may discourage mentors from working for the programme.

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost per item</th>
<th>Number of items</th>
<th>Total cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manager salary</td>
<td>35,000 €</td>
<td>1</td>
<td>35,000 €</td>
</tr>
<tr>
<td>Assistant staff</td>
<td>20,000 €</td>
<td>2</td>
<td>40,000 €</td>
</tr>
<tr>
<td>Interns</td>
<td>8,000 €</td>
<td>2</td>
<td>16,000 €</td>
</tr>
<tr>
<td>Website maintenance</td>
<td>200 €</td>
<td>1</td>
<td>200 €</td>
</tr>
<tr>
<td>Funding</td>
<td>2,000 €</td>
<td>20</td>
<td>40,000 €</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>131,200 €</strong></td>
</tr>
</tbody>
</table>

Table 11: Yearly operating Costs

All maintenance and cleaning cost, as the programme is set to be done in the ETSEIB installations itself, it is expected to reach an agreement, similar to the one of Emprën UPC, which the cleaning and maintenance will be paid by ETSEIB.

### 8.2.2. Revenue streams from operations

In this section, only the revenue streams for the operations will be considered. Other revenue streams such as endowments, subventions, and public help will not be quantified.

The principal revenue streams, therefore, will be the symbolic fees and the participation in startups and licences. We have assumed that all startups in the entrepreneurship segment will remain in the co-working space for the eight months of Phases 2 to 4.
In order to evaluate the revenues from the startups, two main assumptions have been made. First, it is assumed that the moment to sell the startup is in Series A. Second, it is assumed that on average between one and two startups will arrive at a Series A funding. There are two possibilities to quantify this success:

- One startup is sold in a Series A per year, taking into account the average raised in a Series A (see Table 3) of startups that went through an accelerator programme in Europe. This takes into account the 6% stake of the programme and the usual 50% stake given in Series A, which comes up to €544,000 a year.
- One-and-a-half startups in Series A per year, taking into account the maximum of 1M€, in Spanish investment rounds, stated in the interviews. We will assume 700,000€ as the average Series A round for the ETSEIB programme, as 1M€ is the European average. Considering the stake of 6% and the usual 50% stake given to investors, this results in €84,000 per startup per year.

This calculation considers the possible exit of one or two startups from the researcher mindset segment.

For the licence, the average royalty of universities in 1996 was $63,832 (Bray & Lee, 2000) and the calculated exchange rate in 1996 was $0.75/€ (“US Dollar to Euro Spot Exchange Rates for 1996 from the Bank of England,” n.d.). The total inflation in the period 1996–2017 was 229.77% (“Calculadora de inflación,” n.d.). Therefore, the average expected revenue from royalties will be €280,665 per licence. Taking into account the 25% stake for the accelerator, this gives revenue of €70,166. From the 16.3 possible licences, an average of one per year is expected. The average yearly revenue will be €70,166 a year.

Program operating revenues:

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost per item</th>
<th>Number of items</th>
<th>Total cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entry to the program</td>
<td>200 €</td>
<td>30</td>
<td>6,000 €</td>
</tr>
<tr>
<td>coworking space</td>
<td>400 €</td>
<td>15</td>
<td>6,000 €</td>
</tr>
<tr>
<td>participation in startups</td>
<td>84,000 €</td>
<td>1.5</td>
<td>126,000 €</td>
</tr>
<tr>
<td>participation in licenses</td>
<td>70,166 €</td>
<td>1</td>
<td>70,166 €</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>208,166 €</strong></td>
</tr>
</tbody>
</table>

Table 12: Operating Revenues

### 8.2.3. Operating profits and expectations

Consider the cost structure (without maintenance and cleaning) and the revenues (without endowments, subvention, and others). The programme will earn the profits stated in the table:
Of this profit, as stated earlier, one third will go to the mentors and will be distributed proportionally according to the time they spend in the program. In addition, 15% of the licences will go directly to the ETSIEB, which means that the ETSEIB will be receiving €42,100 more a year.

This profit is without subventions and under conditions of a stationary regime. In the initial years, until the first sale, it will be difficult to earn profit from the licences or the startups. In order to quantify the actual value of the investment, the net present value (NPV) of the investment has been calculated.

To calculate the NPV, the assumptions are as follows:

- First sale five years after the beginning of the programme
- Investment spend at moment 0 of the starting of the programme
- During the first five years, the only revenue will be from co-working spaces and the entry fee to the programme
- The average licence and startup earnings will remain constant.
- Average discount rate of 1.61%, which is the long-term discount rate as of April 2017 (European Central Bank, 2017).

Therefore, the calculation of the net present value, will be the one initial payment, an annuity for 5 years, and then a perpetuity. To make it more visual Table 14, have been elaborated. Cost and revenues have been actualized with the discount rate. And the calculation of 2023-end column, have been carried out the perpetuity formula given in Figure 54. As a result, this, program have a NPV of 4,694,875€.

<table>
<thead>
<tr>
<th>Year</th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
<th>2021</th>
<th>2022</th>
<th>2023-end</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investment</td>
<td>-12,550 €</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Revenues</td>
<td>12,000 €</td>
<td>12,000 €</td>
<td>12,000 €</td>
<td>12,000 €</td>
<td>12,000 €</td>
<td>14,004,454 €</td>
</tr>
<tr>
<td>Total</td>
<td>-131,750 €</td>
<td>-119,200 €</td>
<td>-119,200 €</td>
<td>-119,200 €</td>
<td>-119,200 €</td>
<td>5,724,186 €</td>
</tr>
<tr>
<td>NPV</td>
<td>4,694,875 €</td>
<td>4,904,334 €</td>
<td>5,104,413 €</td>
<td>5,307,713 €</td>
<td>5,514,286 €</td>
<td>5,724,186 €</td>
</tr>
</tbody>
</table>

Table 14: NPV of the program
9. Conclusions

Incubator and accelerator programmes are a growing trend worldwide. As seen in the literature review, these programmes are gaining not only in the startup world but also among universities and big companies. This trend is noted by professionals in the sector, by teachers in the ETSEIB, and in the literature. The borders between an incubator and an accelerator are not always clear, less so for professionals within the sector. This is partly because incubators are increasingly moving towards an acceleration model, as seen from the theory and the insights from the professionals.

The amount of literature on this subject, along with the expansion of incubators and accelerators worldwide, indicates that these programmes can deliver value to the stakeholders. But there is also the danger that these programmes may not always work. One reason for this is their concern with short-term rather than long-term profits. Moreover, they may not understand the users and might not add value to the startups. To avoid these problems, the proposed design tries to adapt the programme to the needs of the stakeholders of the ETSEIB. Moreover, the ETSEIB is already a working entity. Getting the school to adapt to the programme could be counterproductive.

First, the programme will ensure technology transfer for the researcher mindset segment. It would allow the researchers to focus on investigation, thus encouraging research in the university while discouraging the best workers from leaving. This concern has come up in the survey and during the interviews with the professionals from the sector. Second, a structured programme with different accelerating phases, instead of only one, would allow the entrepreneurship segment to get a better start and boost their development when needed. This formula could result in better startups and lower risk. The lowered risk results from avoiding a startup that may have only a half-developed idea, as well as knowing how the people work and how they have been trained. Moreover, most incubator and accelerator programmes focus their efforts on mentoring the business part of the startup. Owing to the inexperience of the possible participants, providing mentorship during the product development stage could lower the risk of failure later on. Not providing mentorship could make the programme sterile and lacking in value.

The four-stage model proposed allows the startup to start by following some guidelines. It helps boost startups when the business idea is clear and helps them with approaching customers and investors. In addition, two stages of autonomous but monitored working, support the startups and the direction of the programme. They reveal how the entrepreneurs work, and what their weaknesses and strengths are. The proposed design is sustainable and profitable, as proven by the budgeting and the business model canvas. The programme proposed to the entrepreneur segment will offer training, a workspace, and mentorship in exchange for a small part of the equity.
(a maximum of 6%) and a small fee (a maximum of €700—that is, €200 for the entry and €50 per month over 10 months). Considering the average figures of the sector, the activity will be profitable. Except for the first years, where there are no sales, the programme should be sustained by the ETSEIB and other public entities. The equity strategy combined with symbolic fees is proven to deliver the best results. As the main goal of the ETSEIB is not to earn profits but to provide the best training and research, the equity-based strategy could deliver the results, despite being slightly more risky.

Although some programmes accelerate entrepreneurial projects and others focus on technology transfer, this accelerator would tackle both problems at once. This programme is capable of delivering value in the form of training and mentorship, and as a technology transfer intermediary for the stakeholders in the ETSEIB. Thus, it could complement the service of the ETSEIB while promoting the relationship between university and business, which can bring benefits for society.

9.1. Objectives achieved

All the main objectives of this paper have been achieved, as stated in the following paragraphs.

1) Main objective: Design of the programme

Not only have the general traits of the programme been designed but also the programme has been divided into different sub-programmes to meet the needs of different users. In addition, an implementation plan, a budget, a net present valuation of the programme, and the programme structure have been defined.

2) Theory review and understanding why these programmes exist

Different sets of data have been analysed, along with the characteristics of different sets of programmes, their environment, and the underlying theory. This analysis has led to an understanding of why they were created and what they should cover.

3) Trends of the sector and knowing the experience of professionals.

This objective has been achieved by interviewing seven professionals from the sector. The professionals offered insights into the current position of the sector and possible new trends. Moreover, some offered suggestions on what type of a programme the ETSEIB could have. More importantly, their insights into the main challenges of an accelerator or the problems that the startups usually face have been gathered to design the programme in a better way.
4) Environment analysis

An analysis of the environment where this programme would work has been completed as well. During this analysis, data was obtained from Barcelona Activa, which provides insights into the Barcelona environment. Adding to this were insights from professionals who have contacts with the school. Finally, there were the results of a survey performed on 100 UPC teachers, 72 of whom were ETSEIB teachers. In addition, the ETSEIB has been evaluated in terms of the number of projects available per year. Finally, the positive reaction of the teachers surveyed indicates that the programme would have enough positive support for its implementation and regular operations.

9.2. Future lines of investigation

Even though this work presents a full set of tools and a first design of an accelerator programme for the ETSEIB, more research could help improve on the design proposed here. The following lines of investigation are proposed:

1) Further analysis on the amounts raised per startup that attended accelerator programmes: This could include the analysis of the CrunchBase database. The aim should be to understand why startups that went through accelerator programmes are raising less money and to see if these programmes are having positive or negative effects on the startups.

2) Further analysis on the ETSEIB community: It is necessary to survey and interview directors and organic charges of the ETSEIB and UPC to understand why this programme has not been introduced yet or what the impediments might be. Knowing the opinion of students could also help improve the design.

3) Understanding the other stakeholders: Surveying and interviewing companies and local authorities is important to understand their needs and what they are willing to promote.

4) Look beyond entrepreneurs: This paper only developed the entrepreneurship segment programme, though the proposed programme for the research mindset segment is available on-demand. Further analysis of this programme and proposing a structure to tackle the needs of all participants could improve the overall design.

5) Include accelerator formation as a specialization at the master level: Many business and engineering schools are developing master courses in innovation but these tend to be expensive. For that reason, studying the possibility of extending the accelerator programme in the master course as a specialization could enhance the ETSEIB’s educational portfolio as well as open up a new revenue stream for the programme and the ETSEIB.
10. Bibliography


