UNIVERSITÀ DI PISA

Master Degree in Artificial Intelligence and Data Engineering
Business and Project Management

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Contents

Chapter 1

Introduction

The issue of energy efficiency has now assumed a role of primary importance among the decision-making factors that combine to define a redevelopment project. In a historical period strongly influenced by the effects of the recent economic crisis, ever-increasing attention is in fact turned to technologies and "best practices" which, while providing an undoubted environmental benefit, still make it possible to reduce expenditure with the same result obtainable. This dual economic and environmental nature inherent in every issue relating to energy efficiency is evident when we focus on the term expenditure, deliberately mentioned without adjectives in the previous sentence.
The expenditure, energy and therefore economic, incurred by a subject is an index of the quantity of resources, environmental but also financial, that a system needs to produce a specific product or service. Providing the ability to keep this capacity intact, in the face of a decrease in consumption and economic outlays, can be seen as the goal of the actions taken within an energy efficiency procedure. However, the main constraints that prevent the large-scale diffusion of this mechanism are represented both by the difficulty often encountered in finding the economic resources required to face the projected investment costs, and by the need to wait a few years before being able to start. to fully benefit from the non-financial outlay generated by the saving measures. It is precisely with a view to creating more favorable economic conditions for carrying out these virtuous actions that the State has set up a series of incentive mechanisms, also to honor the commitments made with the Kyoto Protocol first and then with the 20-20-20 Plan.
Encouraging the implementation of energy efficiency policies represents, in fact, one of the main strategies that can be implemented to comply with the objectives of reducing energy consumption and greenhouse gas emissions by 20% compared to 1990 which, together with an increase of 20% of the share, on the total consumption, of energy produced from renewable sources, constitute the goals that the European Community is committed to achieving by 2020. From a technical point of view, in recent years the need has therefore arisen to provide adequate tools to define the procedures for implementing the European energy policy. Among these, the UNI standards play a role of primary importance, drawn up with the aim of regulating the methods of obtaining a better energy performance. The fields of application of the concepts introduced above are indisputably vast. The tendency to improve what already exists, rather than overturning the situation with new designs, is dominant in every sector, from the civil to the industrial one. In particular, the reduction of economic outlays for the management

of an energy system is a need felt today more than ever by companies, whether they are small, medium or large companies.
It is in this general framework that the customers of the URANUS51 company also fit, companies that, needing considerable quantities of energy to carry out their production processes, have every interest in implementing strategies and interventions that can allow them to obtain a reduction in consumption and related annual economic outlays.
Although every production sector and more particularly every company, if analyzed in detail, is characterized by a series of processes that can vary in terms of type, temporal order and characteristic parameters (temperatures and times) depending on the quality of the raw materials, product specifications and climatic conditions. However, it can be said that at a macroscopic level there is a sequence of production processes which can be found, broadly speaking, in every production sector.
The international standard UNI CEI EN ISO 50001: 2018, together with other related standards, defines the methods of creating and maintaining an Energy Management System (EnMS) within an organization, an indispensable tool for guaranteeing the achievement of the so-called continuous improvement of energy performance.
The starting point of the procedural process will be the preparation of an Energy Diagnosis and the definition of appropriate Energy Performance Indicators (EnPI) for the plant, focal points for understanding the current link between consumption and its yield. We will continue with the identification of energy efficiency interventions, with the definition of an appropriate company Energy Policy, with the preparation of an Energy Planning and with the subsequent implementation of the envisaged Implementation Plans. The installation of a Consumption Acquisition System will be a central part of our service, a key tool of the SGE to be able to constantly monitor the energy performance of the production reality and to be able to provide the customer with guidelines to prepare the interventions to be carried out.

Chapter 2

Project Management

2.1 The company Profile

Uranus51 s.r.l. is a new company that provides expertise in energy management solutions for businesses in North Tuscany. Uranus51 is a new company located in Pisa, Italy and will begin operations in July, 2021. Uranus51 will be a partnership, owned and operated by a group of four entrepreneurs.
All owners have knowledge in the field of energy management and ICT, in particular on the management of cloud environments and on the use of Artificial Intelligence systems associated with production processes.
Uranus51 will target small to medium sized companies and government organizations within the Northen part of Tuscany including Pisa and surrounding areas. Uranus51 will seek major contracts with medium sized firms.
Those contracts will be served with the assistance of strategic alliances, to ensure to our customers the best service as possible. At same time, we work on our internal process and service to grant the best solution to each client and to be flexible as possible to work close with our clients to satisfy them as much as possible.

2.1.1 Corporate Sustainability

As well as our value that we bring to our customers, Uranus51 also tries to be sustainable for the environment. Therefore, we use strict energy management policies internally and we rely on commercial partners who look to sustainability as a value for their company. Our primary partner Amazon AWS is committed to running its business in the most environmentally friendly way possible and achieving 100% renewable energy usage for our global infrastructure. Uranus51's goal is to become a net carbon zero company within 5-6 years.

2.1.2 Our Mission

Our business idea aims to sell a service in the energy management market that allows our customers to make savings on their energy bill, get certified as a 'energy saver' complying with international standards, gain in reputation and attract more clients. The service consists in assisting and supporting the client to develop a certified energy management policy, making use of a dedicated digital platform to achieve our business

objective.
To achieve this business objective, we will rely on the ISO-50001 standard, which represents the state of the art in energy management. Our service will also lead our client companies to obtain the certification, as we will enable ourselves as a certifying body. The whole process with the client will be managed through the IoT digital platform, a tool that basically consists in dataloggers (to get data from the client business and work processes) and data-processors (mainly software tools whose output will drive through the process of dealing with the client to achieve the business objectives).
The process with the client consists of four basic steps:

- The first one, in which we acquire the current energy situation of the client and at the same time the client will equip himself with the IoT infrastructure for monitoring.

- Secondly, a report, in which this situation is described, will be produced, delivered and discussed with the client.

- The third step will be to propose to the customer, through the use of AI and machine learning, the best solution to establish an energy management policy in order to increase energy efficiency.

- Finally, the last step guides the customer through the ISO-50001 phase defined as continuous improvement, which aims to obtain a continuous improvement in performance over time, also through the analysis of processes inspected in other companies in the same production sector.

2.1.3 Organizational Structure

A functional organizational structure is a structure used to organize workers. They are grouped based on their specific skills and knowledge. It vertically structures each department with roles from the president to finance and sales departments, to customer service, to employees assigned to one product or service. Functional organizations contain specialized units that report to a single authority, usually called top management. This kind of organizational structure ensure the following advantages. When employees who have similar skills and experiences are grouped together, it makes production more efficient and of a higher quality. Roles and tasks do not change very much so there is little time spent learning, and accountability is clear. Since the hierarchy is simple, employees know the one manager they are to answer to, instead of multiple people. This streamlines communication and reduces confusion among employees. Employees can feel confident about what they're doing because it is standardized. They are more likely to feel a loyalty to their department and the organization as a whole. This increases morale and work ethic, as there is more job security. There is a clear path of growth for employees which provides motivation, and they are more likely to be corporative with people in their department. A functional organizational structure provides a perfect environment for learning for new employees (especially new college graduates) to be taught the real-world application of theoretical information.

But we can have also disadvantages for example, employees may find it boring to

repeat the same task over and over, and become less enthusiastic over time. If promotions are not handled well, an employee may be discouraged if a lower-performing peer is promoted over them. Problems may arise among management if department heads are only focused on their department and do not communicate effectively with other departments. This can cause poor communication and "silos" that are too independent from one another. If employees and management are only loyal to their teams, there will be a lack of teamwork and coordination.
It is a rigid structure where changes, innovations, and flexibility can be difficult to implement. An employee in any department may lack knowledge of information about all other departments. Managers tend to make decisions without consulting the department first, which can lead to problems. A department can become too autocratic and put its goals above those of the organization as a whole. With so many specialists involved in a process, it is difficult to pin the blame for a specific product or service malfunction on any individual.
Our company structure is composed as shown in the figure below.

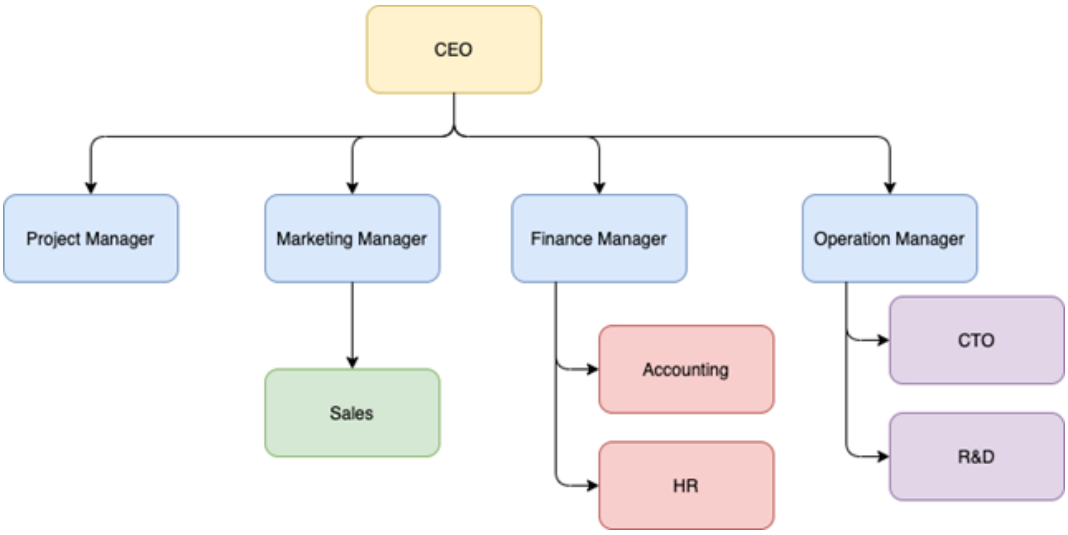

Figure 2.1: Organizational Structure

2.1.4 Number and Roles of Staff

As a startup, we don't have the ability to hire a lot of staff, but we focus on the most important sectors to start our service. So, the focus was on R&D and sales. The rest of the roles will be covered with the resources already present in the company also using the top managers.

- **Top Managers**:
  - Project Manager
  - Marketing Manager

  - Operations Manager
  - Finance Manager
  - CTO

  The operation manager will follow a specific training period on the definition of energy policies. This will allow us to interface with our customers' energy managers to define the strategies to be adopted to better structure our service.

- **Salesman** (1): takes care of evaluating possible leads, of trying to propose our service, of preparing the necessary documentation for contracts. The profile is of a person with a lot of experience in the sector, also must have training in the energy saving sector.

- **Research and Development** (4):

  - IT Engineer, IoT Specialist and Full-Stack Developer (1)
  - Machine Learning Engineer (2)
  - Data Analyst (1)

2.1.5 Top Manager Responsibilities

Project Manager:

- **Communicating with team members**: Project Management is all about communication, whether through emails, calls, daily check-ins, or team meetings. Project managers must communicate with the members of their team regularly to determine the status of various projects and potential roadblocks that will need to be resolved.

- **Communicating with key stakeholders**: Just as important as communicating with your team is regularly updating key stakeholders on project progress and ensuring that the project still aligns with changing company initiatives. This communication can take many forms, including weekly or monthly reports, regularly updated dashboards, or quick emails, calls, or meetings. Regardless of the medium, getting comfortable communicating with data is an essential skill.

- **Issue identification and resolution**: Throughout the course of any project, it's common for scope, budget, resource allocation, and other miscellaneous issues to arise. It is the role of the project manager to ensure that these issues are resolved effectively in order to keep the project on track.

- **Budgeting**: For small-scale projects, cost estimation may be a weekly or even a monthly task. But for larger projects with many different expenses to keep in mind, project managers may spend time reviewing budgets each day to ensure the project does not exceed resource allocations. This may also include reviewing, processing, and approving invoices from outside vendors if the project includes such partnerships.

- **Time management and approval**: In order to ensure that the project remains on track, many project managers turn to timesheets or a project management software that allows them to see how their team is spending their time. In addition to ensuring that the project is moving along as planned, this helps project managers shift resources between projects as necessary.
- **Team-building**: A good project manager will do more than simply manage the steps of a project. They will also manage their team to keep them productive and happy. A part of this should include team-building exercises designed to boost morale, particularly after challenging weeks or phases of the project. Organizing a weekly lunch or happy hour is one such example.

Marketing Manager: Marketing manager responsibilities include tracking and analyzing the performance of advertising campaigns, managing the marketing budget, and ensuring that all marketing material is in line with our brand identity. To be successful in this role, you should have hands-on experience with web analytics tools and be able to turn creative ideas into effective advertising projects.

Operations Manager: The specific duties of an Operations Manager include formulating strategy, improving performance, procuring material and resources and securing compliance. You should be ready to mentor your team members, find ways to increase quality of customer service and implement best practices across all levels. He also ensures all operations are carried on in an appropriate, cost-effective way, purchase materials; plan inventory and oversee warehouse efficiency; manage budgets and forecasts and perform quality controls and monitor production KPIs.

Finance Manager: Finance Manager distributes the financial resources of a company, is responsible for the budget planning, and supports the executive management team by offering insights and financial advice that will allow them to make the best business decisions for the company. He takes care of collecting, interpreting, and reviewing financial information; predicting future financial trends and developing strategies that work to minimize financial risk. He also manages Human Resources Department.

Chief Technology Officer: CTO is an executive who is responsible for the management of an organization's research and development (R&D) as well as its technological needs. CTO provides their team with the technology stack they need to build their product and guide the overall technical vision. Understanding the technical requirements of a project is what's important here. He also oversees the company's hardware and server infrastructure and manage which internal technologies are adopted and implemented.

2.2 Business Plan

2.2.1 Year 1

In the first year of activity Uranus51 will take the first six months to start up company activities and above all, for the research and development of the service to be provided

to customers, and the following 6 months to start contacts with potential customers and consequently the activity. commercial. The activities identified in the first year are the following:

- Business - Start-up
- University Administrative Contact
- Website Creation
- Dataset Exchange
- Demo Development
- System Development
- Search for IoT installers
- System Development Maintenance
- Search Leads
- Advertising Campaign

The start-up task refers to all those activities envisaged by the legislator for the establishment of the company and the economic and financial obligations for the start-up of the company. In particular, it refers to the deed of incorporation of the company, registration with the chamber of commerce, opening of a bank account, payment of registration tax. The task is expected to last one month and involves the Project Manager and the Finance Manager as resources.

The WebSite Development task, in this task you define the graphic style of the site and its composition in terms of content, then we proceed with the development of the code and its deployment on the servers. System a duration of about 3 working weeks and the resources assigned to this task are the Marketing Manager and 2 of the R&D team for the technical part.

The University Administrative Contact task is the activity undertaken to establish a collaborative contact with the University of Pisa to obtain a dataset on which to develop our Machine Learning algorithm. It is estimated to last 6 weeks; the resources assigned are the operation manager and the marketing manager.

The dataset exchange task, with this task the contact with the university department responsible for providing the dataset and its actual transfer is specified. Furthermore, a verification is also carried out by our data analysts to verify the quality of the dataset provided to us. It is expected to last 2 weeks; the resources employed are the operation manager and part of the R&D team.

The system design task refers to all those activities concerning the design of the software architecture in support of our service. In particular, the activity takes place over

1 month, and it is dedicated to the design and development of basic functions such as graphical interface and database creation. The resources assigned to this task are the CTO and the R&D team.

The system development task refers to all those activities concerning the implementation of the software architecture in support of our service. In particular, the activity takes place over 4 months. After the validation of the dataset, the machine learning model is developed and trained, and all the backend functions of the system are implemented in their entirety. The resources assigned to this task are the CTO and the R&D team.

Demo development, in this activity a demo of the service with reduced functionality is developed to show the customer the actual interaction with our system. It is not a production version but a way to familiarize the customer with the graphic interface and the its features. The Demo data is not data from real funds, but is data created ad hoc by our development team to provide a minimum of functionality to the demo. The activity is expected to take place in 4 weeks; the resources allocated are 2 members of the R&D team.

System maintenance and development, in this activity we focus on maintaining the system with corrective maintenance practices and implementing the software parts for the acquisition of our customers' data. The activity takes place after the stable release and lasts approximately 5 months. The resources assigned to this task are the CTO and the R&D team.

The research activity for IoT installers refers to the activity undertaken to evaluate and select our partners for the installation of sensors for customers who need them. The activity is expected to take place in 4 weeks and the resources allocated are Operations manager and Finance manager.

Search for Leads, this activity refers to all the operations necessary for the identification of possible client companies with reference to the provisions of the positioning and targeting of the marketing section. The activity is expected to take place in 3 months and the resource allocated is the salesman.

Advertising Campaign, refers to the salesman's activity in contacting and visiting the companies identified in the previous activities and, if successful, drawing up the related contracts. The activity is expected to take place in 7 months.

2.2.2 Year 2

The activities identified for the second year are the following:

- Maintenance and Development
- Hire new salesman

- Search for new leads

- Advertising campaign-2

Maintenance and development: this activity involves predictive and corrective maintenance of the system and the development of the algorithm for new industrial categories. The activity is expected to last 12 months and the resources allocated are the CTO and the R&D team.

Hiring a new salesman is looking for a new salesman to be hired within our company based on the profile defined by the HR. The activity is expected to last 2 months and the resources allocated are the marketing manager and the finance manager.

Search for new leads, this activity refers to all the operations necessary for the identification of possible client companies with reference to the positioning and targeting of the marketing section. The activity is expected to take place in 3 months and the resource allocated is the salesman.

Advertising campaign-2 refers to the salesman's activity in contacting and visiting the companies identified in the previous activities and, if successful, drawing up the related contracts. The activity is expected to take place in 5 months.

2.2.3 Research and Development

In this section it is necessary to consider the quality and quantity of the dataset provided by the University of Pisa. Since the collaborations between companies and universities are usually held in a geographical area around the university headquarters, within the dataset we find those production activities typical of the territory such as the paper industry, the manufacturing one for leather processing. and the production of leather garments, companies in the ICT sector. From this also derives the limitation imposed, at least for the first year, on our algorithm. Having no data on which to train the model, it is not possible to include companies not present in these production categories because it would provide a seriously non-performing service.
The budget allocated for research and development is approximately € 76,000. This considering the development cost of an AI software, which varies between € 20,000 and € 50,000 for more standard solutions and can reach hundreds of thousands of euros for custom solutions. In particular (approximate prices):

- €50,000 for R&D staff.

- €26,000 for the software useful for implementing the service.

In addition, the company's share capital was considered. For these reasons economic resources have been allocated.

2.2.4 Gantt Chart

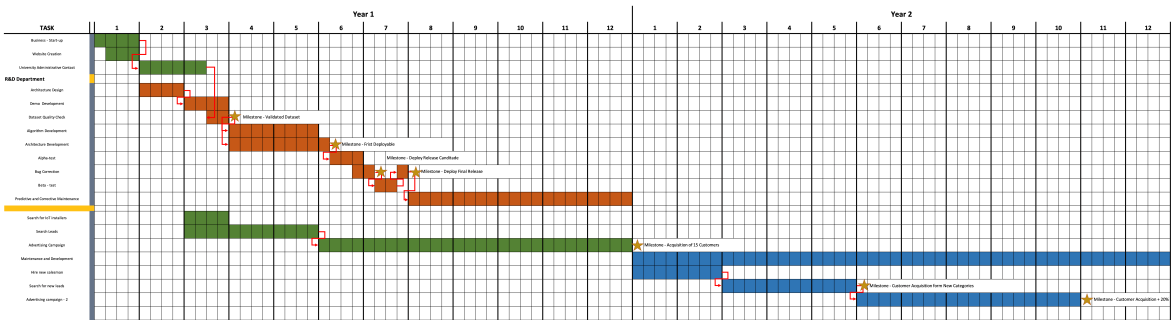

Figure 2.2: Gantt Chart

Milestones:

- Validated Dataset
- Frist Deployable
- Deploy Release Candidate
- Deploy Final Release
- Acquisition of 15 Customers
- Customer Acquisition form New Categories
- Customer Acquisition + 20%

The critical path identified in the gantt chart is the one that connects the University Administrative Contact and System Development activities, as a very large estimate has been made on the response times by the university, but there is no certainty of these times. A possible delay in these activities would delay the development of the system leading to an increase in R&D costs and a consequent delay in the commissioning of the service, which means a lower influx of customers with a consequent reduction in turnover.
Another critical path in the graph above is represented by the Hire New Salesman task, as the delay in this activity would also cause a delay in the acquisition of new customers as there are no resources available for this task.

2.2.5 Long Term Plan

The objectives we set for development on a long-term industrial plan are as follows:

- Once you have purchased a very reliable technology and with a very important number of customers, for a consulting company. It can be open to a partnership with a multinational service provider or with international consulting companies, to reach high-level clients.

- Expand our list of customers by aiming at new production categories, to cover the whole market and broaden the geographical horizons to the whole national territory. This implies the network of salesmen, first with high-profile personnel and subsequently when the conversion rate from Lead to Customer drops, also opening to sellers with less experience.

- Establish partnerships with manufacturers of machinery or solar panels, who supply their products as possible interventions to be carried out. This creates both an economic return and gives us the opportunity to improve our algorithm by having more precise data on the machines available.

2.3 Performance Evaluation

To evaluate the activity of each sector of the company, some Keys Performance Indicators (KPIs) have been identified, which is a measurable value that demonstrates the effectiveness with which a company or a department or a sector is achieving the set objectives.
Within a process of technological innovation, a set of quantifiable analyzes and measures that a company uses to size its performance over time must operate.

The KPIs defined are:

- Average Lead-Customer Conversion Time

- Revenue

- Overall Equipment Effectiveness

- Positioning

2.3.1 Average Lead-Customer Conversion Time

This index refers to sales performance. It describes the average time our company spends from the moment it identifies a possible lead to when it buys our product. It can be understood as the time it takes for a prospective customer to trust our service. Our goal is to reduce this factor by about 20-30% starting from the second year of activity. Subsequently to continue to work in this sense by providing for an annual decrease of 15%. The results obtained evaluate how our service is increasingly becoming a solution known and appreciated by the market.

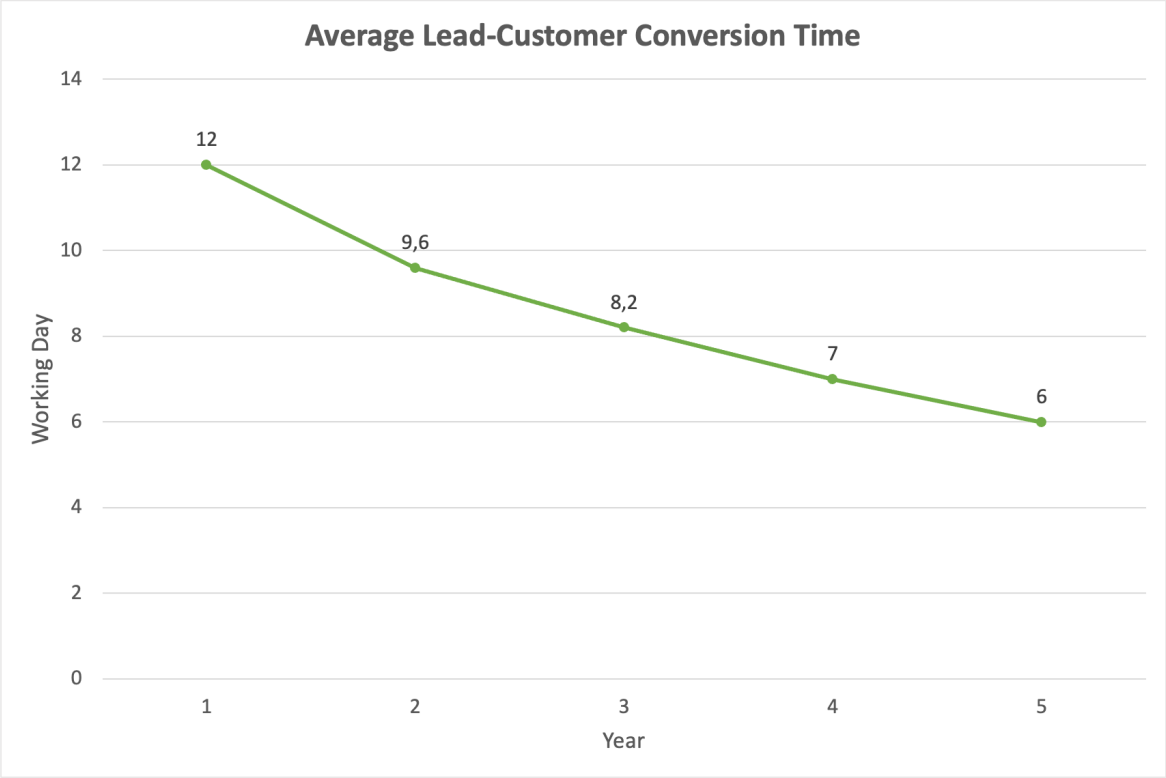

Figure 2.3: Average Lead-Customer Conversion Time

2.3.2 Revenue

The performance impact for the financial sector is turnover. It allows us to understand how customers are responding to our service and gives us a general description of how our company is doing. The target for the first year is a turnover of €375.000, aiming for an estimated growth of 20% for the second year. For the following years, the forecast is to continuously grow by 13%.

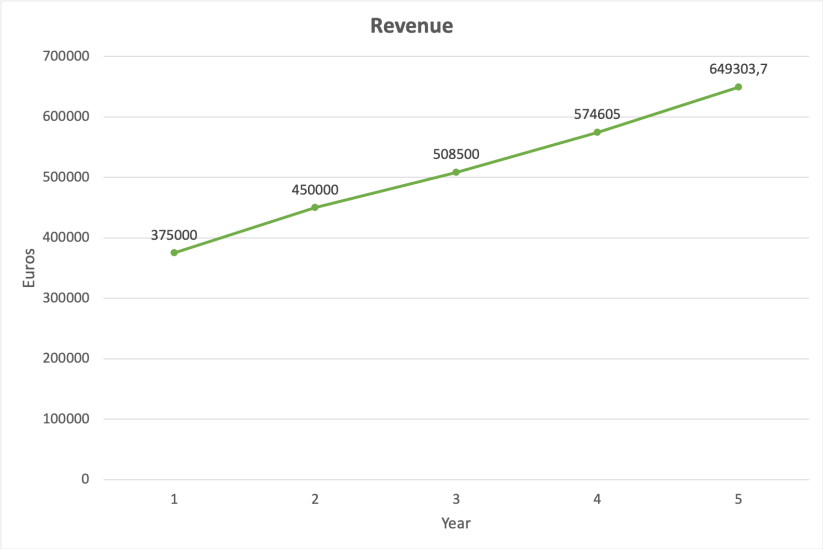

Figure 2.4: Revenue

2.3.3 Overall Equipment Effectiveness

Overall Efficiency Effectiveness is a performance index (KPI) to measure the production capacity of a manufacturing company. The OEE index considers the most common and important sources of productivity loss in production according to the Kaizen philosophy, which means that production can be continuously improved. It is the product of the three fundamental components of production performance "Availability x Performance x Quality".

- **Availability:**Percentage of time worked out of available time. In our case this variable refers to the time in which the cloud platform performed the calculations with respect to the contacted availability.

- **Performance:**Percentage of parts machined compared to theoretically machinable parts. It turns out to be the difference between the customers and therefore the computational quantity required and that available for the cloud platform. Considered also a safety threshold to avoid degradation in performance.

- **Quality:**It is the percentage ratio between the compliant parts with respect to the total number of parts produced. With this variable we go to highlight in how many cases the system has returned to the customer an unacceptable result compared to the totality of the analyzes carried out.

OEE can also be included in the KRI (Key Risk Indicator) indices as it measures the degree of inefficiency and exposure to financial loss. It is more important to prevent bankruptcies so that companies do not face large losses. Interruptions and failures can also occur in production. Such downtime can result from system errors and failures, as well as from missing parts or organizational problems. Several studies suggest that a good weekly average performance index value could be around 85%.

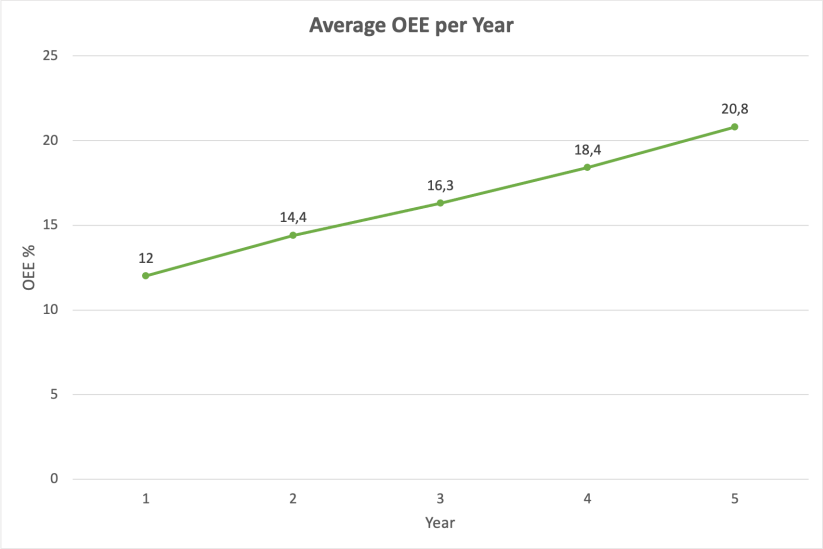

Figure 2.5: Average OEE per Year

2.3.4 Positioning

Another very important index for considering the performance of the marketing sector is positioning. Considering the large amount of data necessary to train the algorithm for each production sector and considering that the dataset for research and development is provided by the University of Pisa, the production sectors in which to look for our customers are reduced to 7. The goal is to bring this value to 11 in the second year and subsequently foresee a growth of at least 3 production sectors per year.

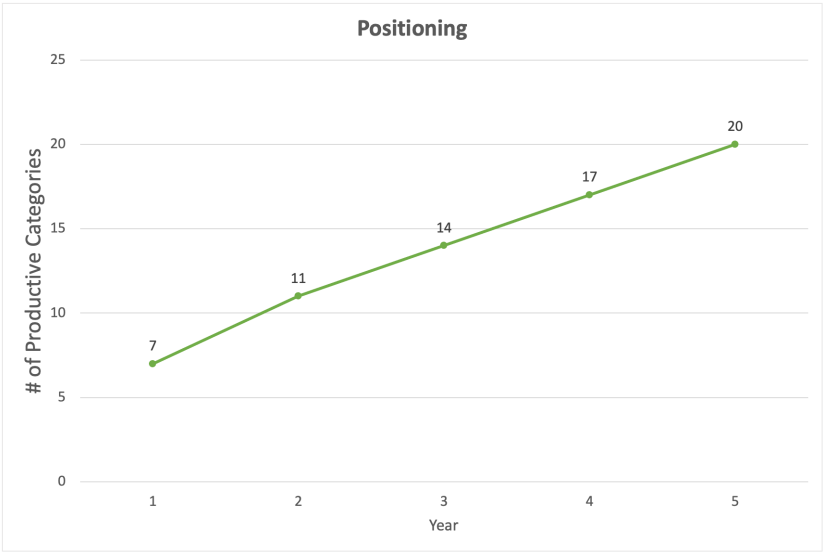

Figure 2.6: Positioning

Chapter 3

Strategy

3.1 PESTEL Analysis

PESTEL analysis is a concept of marketing principles and is used as a tool by companies to track the environment in which they operate or in which they want to launch a new product. The PESTEL Analysis allows you to see the entire environment surrounding the company from many points of view. We can define it as a vertebra of the backbone of strategic management.

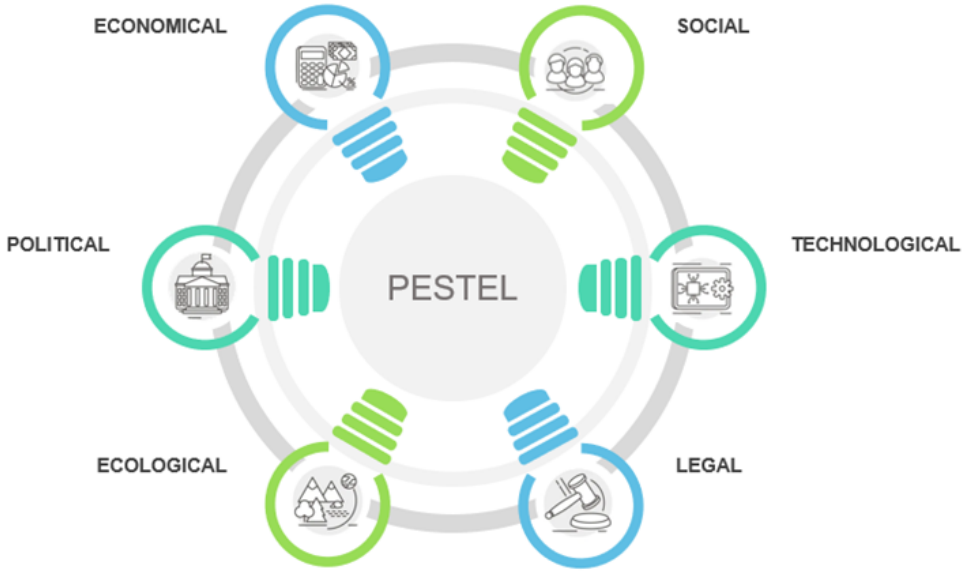

Figure 3.1: PESTEL Analysis

Political Factors

The first factor that we analyze is the political one. We have reported a chronological excursus of how regulations and legislation have changed in terms of energy saving.

It all starts with the Kyoto Protocol, in 1997, in which public opinion became aware of the problems related to the greenhouse gases and the climate changes, the need to adopt new energy policies to tackle these issues and the steps were defined to achieve the objectives set (curb emissions, reduce pollution, improve energy consumption efficiency). With Legislative Decree 102/2014, Italy defines two macro categories of companies: high energy companies, with a consumption of more than 2.4 GW/h; and large companies, that are companies with more than 250 staff or with a turnover greater than 30 million. These are subject to submit the mandatory energy audit, to evaluate redevelopment interventions, according to what is defined by the standard ISO-50001, this must be sent every four years thereafter. In 2018, the UE directive 218/2002 establishes a common framework to ensure the achievement of the 20% energy efficiency improvements target. With the DL 73/2020, Italy amends the DL 102 2014 adopting the measures to the European directive.

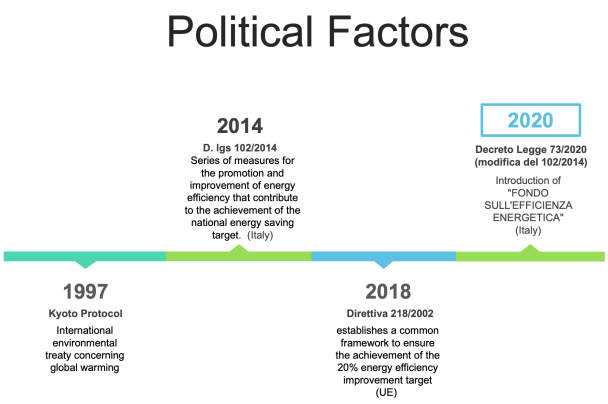

Figure 3.2: Political Factors

As we can see, the regulation of the sector appears to be favorable to our business idea and if it continues to evolve in this sense, it will make our platform an increasingly necessary tool for all production sectors. It is highly improbable that this process will stop or even slow down in the foreseeable future. The regulatory framework is expected to be stable for a long time.

Economical Factors

As for the economic factors, they do not act directly with our business in different ways. The law of supply and demand is expected to raise the demand as the environmental responsibility spread in the market and the need to be seen as a “green company” grows. But reputation and responsibility are not all. A general consideration can be done about the decrease of interest rates for “green” company and for company that can prove to be certified for their reduced energy consumption. More, it could even be that the regulatory framework will set as mandatory requirements what now is recommended, therefore opening even more the market because the companies must comply with the regulations.

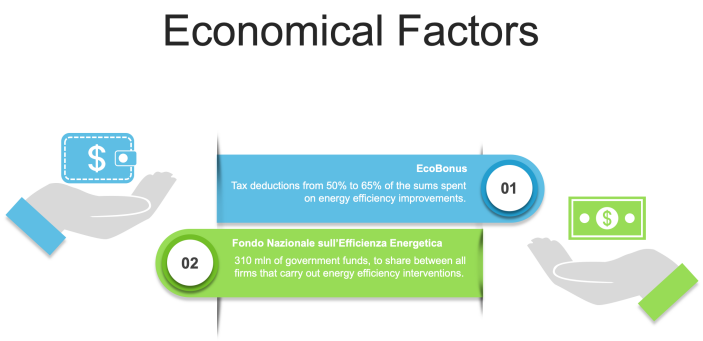

Figure 3.3: Economical Factors

It is also to mention that States and regulators usually give incentives in order to push the companies to adopt energy saving policies and this adds value to the market and to our business. The Ecobonus and the national fund on energy efficiency are measures that can incentivize the company, our client, to adopt energy efficiency plans in a shorter time frame given the concessions.

Socio-Cultural Factors

To evaluate socio-cultural factors, we analyzed the research trends of the world population to see how much people care about the problem and how sensitivity about it grows. We have not limited ourselves to the simple keyword "global warming", but we have also extended the search to related keywords.

Figure 3.4: Socio-Cultural Factors

We can see how it is a growing trend and for this reason it can lead companies to be greener, both from the inside because for example the managers are more sensitive to the problem and from the outside because the customers of that company push

towards a change in this sense. A way to implement such a plan is to entrust our company the service and perform all the steps that our service foresees, starting by get the certification and equip the company with a tool like the one we propose, to have a monitoring and improvements in real time.

Technological Factors

The technological factors are essential in the implementation of an energy efficiency project. In fact, the development of new AI technologies allows us to be more and more efficient in monitoring and prevention, this leads us to the second factor, the constant research and development in the field of IoT devices, this allows us to have more and more precise and reliable data. We must also consider the improvements in terms of energy efficiency for the production of energy from renewable sources, this in the perspective of the fourth phase, that is, continuous improvement.

Our customers may see this new approach as a possible violation of their privacy or their trade secrets, but in reality, this is not the case. All the data that is taken from our service is the same that should be provided to a consultant to carry out his analyzes. Access to data can be regulated by our customer's IT department, with dedicated access policies for the service. As regards the processing of data, these are collected through secure protocols and are stored in datacenters with high levels of security provided by our technical partners. Their use is limited to the provisions of the terms of the contract that the customer signs when purchasing our service and is fully aware of them.

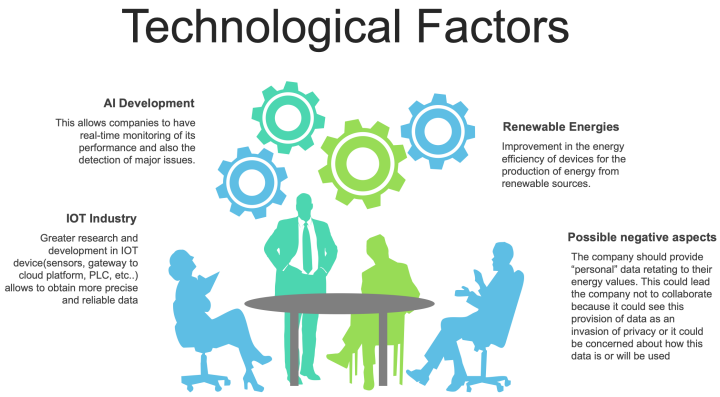

Figure 3.5: Technological Factors

Ecological Factors

As for the ecological factors, we have tried to associate these with what we have said for the sociocultural factors almost as if it were a double check. The continuous increase in global warming means that the problems related to energy efficiency are increasingly

evident and therefore people become more and more aware of this issue.

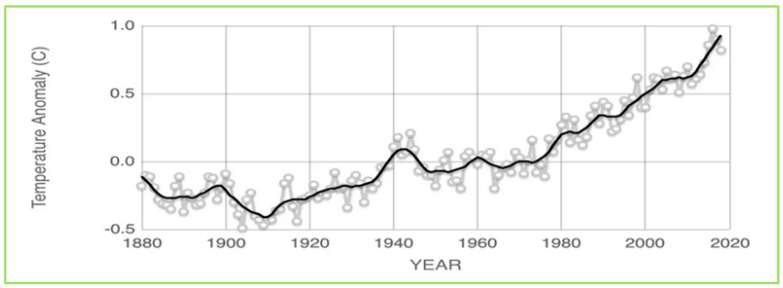

Figure 3.6: Ecological Factors

Legal Factors

Massively entering the world of IoT, it could raise many doubts on the part of the customer regarding privacy and data processing. We can reassure everyone by saying that this is not a world without rules, but that like all environments, even analogue ones, in which data is processed, the general European data protection regulation must be respected. In addition, Italy had already adopted a regulation with Legislative Decree 196 of 2003, now amended to be compatible with European rules. It is also necessary to refer to the notes of the privacy guarantor.

To prevent such objections, it is necessary to write and sign a NDA (No Disclosure Agreement), with Terms and Conditions that protect both the Client toward sensible data leakage and our business toward loss of intellectual property. More, we must set as a goal to be seen as a trustworthy and reliable partner, with a well-deserved reputation of professionalism and integrity.

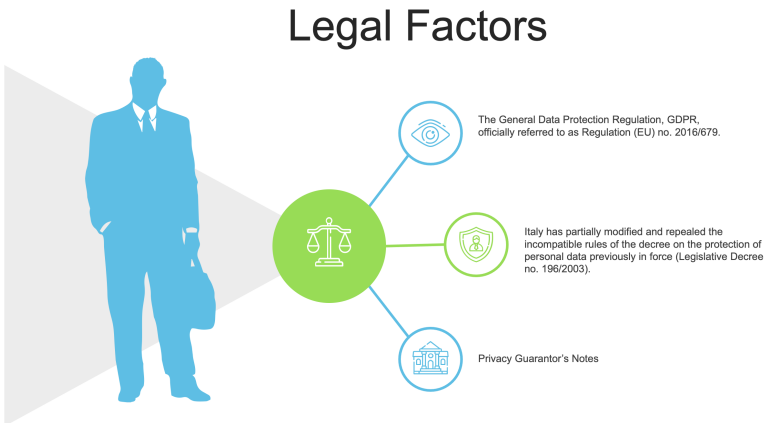

Figure 3.7: Legal Factors

3.2 Porter's Five Forces

Porter's Five Forces is a model that identifies and analyzes five competitive forces that shape every industry and helps determine an industry's weaknesses and strengths. It is a business analysis model that helps to explain why various industries are able to sustain different levels of profitability.

Figure 3.8: Porter's Five Forces

The Threat of Entry

Newcomers that can provide the same service are companies that can either be start-ups or established company that are in close markets (auditors, certifiers) that are willing to enlarge their business. A third possibility, an established company in a distant market willing to enter this market, looks remote.
The market seems already crowded enough and the barrier to newcomers can be estimated as medium, because the initial investment is not that high and especially companies that are in close markets can have significant economies of scale and can exploit experience, clients list and reputation. Yet, the barrier consists in the fact that usually companies like these tend to adopt the same instruments and the same way of doing business of their market of provenience therefore missing the advantage of using new, cutting-edge technology and breakthroughs as our business model foresees (use of IoT, AI, networking).

The Power Of Suppliers

This is the list of suppliers:

- Office rental

- Legal firm
- Administration, accounting and bookkeeping
- Tax advisor
- Bank
- Insurance
- Head hunters and Human Resources management
- ICT (internet, smartphone, tablet, laptop, desktop, peripherals)
- Travel agency
- Advertisement
- Call Center (customer care)
- App platforms
- Datalogger (hardware and software)
- Office stuff
- Merchandising

We currently do not think that we are subject to suppliers' pressures. All we need can be found quite easily and there is plenty of providers that can be selected and awarded. Platforms are happy to receive apps that help their platforms grow.

The Powers Of Buyers

- Number of customers: 16 (4 employees, 5 clients per employee, 6 months of contract, €150/h billed, 33 hours per client per month)

In other words, an employee takes on 5 clients per semester and in that period is fully dedicated to the client; clients know and recognize that he/she is their 'energy management advisor', fully dedicated and responsible to achieve the result within the time assigned (6 months).

- Buyer ability to substitute: MEDIUM
- Size of each customer order: €15.500 per 12 months of contract
- Independence of buyers: MEDIUM

The Threat Of Substitutes

Substitutes can be service providers that doesn't make use of machine learning, AI tools and Apps but nevertheless can prove themselves able to provide the same service and exploit advantages like a good salesman, the vicinity to the client venues, the acceptance of lower price, the implementation of partial or other ISO standards, the possibility of offering a wider range of services to the client (other certifications, as an example).

The Rivalry Among Existing Competitors

Our competitors are small and medium companies that provide clients with the same service, consulting companies and helping them adopting and implementing ISO standards, getting certifications, establish an energy management policy and save on the energy bill. A list of competitors includes:

- Tecno
- EGO Group
- Enel
- Edison
- ENI

3.3 SWOT Analysis

The SWOT analysis is a strategic planning technique used to help a person or organization identify strengths, weaknesses, opportunities, and threats related to business competition or project planning. Users of a SWOT analysis often ask and answer questions to generate meaningful information for each category to make the tool useful and identify their competitive advantage.

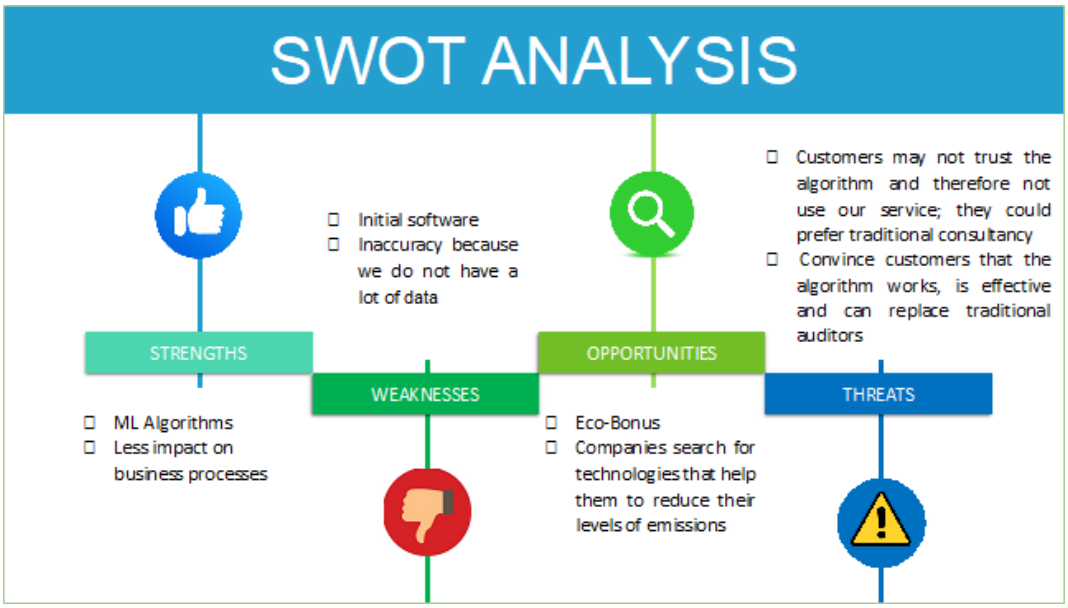

Figure 3.9: SWOT Analysis

Strengths

- The algorithm is intellectual property: results and advantages can be obtained only through the service.
- The business model is innovative: clients have their dedicated and committed "energy management advisor" that follow them through the entire process, since the beginning to the end.
- No need of committed resources from the Client, all is provided.
- Fast delivered results, clear and tight Time Schedule, fixed costs (no risk for the Client)

Weaknesses

- New presence on the market: low recognition, no reputation.
- Time and resources needed for acquiring clients and convince them that the algorithm can produce great results within the Time Schedule.
- Possible not-so-good results of the first works (to be managed the communications).
- Maintenance of the algorithm

Opportunities

- Incentives from governments (eco-bonus).
- Faster than expected demand (stronger commitment from governments under pressure from the public that demands stronger actions to tackle climate changes).

Threats

- Clients could not trust the algorithm and therefore give a preference to a more traditional and consolidated approach.
- Newcomers with more financial power.
- Reaction of incumbents that can develop an algorithm and exploit their experience and knowledge of the market.

3.4 Value Proposition

The value proposition for Uranus 51 customers is to increase for each of its customers the ability to better manage energy management policies. Through a SaaS service, our customers can constantly monitor the resources used in their production processes and have clear and timely suggestions on how to improve their energy efficiency. The strengths of Uranus 51's service lie:

- Minimal intrusiveness by consultants within the company. This gives our client the possibility to have a more efficient use of human resources.
- A Machine Learning algorithm, which through data mining models, together with the customer's company policies, suggests to the customer practices to improve their energy efficiency, according to the ISO 50001 standard. This is possible thanks to a series of sensors present in company, due to a growing migration to Industry 4.0. The real added value of Uranus 51 is the use of new information technologies, specifically artificial intelligence, within the context of business consulting. This allows our customer to save costs and at the same time to have a constant presence of a consultant in the company.

3.5 Business Model Canvas

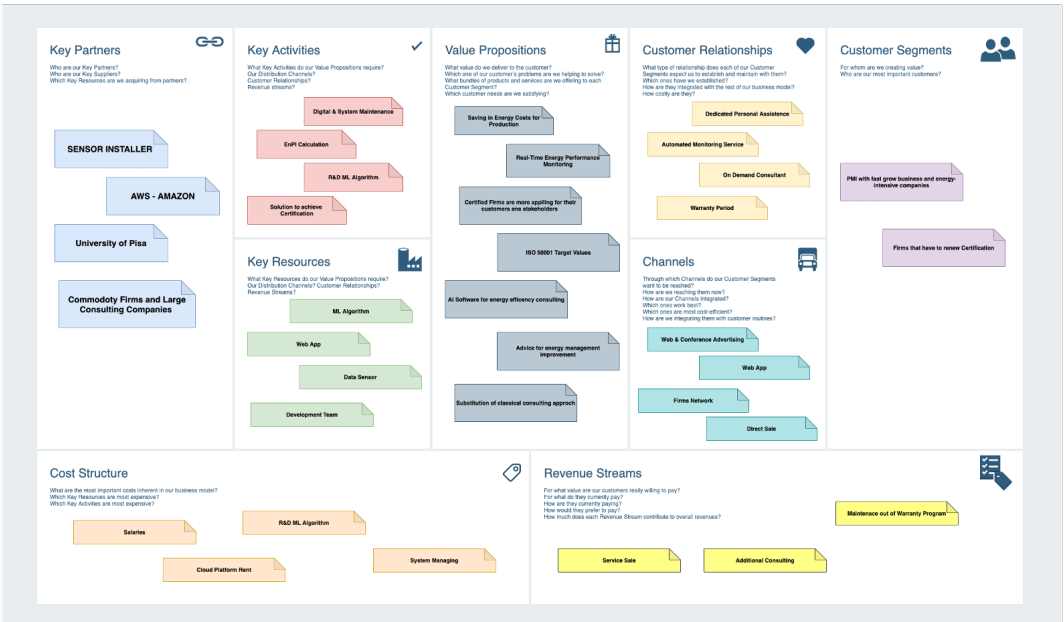

Figure 3.10: Business Model Canvas

Chapter 4

Marketing

4.1 Market Analysis

The service that we propose is aimed at other companies (B2B market), in particular for companies that are particularly energy-consuming and need to monitor their consumption and possibly make changes to their production process or modify different settings of the machines to have a saving on company consumption.

The market on which we want to enter is very large, because the ISO 50001 certification can be requested by any type of company, from those who produce products to those who provide any type of service. This type of service is already provided, although with different technologies and methodologies, either by companies specialized in this type of service or by companies that do not have this type of service as their core business, an example: Enel, a multinational electricity supply company, through Enel X, a branch of the company, provides the consulting service to a company to obtain savings in the energy sector to reach the ISO 50001 certification.

Through the most recent Dati Istat (Istat, s.d.), in Figure 4.1, we can see that in recent years both public and private organizations in the Italian territory are moving towards obtaining ISO 50001 and therefore towards greater energy savings.

Tavola 22.2 - Numero di unità locali di organizzazioni (pubbliche o private) **con Certificazione di gestione dell'energia - UNI CEI EN ISO 50001 - attiva nell'anno di riferimento dei dati per provincia/città metropolitana, regione e ripartizione geografica** - Anni 2015-2018 *(valori assoluti)*

cod. reg.	cod. pro.	PROVINCE/CITTÀ METROPOLITANE REGIONI RIPARTIZIONI	Certificazione di di gestione dell'energia - UNI CEI EN ISO 50001			
			2015	2016	2017	2018
		Nord-ovest	109	309	767	827
		Nord-est	66	210	292	346
		Centro	24	186	329	470
		Sud	30	72	128	180
		Isole	4	23	51	82
		Italia	**233**	**800**	**1.567**	**1.905**

Fonte: Elaborazione su dati Accredia

Figure 4.1: Public and private organizations moving towards obtaining ISO 50001

In addition, the largest numbers are located in central-northern Italy, because it represents the most industrialized area of the national territory.

From this first analysis it seems that the market is growing strongly considering the latest data, moreover on the basis of what has been said in the strategy part, in particular among the political factors in the PESTEL analysis, the Italian government has provided a "Fund for energy efficiency" (Super ECO Bonus 110), this factor could increase the companies that want to be certified according to ISO 500001 because the Italian government gives a financial aid to the companies which want to change their energy consumption for the better.
In the subsequent paragraphs we will analyse the market that we want to reach. We want to underline that, during our research, we found very limited data regarding this type of market. For this reason, we had to do a couple of interviews with people and companies who know this type of market.

4.1.1 Market Segmentation

As already mentioned in the previous paragraph, ISO 50001 is addressed to many companies but in particular for those operating in the productive sectors (industrial products, energy, technology, transport, etc.. . .). Obviously in our case we tried to segment the market because it was too large, so we used multiple criteria to identify our segments.

Figure 4.2: Organizational segmentation

First Criterion: Organizational size.

Through this first criterion, the market has been divided into PMIs and Large Companies to try to identify whether our service can only be applied to large companies, which very often are very energy-consumption, or even to PMIs.

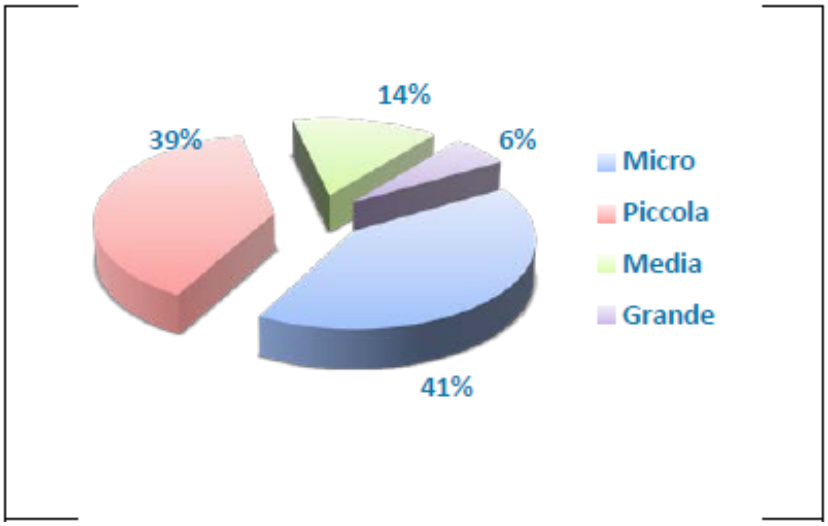

Figure 4.3: Sample of companies' corporate distribution(Companies Classification, s.d.)

Micro	<10 dipendenti e < 2 milioni € di fatturato
Piccola	<50 dipendenti e <10 milioni € di fatturato
Media	<250dipendenti e <50 milioni € di fatturato
Grande	>250 dipendenti o >50 milioni € di fatturato

Figure 4.4: Classification of SMEs and large enterprises(Companies Classification , s.d.)

Second Criterion: Industrial.

As already mentioned before, the production sectors are the most interested in acquiring this type of certification, but this type of segmentation is still too wide, so we have chosen to segment the production sectors themselves in a more specific way to identify which industrial sectors can benefit most from obtaining certification and therefore, at the same time, which industrial sectors may be more interested in our service.

Third Criterion: Geographic location

This third criterion was adopted to allow us to focus on a certain geographical area, in particular it was chosen to adopt a radius of action of about 70 km from the headquarters of the company, which takes place in Pisa.

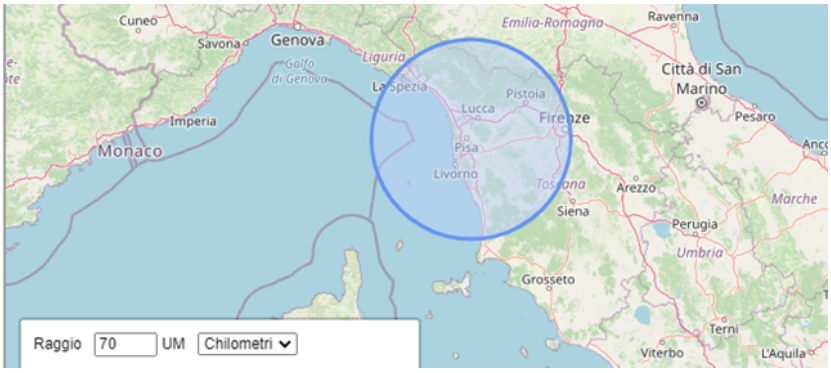

Figure 4.5: Geographic Location

Fourth Criterion: Choice criteria

The firms can choice to renew the certification.

Given these four types of criteria, the following segments have been identified:

1. Large companies or PMIs in the geographical area indicated about the manufacturing and housing sector.

2. Companies that want to renew their certification.

Since the manufacturing sector is still too large as it contains many subsectors, it was decided to segment the market by subsector, always maintaining the distinction between large companies and PMIs. Among the subsectors of manufacturing are: beverages, textiles, clothing, leather, wood, paper, printing, coke and petroleum, chemicals, pharmaceuticals, rubber and plastics, non-metallic minerals, metallurgy, metal products, electronics, electrical equipment, machinery, motor vehicles, other means of transport, furniture, other manufacturing, repair and maintenance of machinery and equipment.

Considering the housing sector, it is not necessary to do this kind of segmentation since its subsectors are few and similar to each other.

The segments identified in this first analysis were found based on the density of companies in the chosen geographical territory and information collected in a market interview (Travisano & SantiRocco, 2021).

In addition to this type of segmentation, we wanted to carry out a segmentation taking into account the companies that could most benefit from obtaining the ISO 50001 certification, so according to this criterion other segments were identified (some of them can be considered as sub-segments of the n° 1 and 2 segments found previously):

3. Utilities that sell electricity.

4. Companies that provide components and services for the production of electricity, especially those that are suppliers or suppliers of renewable energy services

5. Companies that are in the digital business.

6. Companies that are interested in energy efficiency and are located in the real estate, facilities, warehouse and housing market.

The reasons that led to the identification of these segments will be reported below and have been recovered by performing a market survey on people working in the sector (A.Marabotto): The n° 3 and 4 segment can be interested since in these companies the reputation of being 'green' is a key factor of success; some companies allow to become a supplier or a service provider only those company that can prove their commitment through certifications, so that they can be sure that the whole supply chain is 'green'. This could the case of either of renewable energy producers or renewable energy manufacturers like wind turbine manufacturer or solar panels manufacturers.

The n°5 segment are companies that have a large energy consumption (just think of the large data centers) so even a small reduction in the percentage of energy consumption can give great savings on the energy bill. These companies strive to reduce consumption and they are, by their nature, open to innovation and the implementation of a new system that can allow them to achieve their goals.

The n°6 segment can be linked to the housing segment found previously, but in particular it is possible to consider the fact that companies like these are very interested because they can add value and demand a higher price from their customers by proposing to integrate an energy management system into the real estate sector and these companies use the certification to attract new customers who are environmentally conscious.

Obviously, these segments will have to be divided into PMIs and Large Companies as has been done previously.

So, if in the end we wanted to make a summary of the segments found, always considering the geographical area indicated and the division into SMEs and Large Companies, we have:

- **Manufacturing sector and all its subsectors**, segment n°1 and 4.
- **Housing sector**, in particular segment n°6.
- **Information and communication services sector**, in particular segment n°5.
- **Electricity supply sector**, segment n°3.
- **Companies** that need to renew the ISO 50001 certification, segment n° 2.

4.1.2 Target Marketing

In this paragraph we will analyze the various segments found and which of them have been chosen.
Analyzing the individual segments identified in the previous section, we have seen that the segments that include Large Companies cannot be easily attacked for the following reasons:

- The Large Companies, often, for this type of service, do not rely on start-ups, but on companies that are more established in the sector and that already have some experience.
- The most Large Companies are often very energy-consuming, as illustrated in the strategy part, are obliged by law to reduce their energy emissions, so a large part of the market in this segment is saturated.
- The Large companies that are already under contract with another competitor are reluctant to change their supplier (energy consultant).

As for the segment that concerns companies that want to renew their certification, the following assessments can be made:

- the company in the previous service contract did not find any particular advantages.
- the company in the previous service contract found advantages.

From these considerations, it is easy to understand that this type of companies can become a potential customer, in particular if the company has found the management of the service intrusive, due to the presence of a consultant in the company or if it is interested in a new evaluation technologies.
As far as companies included among the SMEs are concerned, these are very promising since:

- PMI sector accounts for 92% of the various sectors found.
- There are many PMIs in the productive sectors.
- Many PMIs that are growing strongly in the sectors found, especially medium-sized enterprises, are the ones that are becoming energy-intensive faster and very soon will need an Energy Management System (EMS).
- Many of these companies do not possess ISO 50001 certification.

From these considerations, the PMIs companies represents to be a very promising both in terms of the quantity and type of costumers. One of observation can be that the PMIs, especially for small companies, do not often have a budget such as to be able to face costs due to possible changes in their plants or their production processes to obtain the certification. This type of consideration can be true partially because the acquisition of ISO 50001 certification allows companies to be seen with greater interest by investors. So very often the companies prefer to get into debt now and then have a greater return in the future and therefore increase their business growth. (Travisano & SantiRocco, 2021)

From this first analysis, all SMEs and companies that want to change service providers can be considered as **segments target**.

Now what we need to do is analyse which business sector we want to focus and, to do this, we must take into account some fundamental factors:

- The initial dataset provided in collaboration with the University of Pisa.
- Density of companies in the geographical area considered.
- More energy-intensive companies.

We have just considered the density of companies in the geographical area during the discussion about the segment in previous paragraph.

Regarding the dataset in our possession, provided through the collaboration with the University of Pisa, contains information on the energy monitoring of companies in specific sectors, in particular those most densely present and those most energy-intensive in the Tuscan region. This characteristic of the dataset and the considerations that we have done on the previous paragraph bring us to select to some specific segments, so in particular we focus our attentions in these sectors:

1. Manufacturing activities, **production of clothing and leather** (Ateco Code 14 and 15)
2. Manufacturing activities, **papermaking and paper products** (Ateco Code 17)
3. Manufacturing activities, **manufacture of metal products** (Ateco Code 25)
4. Manufacturing activities, **manufacture of electrical equipment and non-electrical household equipment** (Ateco Code 27)
5. Activities of accommodation and catering services, **housing** (Ateco Code 55)
6. Information and communication services, software production, **IT consulting and related activities – activities of other information services and other IT services** (Ateco Code 62 and 63)

The density of these sectors, among the PMIs, taken into account is confirmed by the tables in Figure 4.6 and 4.7, which represent the number of companies in Tuscan region (geographical area in which we want to offer our service) and in these tables the PMIs are represented in first three columns (firms with less than 250 employees). Moreover, the fact that these sectors are energy-consuming are confirmed by market interviews carried out (Travisano & SantiRocco, 2021). In particular the companies in the target segments No. 1, 2, 3, 4 consume a lot of energy, due to the machinery used and their production processes. The segment n° 4 includes those companies that produce appliances and components that relate to renewable energy (solar panels, etc.). The target sector n° 5 is energy-consuming because very often their consumption is based on the excessive use of heating systems. Finally, as already mentioned above, the target segment n° 6 is open to new technologies by nature and also the maintenance of datacentres leads to excessive consumption in terms of energy.

We will focus on this segment also due to the fact that we have already some data regards the previous sector and this can bring us in a point of advantage because for the companies that belong to these sector we can propose solutions in rapid and accurate manner.

Considering the discarded segments, the companies that belong the segment concerning **energy suppliers** can be a good potential customer but often these companies are Large Companies and moreover often they are companies that already provide the same service, but with different technologies, because they already work in energy sector, so we can consider these companies also as competitor. As regards all the other subsectors of manufacturing activities, they have not been taken into account either because data on energy consumption in these sectors are not currently available and because some of them are not very energy-consuming.

Tipo dato	numero imprese attive				
Classe di addetti	0-9	10-49	50-249	250 e più	totale
Ateco 2007					
0010: TOTALE	299583	15650	1359	214	316806
C: attività manifatturiere	30117	6122	568	67	36874
10: industrie alimentari	2390	440	30	3	2863
11: industria delle bevande	130	24	6	2	162
12: industria del tabacco	..	1	..	..	1
13: industrie tessili	2290	562	53	..	2905
14: confezione di articoli di abbigliamento, confezione di articoli in pelle e pelliccia	5570	964	33	5	6572
15: fabbricazione articoli in pelle e simili	3872	1118	98	8	5096
16: industria del legno e dei prodotti in legno e sughero (esclusi i mobili), fabbricazione di articoli in paglia e materiali da intreccio	1776	126	6	..	1908
17: fabbricazione di carta e di prodotti di carta	252	141	15	6	414
18: stampa e riproduzione di supporti registrati	874	103	8	1	986
19: fabbricazione di coke e prodotti derivanti dalla raffinazione del petrolio	10	2	3	..	15
20: fabbricazione di prodotti chimici	200	93	12	6	311
21: fabbricazione di prodotti farmaceutici di base e di preparati farmaceutici	13	7	5	8	33
22: fabbricazione di articoli in gomma e materie plastiche	410	169	24	1	604
23: fabbricazione di altri prodotti della lavorazione di minerali non metalliferi	1347	204	13	3	1567
24: metallurgia	177	68	14	3	262
25: fabbricazione di prodotti in metallo (esclusi macchinari e attrezzature)	2932	642	64	1	3639
26: fabbricazione di computer e prodotti di elettronica e ottica, apparecchi elettromedicali, apparecchi di misurazione e di orologi	232	74	16	3	325
27: fabbricazione di apparecchiature elettriche ed apparecchiature per uso domestico non elettriche	382	104	21	1	508
28: fabbricazione di macchinari ed apparecchiature nca	676	388	67	4	1135
29: fabbricazione di autoveicoli, rimorchi e semirimorchi	49	33	9	7	98
30: fabbricazione di altri mezzi di trasporto	178	106	17	3	304
31: fabbricazione di mobili	1230	214	18	1	1463
32: altre industrie manifatturiere	2708	281	25	1	3015
33: riparazione, manutenzione ed installazione di macchine ed apparecchiature	2419	258	11	..	2688

Figure 4.6: Manufacturing companies in Tuscany, Dati Istat 2019

I: attività dei servizi di alloggio e di ristorazione	22987	2325	83	7	25402
55: alloggio	5734	606	44	4	6388
56: attività dei servizi di ristorazione	17253	1719	39	3	19014
J: servizi di informazione e comunicazione	6717	382	42	4	7145
58: attività editoriali	283	12	2	..	297
59: attività di produzione cinematografica, di video e di programmi televisivi, di registrazioni musicali e sonore	379	9	..	..	388
60: attività di programmazione e trasmissione	76	13	..	..	89
61: telecomunicazioni	243	20	2	..	265
62: produzione di software, consulenza informatica e attività connesse	3077	230	27	3	3337
63: attività dei servizi d'informazione e altri servizi informatici	2659	98	11	1	2769

Figure 4.7: companies in Tuscany, Dati Istat 2019

In conclusion, the segments that will be taken into account will be:

- PMIs in the sectors/activities mentioned above (production of clothing and leather, manufacture of paper and paper products, manufacture of metal products, manufacture of electrical equipment and non-electrical household equipment, accommodation, software production, IT consultancy and related activities – activities of other information services and other IT services).

- Companies that want to renew the contract but do not want the intrusiveness of the consultant.

4.2 Market Positioning

Our position in the market is very precise, We want to be able to reach those customers who do not want to have the intrusiveness of the consultant in the company that could interfere with the production process of the company and at the same time provide high performance regarding the service, in fact our service provides for a lower intrusiveness towards the company, therefore our approach will provide an initial intervention of the our energy manager only for the first part, only for the general evaluation of the company (inspection, possible sensor installations, etc.) and we also provide a system that signals in real time and with high performance the possible energy waste.
This version of the service is partially new because very few companies are able to offer this type of service through the support of Machine Learning algorithms such as to eliminate the constant presence of the consultant moreover the energy optimizations are reported in very short time compared to the classic approach. Looking at Figure

Figure 4.8: Perceptual Map

4.8, most competitors aim to have a very direct relationship with the customer that could sometimes be almost intrusive in some business processes, but large competitors provide great performance for their customers because they are industry leaders and also have greater experience. Our goal is therefore not to hinder the market of large companies in the sector, which focus more on customers who have a certain importance and size, but we focus mainly on a little exploited market which can give good profits.

4.3 Empaty Map

From the analysis carried out above, through this tool we want to show what could be the impressions that the customer can have regarding our value proposition.
DO:

- The customer would like to request a demo or a trial period on the software to be used.
- The client performs cost assessments with this approach compared to the consultant approach.
- The customer could inform himself with other companies in the same sector to understand if the other companies obtained more benefits using this new method of evaluating energy costs.

FEEL:

- The customer may be wary of recommendations given by a machine learning algorithm.
- The customer may feel unsuitable for using the software which may be very complex.
- The customer may be concerned about the privacy of the data provided.

SAY:

- The customer says to use our platform to achieve ISO 50001 which will allow him to obtain an energy consumption management system.
- The customer says that he is interested in the issue of environmental protection.

THINK:

- The customer thinks that in this way he can save energy in a short time and at the same time obtain better performance.
- The customer thinks he can attract new customers who pay attention to both the company's energy consumption and environmental sustainability.
- The customer thinks he can get tax relief and at the same time he can take advantage of bonuses made available by the Italian State.
- The client thinks of using a cheaper solution than that of the consulting agency.

Through this approach we can identify the possible positive and negative aspects that our service can give to the customer. So from the previous analysis we can say that the customer seems to have in general a good impression on our service but he also perceives some critical issues of the service, among them we have:

1. Difficulties in using machine learning software.

2. Distrust of solutions given by a software.

3. Concern about personal data on energy consumption provided.

Regarding point n°1, we can reassure the customer because our software will be very user-friendly so that it can be used like any web application that are used nowadays.
About the second point, it will be our task to show the different results obtained in the sectors similar to those of the customer to reassure him about the solutions that the software provides.
For the third point, we can easily reassure the customer because the cloud infrastructure (AWS) on which we will implement our service will be one of the most secure and at the same time it is a leader in its sector.

4.4 XYZ – Hyperzooming - Pretotyping

We had this estimation through a market interview with a company leader in this particular sector (Travisano, R., & SantiRocco, L. (2021))

XYZ:

Value proposition: "Many companies would be interested in purchasing a subscription to a digital platform that leverages a machine learning algorithm to guide the company to achieve ISO 50001 certification".

- X = at least 10%
- Y = PMIs of Italian manufacturing sector
- Z = €15000

"At least 10% of PMIs in the Italian manufacturing sector would be interested in buying at a price of €15000 a subscription to a digital platform that guides them to obtain ISO 50001 certification".

Hyperzooming:

- X = at least 10%
- Y = 300 PMIs in the field of production and processing of leather within a radius of 70 km from Pisa
- Z = €15000

"At least 10% of 300 PMIs in the field of production and processing of leather within a radius of 70 km from Pisa are interested in buying at the price of €15000 a subscription to a digital platform that guides them to obtain the ISO 50001 certification".

Pretotyping

A beta version of the software is designed for companies that have at least one machine with built-in sensors in order to allow the monitoring of an indicator related

to energy consumption and this demo will give possible solutions to be adopted to fall within the target values set by the ISO 50001 standard. The beta version will be presented to potential customers in the target sectors by representatives of the company. The demo can be offered either at a discounted price or possibly provided for free to interested companies for a period of 3-4 months. At the end of the period, customers will be able to decide whether to:

- Do not accept the service.
- Request a meeting with the entrepreneurs of the start-up for clarifications and explanations on the functions of the final version.
- Buy the final version.

4.5 Distribution

Our basic idea to reach the customer is based on a purely **direct approach**. With online and offline advertising, we try to reach the potential customers in order to they can visit our platform to contact us or to give us their direct contact / data (email, telephone number, company name, etc.). This type of approach is not sufficient because to reach a customer in efficient manner in a B2B market a professional figure of a certain importance and certain experience is required who is able to stable a direct relationship with the target companies. For this reason, the presence of one or more salesmen is expected in the company who, both during the research and development period and during the sale of the service, tries to stable contacts with companies in the target geographical area. Starting from this last discussion, we will have one salesman (for the first year) who will call or visit the potential customer to take a meeting or to propose our service, in fact his work is divided in 2 parts: work in office and work on field (visit companies). We can estimate that:

- our salesman can visit, during the working day, 2 – 4 companies.
- The salesman can dedicate 6 – 8 days per company, this time is exploited to do visits (work on field) or to do calls for example to agree on the price for a particular customer.

From these estimations, our salesman, saturating his working days, can close around 30 contracts during the year.

This type of approach will lead our service to be distributed directly.

4.6 Pricing

In a B2B market it is not easy to know the price that other competitors try to adopt in the market. But through the interview with "Seaside Gruppo Esco Italgas" (Travisano&SantiRocco, 2021) it was possible to retrieve some information about the general price that is present in this sector so to be able to make **Competitor-Oriented Pricincing**. In particular, a consulting service for a first energy assessment of the

company and definition of the energy policy has an indicative price between 16,000 and 20,000 euros. This range depends mainly on the size of the company on which the evaluation is made, also it must be taken into account that every time a new evaluation of the plant must be made, the company must spend more money to re-evaluate its machinery and production processes after the changes made. However, this price varies according to the type of contract that the company has entered into with the service provider. Usually, this type of price drops back to 3000 – 5000 euros.
Starting from this first analysis, we tried to understand how to evaluate our service. Through a market research (https://www.webfx.com/internet-marketing/ai-pricing.html) we found that the annual price of an AI (Artificial Intelligence) software varies between 0*to* 40000 (€0 - €33600). This variation depends on how much the software is customized.
To define the sale price of our service it is also important to make a valuation based on **cost-based pricing**.

Direct Costs: estimated costs that are directly related to the production of the service:

- Estimation of sensor installation price:
  - Sensor: €80
  - Antenna: €30
  - Gateway: €800
  - Sim: activitation + annual subscription = €1800
  - Installation price = €500

  Total (consider the installation of 7 sensors) = 80 * 7 + 30 + 800 + 1800 + 500 = 3690
  We consider that only 40% of the companies must install the sensor On 30 companies only 12 need to install sensors.
  - • (Sensor installation* number of firms) + cloud + salaries(R&D) = 3690*12 + 12.000 + (1.600*12*4 + 2.000*12) = €157080

Indirect Costs: estimated costs that are related to the operation of the service:

- Utility bills + rent + commercial sector costs + company car (leasing) = 12,000 + 24,000 + 35,000 + (5,000 + 300*12) = €79,600

Overhead: estimated costs not directly related to the service:

- Administrative costs + office costs + advertising = 10,000 + 120,000 + 15,000 = €145000

TOTAL = TOTAL = overhead+ indirect + direct = 145,000 + 79,600 + 157,080 = 381680/ (30 annual contracts) = 12722 → Mark-up about 25% → **Annual contract price** = €15.500 annually

The price obtained from the cost-based analysis is in line with the prices of a Machine Learning software and with a mark-up of 25% we can cover the costs and at the same time the price remains slightly competitive compared to the prices currently on the market.
Starting from the previous evaluations, we can define the price according to **value-based pricing**, i.e. define the price based on the value of the service that the customer has perceived during its use. With this approach it is possible to vary the price based on the use of our customers and if our service was useful to reduce energy consumption. From Figure 4.9, we can see what the average consumption is among micro, small and medium-sized companies. From here it is easy to understand that it is easier to obtain savings in medium-sized companies because they tend to consume more easily and therefore to be more energy-intensive.

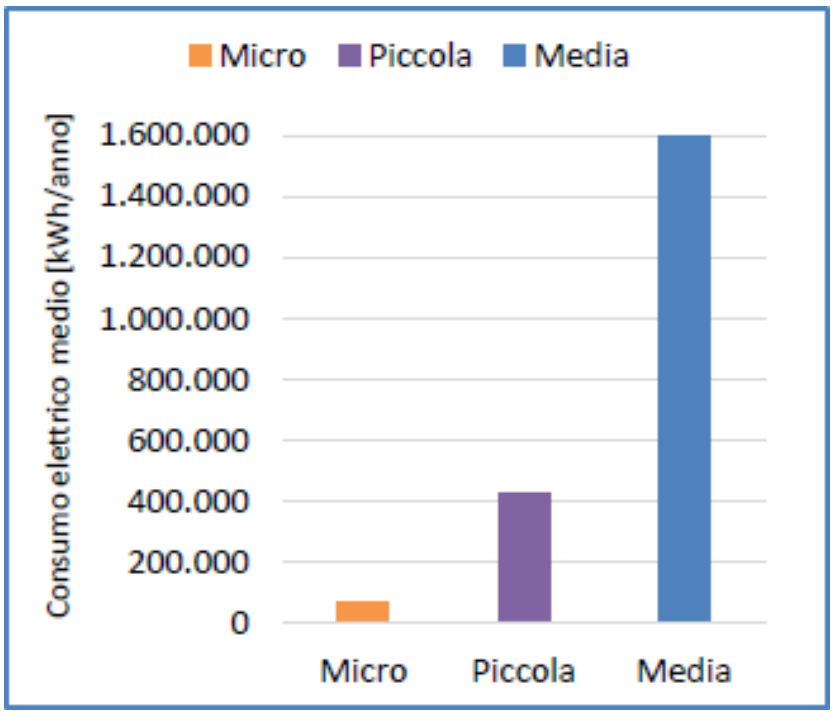

Figure 4.9: Average consumption table for PMIs (Energy consumption Analysis, s.d.)

From this assumption it is possible to differentiate the price based on how much a company turns out to be energy-intensive, in particular:

- For a medium-sized company it is possible to ask for a higher price because it will most likely be able to achieve considerable savings after using our service.
- For a small company, on the other hand, a lower price will be required precisely because the savings may be less than medium-sized company.

This differentiation could be maintained depending on how much the company has managed to reduce its consumption. One solution could be to want to make a policy according to which exceeding a certain savings threshold the customer is due to pay a

small extra fee.
For example:

- For **medium-sized** companies, every 3% of savings is due to pay an extra fee on the basic service of €500
- For **small-sized** companies, every 3% of savings is due to pay an extra fee on the basic service of €250

In these circumstances, however, we should lower the base price compared to the calculation made previously in order to always make it a competitive price but that it is still enough to cover the expenses, therefore the base price could be around €14.500. In addition, this sort of extra quota could be lowered or totally eliminated when the customer continues to use our product for a certain period of time.
These evaluations can help the seller to decide the customized price for the customer, in fact, based on the type of customer, the seller can decide a certain margin of variation on the prices taken into consideration.

Payback Time

Our platform includes also an additional service which allows to compute the period of return of a investment which was suggested by our Machine Learning algorithm. This service can already be included in the service offered or it can be seen as an additional service that can be used if an additional fee is paid on the basic service (which could be around €100 given the simplicity of the calculation). This part will be described in more detail in the part of Operations, but first of all we wanted to anticipate the approach that the company intends to adopt on this type of service: we propose to insert this service both digitally, that is, through the platform the customer can calculate, by entering all the appropriate data, the return times of a certain investment proposed by our Machine Learning algorithm or can at the same time contact us in case the n who wanted to have an opinion from an expert in the company.
A possible simple example:
Our algorithm proposes to a company A to replace a machine providing a maximum cost of €10.000. This replacement will save on the energy bill on €200 every month, so €2.400 per year. Therefore, following the classic payback time formula, the company will return from the investment in a period of **4.16 years**.
This example turns out to be very trivial, but it was made to give an idea about the logic and the calculation that needs to be made. In fact, in the specific example you could calculate the sale price of the replaced machinery that could decrease the time of return from the investment.

4.7 Communication

As mentioned in the pricing analysis, the segment we would like to reach, at least for the first year, around 30 companies in the target territory at the end the advertising campaign. Our communication plan includes both an online and offline advertising campaign and our budget can be around 10000 and €15.000.

4.7.1 Online

- **Website:** the site will be adapted for both PC / Laptop and smartphone / tablet. The site must contain a small description of the service we offer, a video presentation, posts about the importance of energy saving in the company and in general. There will also be a dedicated section to contact us and ask for information about the service or leave your contacts to be contacted by us.
  From the website can be retrieved numerous data about the interest of visitors and therefore of possible customers:
  - The traffic that is present on the site.
  - How much on average a user stays on the site to read the various information.
  - How many visitors have left their contacts.
- **Linkedin ADS:** LinkedIn ADS are able to produce high-quality leads and offer very broad and comprehensive targeting options, these solutions are perfect for companies in B2B market. In our case, these ads can be sponsored emails that try to reach companies that are looking for a professional figure who can help them organize energy saving plan, such as an Energy Manager. In addition, an account has been created to increase our notoriety.
  - *Price*: €10 per day * 3 months = €900.
  - *Tool to measure the results*: LinkedIn ADS provide a tool named "Reporting and Analytics" that allow us to measure the ROI of our LinkedIn ADS.
- **Google ADS:** it could be a useful tool to advertise our service because this type of advertising is addressed to those customers who are already interested in the service and are looking for information about it. For example, our ad could pop up when a potential customer is searching for keywords such as "ISO 50001", "energy saving", "energy-intensive companies" and similar words.
  - *o Budget for Google ADS campaign*: €4.000
  - *Tool to measure the results*: Google ADS already provide statistics on performance of our advertisement.

We can also create others social network accounts (Facebook, Instagram etc...) to increase our notoriety.

4.7.2 Offline

- **Sector conferences:** insert some announcements in conferences in which the main theme is the "corporate energy saving" or "the importance of obtaining ISO in the company". In these conferences could participate customers who are already interested in the theme of energy saving and therefore it could be a good opportunity to let us know by customers.
  - The price depends on the number of conferences and the type of visibility. Example: visibility Sponsor light in 3 conferences = €4.000 (Conference Price, s.d.)

  - *Tool to measure the results*: number of corporate business cards that the companies took during the conference or the number of the companies that will contact us 15 days after the conference.

- **Sellers:** our sellers, in trying to sell our service between companies, take care of doing **Direct Marketing**, so they try to sponsor it as much as possible among the companies in the target industrial sector on which it goes to make visits.

How we can see, the budget for the advertising campaign is greater than the effective costs, this because may needs necessary to spend more money in a certain period of the year to advertise our service through another channels of communications.

4.8 Use Case

In this paragraph we are going to talk about a real scenario on which all those processes necessary for obtaining ISO 50001 have been applied. These processes will be described in more detail in the Operations part, but what we want to emphasize in the section is how our service can be more efficient than the classic approach. In particular, the case study that is being analyzed is an article called "Effective implementation of ISO 50001: A case study on energy management for heating load reduction for a social building stock in Northern Italy" and talks about the analysis of building heritage regarding social housing in Italy and this analysis can be found at the link: https://www.sciencedirect.com/science/article/pii/S037877881931936X (Use case, s.d.).

This article may interest us because one of our target segments concerns housing or in any case properties that can have a high environmental impact. The document describes an initial part where a general assessment of the building complex is made and then proposes solutions on the possible changes to be made to obtain lower consumption. As already mentioned before, we want to focus our attentions on the procedures that have been adopted for the evaluation of the building system and how, using this new methodology provided by us, we could reduce the evaluation time and at the same time increase the overall performance. The following table will list the key points of the evaluation where our service could improve the entire process to obtain ISO 50001 certification.

Possible problems in the use case	**Our Optimization**
"it is not feasible to perform a detailed energy audit (for each building) according to the classic schemes because the cost of the audits would be high and the time required long"	Our solution is based on the installation of sensors that collect the data in detailed manner and whitin a certain period of time
"typically, the information on the building stock is poor in terms of the thermophysical characteristics of the buildings or plants"	The installation of sensors allow to collect data in a brief period of time

"typically, no disaggregated energy consumption data are available; the only energy consumption data can be obtained from energy bills, which group several services"	The utility bills are still used to collect the preliminary data but the sensors are more useful
"the consumption of thermal energy was monitored starting from the data of the conventional gas meters installed from the gas supplier company. In this phase, more detailed analyses, i.e. a comparison with the thermal energy supplied through installing heat meters, were impossible owing to budget constraints"	The solution based on sensors is not expensive e allow to collect more data than the conventional gas meters
"the figure shows the three monitoring campaign curves, corresponding to the autumn/winter, winter, and winter/spring heating periods (15 October–15 December, 16 December–15 February, and 16 February–15 April, respectively)"	The evaluation period can be reduced thanks to the Machine Learning algorithm and the dataset that alredy has data on this sector
"the buildings of the ALER's stock having a specific normalised consumption exceeding ±15% will be subject to inspections and checks to rectify the cause of the anomalies"	In our solution is not needed to do others inspections thanks to real-time monitoring system (use of sensors)
"When the documentations are insufficient, the data are obtained based on the values provided by Dall'O' et al. In that study, 175 778 buildings were investigated, starting from the analysis of data extrapolated from the energy database of the Lombardy region, identification of a methodology that enables the energy performance of buildings to be estimated based on energy indexes, and calculations according to the construction period and the number of housing units in the building"	We already have a dataset with data which belong to the sector that we are analysing and this fact allow us to don't loss time in search data
"it was difficult to collect data required for building the energy database of buildings"	We don't have to spend much time in searching data

Possible use case's problems and optimizations

4.9 Forecast

In a B2B market it is not easy to make precise assessments on the possible contracts that can be closed but we try to analyze the target sectors that we have identified in our market analysis. Looking at the Istat data, visible in figures 6.1 and 6.2, we can see how many the potential customers are (we will consider only PMIs as already described above):

- Ateco Code 14 → "Manufacture of clothing, manufacture of leather and fur articles" = 5570 + 964 + 33 = **6567**
- Ateco Code 15 → "Manufacture of leather and similar articles " = 3872 + 1118 + 98 = **5088**
- Ateco Code 17 → "Manufacture of paper and paper products " = 252 + 141 + 15 = **408**
- Ateco Code 25 → "Manufacture of metal products" = 2932 + 642 + 64 = **3638**
- Ateco Code 27 → "Manufacture of electrical and household equipment" = 382 + 104 + 21 = **507**
- Ateco Code 55 → "Accommodation" = 5734 + 606 + 44 = **6384**
- Ateco Code 62 → "Production of software, IT consulting and related activities" = 3077 + 230 + 27 = **3334**
- Ateco Code 63 (" Activities of information services and other computer services " = 2659 + 98 + 11 = **2768**

Now adding up all the potential customers found we will get:
6567 + 5088 +408 + 3638 + 507 +6384 + 3334 + 2768 = **28694 customers**.
So considering that there may also be customers who may come from other industries but who want to renew their certification by using and experimenting with this new technology, we can reasonably assume that the number of target customers could be around **29000 customers**.
However, we do not operate in all Tuscan region but only in the Centre Nord Tuscan region, in particular in provinces of Florence, Pisa, Massa, Pistoia, Prato, Livorno and Lucca. In these provinces there is a very large number of companies that belong to target sector. In fact with data taken from this link: http://dati.toscana.it/dataset/imprese-unita-locali-e-occupati-asia-anno-2018/resource/b01ae2d7-4ac9-4350-891d-41d85b56a544 (Data on the provinces of the Tuscan region, s.d.), where there are data with the numer of companies divided for sector and province, we could calculate that the 85% of previous number of the customers is present in these target provinces. So, considering this fact our potential customer become around 25000.
This initial number we could remove some companies that either already have ISO 50001 or that for internal business reasons are not interested and this could lead to reduce the number of customers to around **20000 potential customers** (making an underestimate).
Obviously, especially in the first periods it will be impossible to reach such a large

number of customers, this is because the B2B market, as already mentioned before, turns out to be a very complicated market where, before being able to sign a contract, it is necessary that several managers of the client company give you the opportunity to propose your service and subsequently analyze your proposal. This type of process often takes up a lot of time and at the same time some target companies may not even give an answer on the proposal made. So given these considerations we will try to make very low estimates about the first years of activity on the number of potential customers and we will take into account also the considerations made on the salesman in the "Distribution" paragraph.

- **1st Year:** It is assumed the first year to be able to succeed in contracts with about 0.15% of the potential customers previously examined (25000) → About 25 – 30 contracts. Considering that for the first 6 months our R&D employees will implement all the software and infrastructure for the service → **About 15 – 16 contracts**
- **2nd Year:** For the second year the main objective is to try to maintain the same number of customers (perhaps proposing special rates) and at the same time try to close some other new contract with the target companies. Then we will try to increase the number of contracts → Considering that the salesmen can work during all the year, they can close other 15 – 21 contracts in addition → **About 30 – 36 contracts**. For this increment of contracts may be necessary to hire another salesman.
- **3rd Year:** The third year our start-up will certainly have already grown and known in the energy sector, so we will try to have a greater number of contracts than the previous ones (It is estimated that it will be possible to have **about 41 – 43 companies** as customers who use our service. Also in this case we can do the same considerations on the salesmen.

For the following years, as already mentioned in the strategy part, to obtain a greater number of contracts, we will try to obtain a partnership with a company that is a leader in the electricity supply sector (Enel X or Seaside ESCO Group).

Chapter 5

Operations

5.1 Data Center Location

Our company has an outsourcing contract with AWS Global Cloud Infrastructure that provide the organization with the Data Center License and Management Relational / Non-Relational Database service (Appendix 1), in order to increase performance, security and reliability to offer all our services in consulting software solutions, design and implementation of ML projects for our clients.
AWS constantly monitors service usage to deploy infrastructure that can guarantee availability requirements and commitments. AWS offers a capacity planning model that evaluates at least monthly usage and demands on our infrastructure. With this model, you can plan for future requests and include information processing, telecommunications, and audit log storage considerations.
URANUS51 selected the AWS data center located in Milan, this with the aim of complying with all the legal requirements, security, availability and data performance in Italy, as well as for a matter of time and cost. The objective of URANUS51 with this subcontracting is to guarantee the monitoring of our clients 24 hours a day, 7 days a week and thus help to guarantee the confidentiality, integrity and availability of the data when the client requires it.

Figure 5.1: Uranus51 - Data Center Location

The features of the outsourcing contract for the Data Center License and Management Relational / Non-Relational Database service and the cost (1 USD = 0,837 EUR) are the following ones:

Service	**Features**	**Cost (monthly)**
Amazon EC2	Operating system (Linux), Amount of storage (30GB), DT Inbound: Internet (2TB per month), DT Outbound: Internet (1TB per month), DT Intra-Region: (0TB per month), Workload (Daily, (Workload days: Monday, Tuesday, Wednesday, Thursday, Friday, Baseline: 2, Peak: 4, Duration of peak: 4 Hr 0 Min)), Preventive EC2 Instance (r5d.large), Pricing strategy (Compute Savings Plans 3 Year None upfront), Snapshot frequency (2 times per day), Changed amount for each snapshot (3 GB), Preventive EC2 instance (g4dn.2xlarge), Pricing strategy (On-Demand)	€227,5
Amazon Document DB	(2 instances of type db r5. xlarge), Storage (2 TB), I/O (3), Storage di backup (1 TB)	€632,89
Total (monthly)		€860,39
Total (year)		€10.324,70

Table 5.1: Features and costs of the data center service

5.2 Products

URANUS51 is a company that provides the service of Improving the energy efficiency of its clients through digital monitoring, its main objective is for its clients to achieve ISO-50001 certification.

our digital monitoring is based on artificial intelligence technologies such as machine learning algorithms. This technology combined with technical skills in the energy sector and knowledge of the production cycles of the main industrial sectors, allow monitoring the fundamental variables of the production cycle to optimize consumption, reduce energy expenditure, highlight waste and inefficiencies, and maintain control of the energy performance indicator (EnPI) values.

5.3 Web App + Cloud Service

URANUS51 web portal is a platform that will be used both to contact our experts for the provision of the service and to view individual customer data and therefore to

monitor the customer's energy performance in real time.
Ease-of-use and user instructions: The portal is presented as a simple platform to allow the customer to check in simple steps their energy performance, is elegant for new customers who are interested in taking advantage of the service we offer. The portal will provide the main information of energy consumption and the new technologies used for making the customer experience unique.
The monitoring of the energy trend will be the task of a dedicated platform that will take care not only of showing the trend of the individual company but at the same time, through the data collection, will provide, for each industrial sector, general solutions for the energy improvement. Starting from the latter aspect, we would like our platform to be taken as a simple and fast reference point to obtain improvements on energy consumption in a shorter time. In the following images we show:

- A **Monitoring page**, on this page the customer can select the machine or plant of interest and see the daily production (it is the percentage of energy production in a time slot), the daily energy consumption (behavior of energy consumption in a day) and measurements in detail of each sensor, indicating the time slot and the average value of energy consumption, signaling the customer in real time about outliers (The page shows the outliers in red).

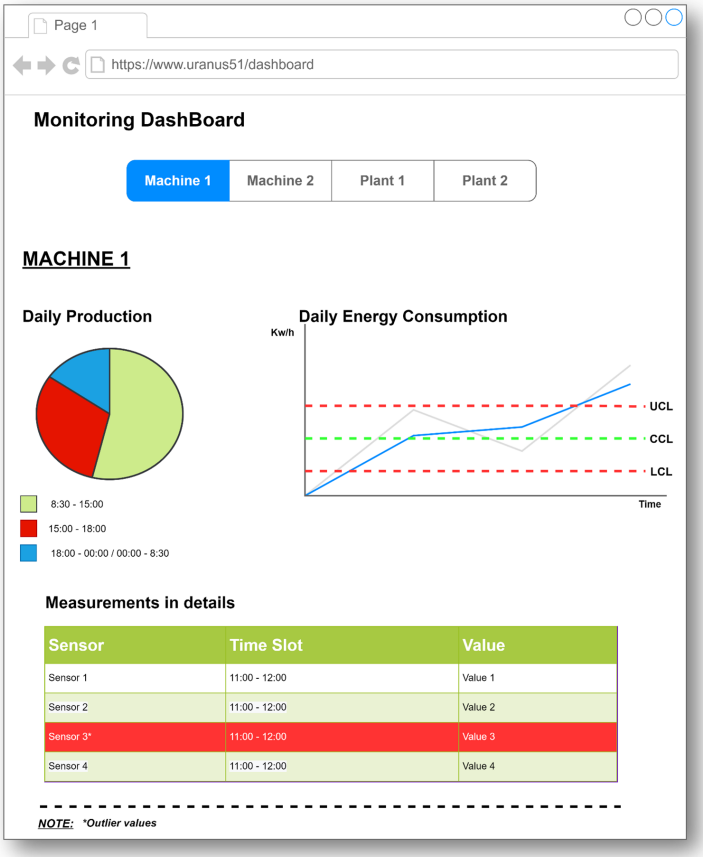

Figure 5.2: Monitoring Dashboard

- **Suggestion dashboard**, a page with the list of possible solutions for energy improvement, on this page the customer as in the monitoring dashboard can select the machine or plant of interest and can see more in detail the control chart [1] of each machine according to the EnPI values (these are indicated in the ISO-50001 and Defined in the energy policy). The Table of the EnPI values show the values out of control (the ones circled in red in the suggestion panel) and for each time slot show the minimum value, the maximum value, and the mean value. For each of these values out of control, the client can see different advice to implement and correct the problem presented. In the Suggestion dashboard, when the advice is for instance replace the machinery, the customer can also click on calculate payback time, when this happens, the customer is redirected to a next panel (Payback Time Dashboard).

Figure 5.3: Suggestion Dashboard

- **Payback Time dashboard**, a page in which you can compute the payback time, in this the client can know the number of periods it takes to recover the money

[1] A control chart pattern recognition has the capability to recognize unnatural patterns (Jenn-Hwai Yang, 2005). It is a chart in which you place the threshold level for any process and then you put the point that are observed, and you define the tolerances, if the points fall inside the tolerance everything is ok, if fall outside you must interevent in the correction

used at the beginning of an investment. Our company has a database of different machinery, therefore the client has the possibility to select the type of machine that he wants to change, once this is selected, the client can also know the savings get it when change it (this because our system immediately computes the payback time). In case that the type of machine that the client wants to change does not exist in our database, the client can insert the type of machine and its price, in this way our platform can perform the necessary calculation.

In this dashboard the "other entrance" space refers for instance to the fact that the client can sell the machinery that is failing and take this money as part of the payback time. In this way, it helps to recover the investment of changing the machinery in a shorter period.

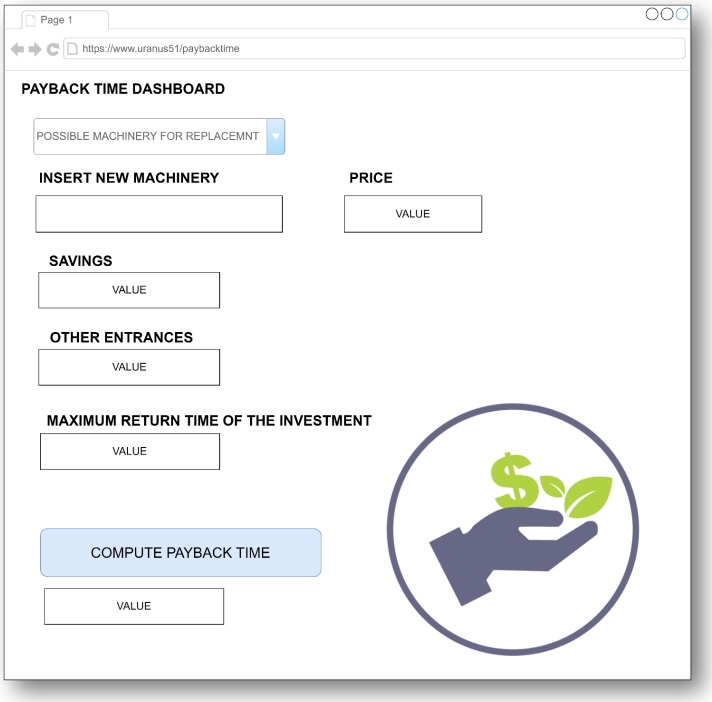

Figure 5.4: Payback Time Dashboard

5.4 Acquisition of data from various sources

In terms of data acquisition, two cases can be presented:

1. The client already has the necessary sensors for data acquisition.
2. The client is totally or partially without the necessary sensors for data acquisition.

In the first case, an automatic acquisition system is developed. This system takes the data directly from the cloud on which the sensor sends and imports them on our

database. In the case of an integrated sensor, there is no possibility to set the behavior of the sensor, the data must be recovered based on the measurements made by the integrated sensor.
In the second case, we will provide and install the necessary sensors and connect them to our cloud through a gateway provided by us to avoid problems with corporate networks, on which security policies may exist. In particular, the gateway interfaces externally through an on-board 4G module and with the sensors through a mesh network that does not violate any specific legislation for industrial plants.

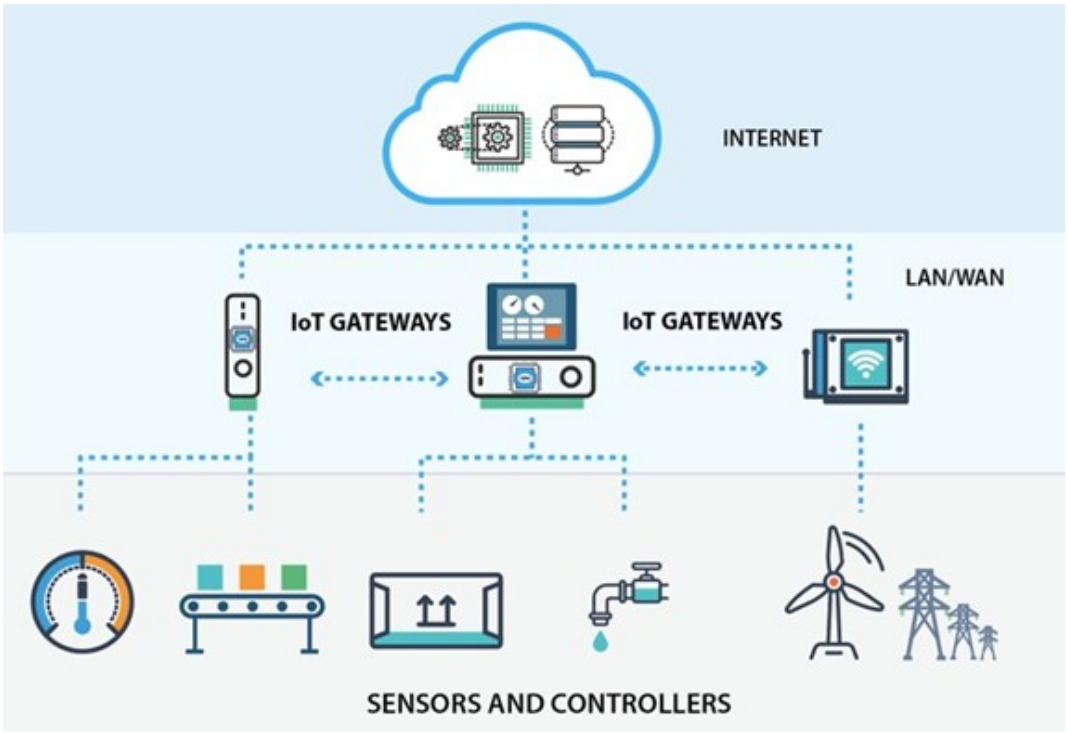

Figure 5.5: Sensor, gateway, and cloud connection

5.5 Products / services – flow

Our service starts with the contact of the client, after do the first contact, our company and the client define the work teams (one for the client and another one for our company) that are responsible for developing the project.
After the team's conformation, our team visit the client facilities to collect the relevant information to start working, in this visit we stablish an ending date of the project and the possible monitoring period of our clients' activities.
Our assigned team works also as a quality assurance team that conducts activities to validate quality requirements for each project.
The following diagram describes the flow chart of the production process of our company:

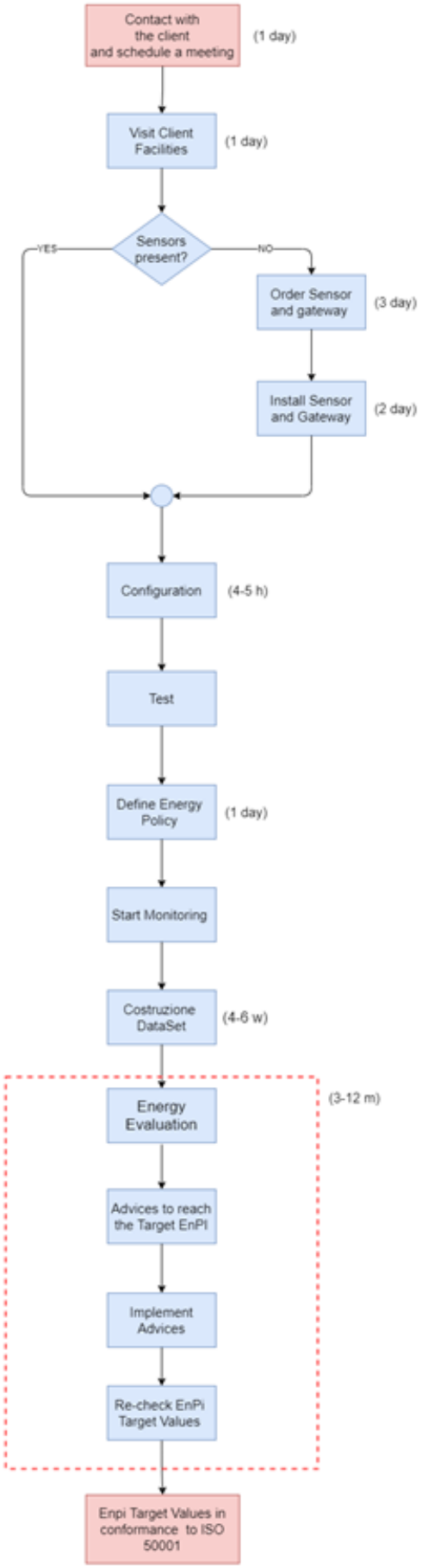

Figure 5.6: Flow chart of the production process of URANUS51

As we mention before, the diagram present two cases:

1. The company presents the sensors and therefore only the configuration of the acquisition system is required.

2. We need to design a sensor system to obtain useful data for monitoring, and then order and install the different components.

Then, the Energy Policy is defined by the operations manager and the client, who establish the EnPI values and processes in which they must work to comply with the ISO 50001 standard.
The "Start Monitoring" status is a milestone to indicate that our service begins to acquire data by the customer, at first to have enough data to train the ML algorithm and subsequently to start processing them and provide useful advice to be implemented to achieve the target values defined in the Energy Policy. These operations of continuous monitoring and implementation of the advice varies according to the size of the company and can take from 3 to 12 months.

An example of EnPI is:
The annual energy consumption of each heating system through the index $E_{H,n}(kWh/m^2)$, calculated according to the following equation (Dall'O, Ferrari, Bruni&Bramonti, 2020):

$$E_{H,n}(kWh/m^2) = \frac{C_{H,n} \cdot S_H \cdot HDD}{S_{B,n} \cdot HDD_{A,S}}$$

Where:

- $C_{H,n}$ is the fuel consumption (m3)
- S_H is the lower calorific value (kWh/m3)
- HDD is the number of standard degree days for heating
- $S_{B,n}$ is the floor surface of the building.
- $HDD_{A,S}$ is the number of actual degree days of the considered heating season.

This $E_{H,n}$ is useful for comparing energy consumptions, considered as a basis for monitoring the evolution in subsequent years (Dall'O, Ferrari, Bruni, Bramonti, 2020).

The heating degree days (HDD) are the data related to the cumulated temperature differences (K Day) used to estimate the energy for heating buildings. In Italy, the HDD is calculated based on the following equation (Dall'O, Ferrari, Bruni, Bramonti, 2020):

$HDD = \sum_{e=1}^{n}(\Theta_0 - \Theta_e)$

Where:

- n the days of the year.
- Θ_e is the average external daily temperature and needs to be lower than a reference temperature (12 °C).
- Θ_0 is a fixed reference indoor thermal comfort temperature (20 °C).

5.5.1 Deming Cycle (PDCA cycle) of the production process

The following image present the Deming Cycle included in the implementation of the ISO 50001 standard for energy managing:

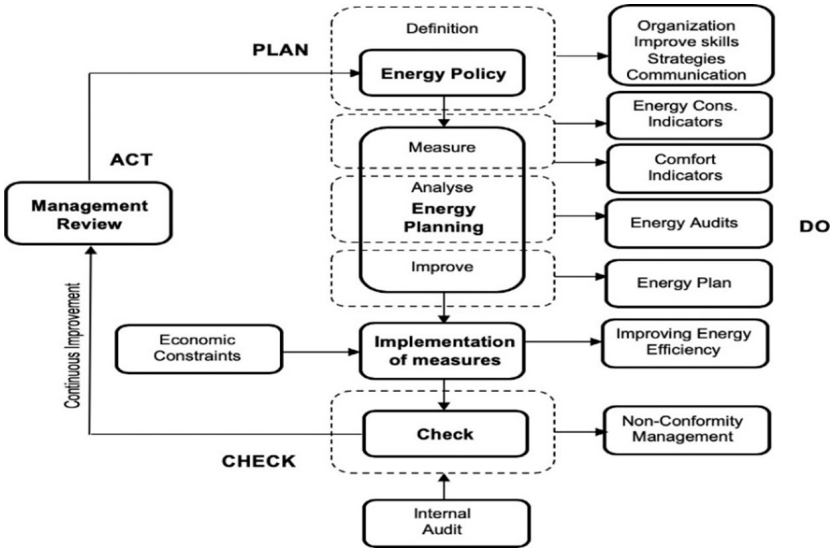

Figure 5.7: PDCA of the production process of URANUS51.

The scheme represents a recursive process that aims to continuously improve the energy quality of our clients.
The most important phases of the energy process are:

- **PLAN:** Establish objectives and processes necessary to deliver results in accordance with the organization's energy policy. The **energy policy** defines the general strategies that Uranus 51 will adopt in the project, it is also necessary to involve the entire organization and implement a communication strategy, this is achieved when we implement training courses in energy, IT and IOT. In this phase we do the **energy planning** by implementing energy audits, during the audits we collect the data related to the energy consumption of the processes and then analyze it. This data allows us to obtain indicators on energy consumption, which are useful for objectively understanding the improvement in energy performance compared with the initial situation of our clients.

- **DO:** we do the process implementation, implement the improvement plan, and document any changes made.

- **CHECK:** monitoring and measuring the processes with respect to energy policy, and other requirements approved by the organization; after that we need to report the results, and check these against the goals. This phase helps us to understand if the energy management has been implemented according to the ISO 50001.

- **ACT:** the phase of the **management review** is fundamental to guarantee a continuous improvement of the SGE (Energy Management System or EnMS). If the results are successful standardize the method and communicate it. When the results are unsuccessful, we re-check the plan and implement it again.

5.6 Sensors Acquisition

As there are already several companies specialized in manufacturing sensors and gateways, it was decided to order them externally and hire a certified company for the installation of the sensors that best suit the needs of our customers (this according to the inspection carried out by our company). Other main reasons to our company order the sensors externally are:

- The volume of products needed is small.
- The suppliers specialized in manufacturing sensors and gateways have more expertise and experience than us.
- We can specialize and focus better on our business.

To evaluate our potential suppliers, due to cost increases when purchasing sensors outside of Italy and the need for a close supplier relationship, it was decided that our supplier should be located in Italy.
In our search we find three possible suppliers:

- NGS-Sensors S.R.L [2]
- TSM Sensors S.R.L [3]
- LSI Lastem [4]

To evaluate which one is the best option to acquire the sensors we defined a list of criteria that are important for our company and an evaluation scale.

1	**2**	**3**	**4**	**5**
Extremely poor	Bad	Average	Good	Excellent

Table 5.2: Evaluation scale

[2](NGS-Sensors, 2021) and (Sant'Anna-ScuolaSuperiore, 2015)
[3](TSM, 2021))
[4]:(LSI-Lastem, 2021)

Criteria	**NGS Sensors**	**TSM Sensors**	**LSI Lastem**
Closeness	5	2	2
Certified company (ISO standards)	3	5	5
Experience with similar companies	3	5	5
Overall quality of products	5	5	5
Customized solutions	5	4	3
Technology (efficient, precise, and updated)	5	5	5
Ability to meet requirements	5	5	5
After-sales assistance	3	3	5
Guarantee	3	3	5
Total score	39	37	40

Table 5.3: Criteria for suppliers' selection

In the evaluated criteria, we can see how an important aspect for Uranus 51 is whether the supplier company is certified with the ISO standard (ISO 9001, ISO 14001, etc.), this is an important criterion for us because if our suppliers respect these standards, we can guarantee external quality of our services.
As we can see, the best solution is LSI Lastem, but if we consider that we want a nearby supplier and we do not want to depend on a single supplier, we consider as our 2 main suppliers: LSI Lastem and NGS-Sensors.
Our suppliers take care of the acquisition, installation of sensors and their local configuration. To guarantee the correct functioning of the sensors to the Client, a technician from our work group will carry out an inspection to test the system. As we mentioned in the marketing plan, the cost of the acquisition, installation of sensors and their local configuration is around €3.690.
As we mentioned in the marketing plan, the cost of the acquisition, installation of sensors and their local configuration is around € 3.690, of which the client must pay only the sum of €1890 for the installation because the sim is a cost that our company must pay. This price corresponds to the following:

Sensors (7 sensor for each project)	€560
Antenna	€30
Gateway	€800
Sim (activation and annual subscription)	€1.800
Installation	€500
Total	€3.690

Table 5.4: Total cost of the installation of the sensors

for project purposes, we assume that the average number of sensors we install is 7 per project. However, this price may vary, depending on the number of sensors that the company really needs. For this our work team performs a first inspection, after which a report is prepared on how many, how and where to install the sensors, based on this, our supplier gives us the final price of the installation.
It is important to mention that after installation, our work team performs a second inspection to verify that the outsourced service was done correctly.
The price of our service for the companies that does not required the installation of the sensors is about €15.500.
The price of our service for the companies that required the installation of the sensors is about €17.390.

5.7 Dimensions of Service Quality

5.7.1 Quality Time Policy

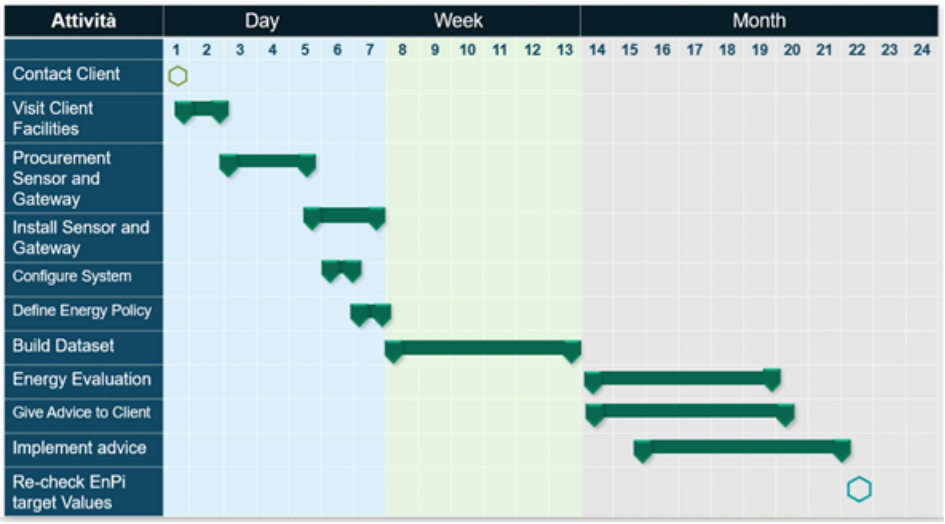

Figure 5.8: Timeline: machinery without sensors

Lead Time: 7 days + 6 weeks (42 days) + 8 months (224 days) = 273 days (9 months)
Lead Time: 4 days + 6 weeks (42 days) + 8 months (224 days) = 270 days (9 months)
In this section, the lead time of the service provided by our company is calculated, we obtained a standard lead time of 9 months.
However, depending on the following factors, it may be less or even greater:

- Client's commitment to the development of the project
- Communication between work teams (customer-supplier)
- Involve all staff related to the project
- The type of productive sector of our client

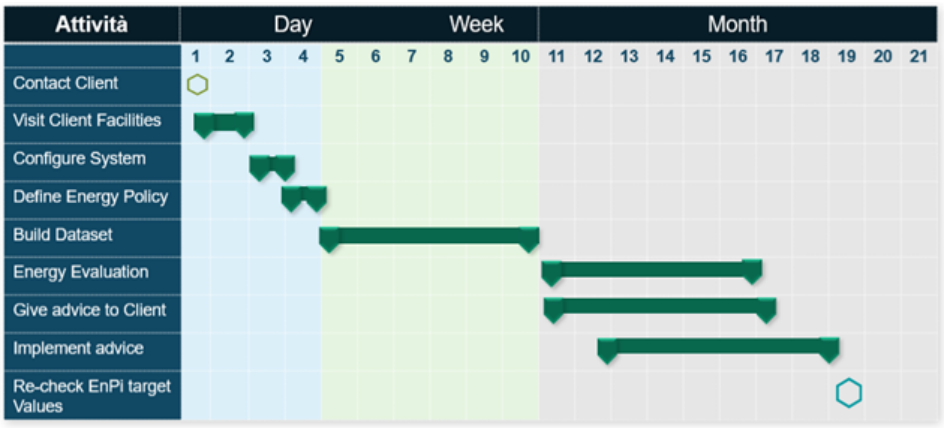

Figure 5.9: Timeline: machinery with sensors

Delay considerations regarding lead time

Considering our flowchart, the times calculated concern the periods in which customer requests are medium-low, that is, of about 25 – 30 contracts (Considering that for the first 6 months our R&D employees will implement all the software and infrastructure for the service 15- 16 contracts.) companies for the first year. In the event of a high workload, that is when many customers request our service (About 30 – 36 contracts for the second year or 41 – 43 companies for the third one), delays may occur especially in the first part where our relationship and contact with the customer is more constant as there may be overlapping of appointments (inspection, meeting, etc.). The problem could be solved by scheduling, at the first contact with the customer, the inspection in a period in which the workload is less loaded or by making sure to provide special tariff plans (of excuses) to try to convince the customer to stay with us.

Project Manager process considerations: our company defines the MSP (Master Scheduling Process) as a variant that will be focus on the R&D projects to develop frameworks that in the near future can be adapted to the projects to facilitate and be flexible in the solutions proposed. Regarding the WPP (Weekly Project Planning), the teams assigned will be focus on the customizable software/platform solutions related directly with the project's pipeline.

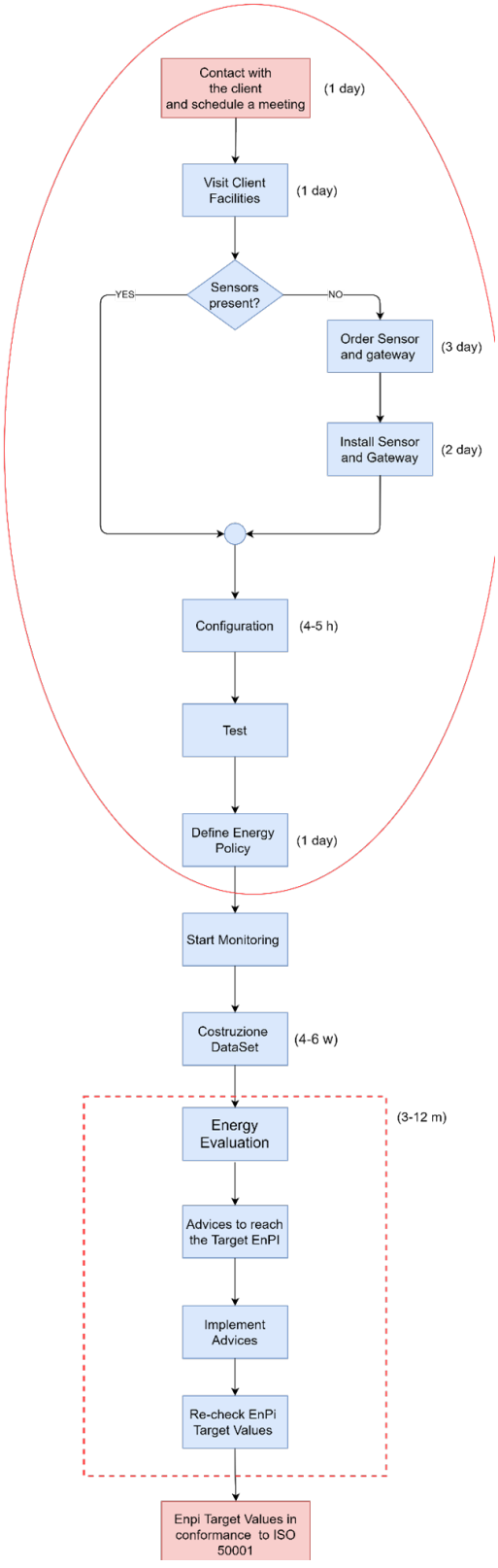

Figure 5.10: Delays In the service-flow

5.8 Quality Assurance Policy

Uranus 51 is an organization committed to continuous improvement and that has its own Quality Management System (QMS) that provides a framework to measure and improve performance and it is based on the ISO 9001 standard. In this way, we offer our clients an objective and transparent advice based on experience, industry benchmarking and input from user groups.
At Uranus 51 we obtain trained IOT topics to align our services with business needs, and our operation manager receive the training in the ISO 50001 standard and is responsible to give updating of knowledge to the project manager, the finance manager, and the marketing manager.
As we mentioned before to ensure that our services meet the customers' expectations, we assigned a quality assurance team that conducts activities to validate quality requirements for each project. This typically involves planning, observation and inspection with policies and procedures established.
To ensure internal quality, we perform tests after the configuration of the sensors and gateways and do the Deming cycle (PDCA cycle) of the process to check that our client's energy consumption values are always in conformance with the target EnPI values.

5.9 Quality Tangible Policy

Uranus 51 headquarter is in Pisa and the facilities have an eco-friendly construction that include executive offices, open working areas for the project's teams and a meeting room for the presentation to our customers.
We have organized our offices in such a way as to optimize communication between the various divisions. We have merged **Marketing - Project Managers** in order to work coherently, especially on the Strategy Management part.
We have merged **Operation - Finance Managers** to ensure that Finance Manager can notify the Operation Manager of any leaks in the production / evaluation process of business processes and at the same time the Operation Manager can communicate with the Finance section in real time on various operations that the company will have to carry out and therefore better organize the company's report and the various expenses to be faced.
The third office is dedicated to the administrative part and possibly to **human resources (RH)**.
The **Research and Development (R&D)** area is mainly dedicated to the creation and management of the Machine Learning algorithm that is the basis of our business, in fact in this area there are specialists in IT engineering. Furthermore, in this area there are "electronic" personnel specialized in the field of sensors in order to select, step by step, which are the sensors that must be used in a specific company that requires them and possibly test them, in fact a small laboratory to do this type of operation.

Figure 5.11: Uranus 51 Facilities

5.10 Quality Expectancy Policy

We are a company in which our job is to guide our client's business to successfully acquire the norm ISO 50001.

5.11 Continuous Improvement

In order to achieve a continuous improvement of the service provided by our company, we decided to perform monthly surveys to our clients, this with the purpose of seeing the aspects that we are doing well and in which we are failing. A one-month periodicity is established during the first year because we are new to the market, but for subsequent years we consider a period of every three months.
We decided to consider the opinion of our clients (VOC) so that they feel involved in our improvement process and understand the importance of establishing a close relationship with them for us. In addition, it allows us to identify the needs and plan

possible actions to improve the service we offer.
To complete the survey regarding the service we provide, our company performs different procedures:

- Send the survey to the customer by email
- Insert the survey directly in our service platform
- Make a phone call with the counterpart (client's work team)

5.12 Our Algorithm

It is a machine learning algorithm based on neural networks and a supervised dataset, for the algorithm training. As input, the system takes an aggregate data consisting of a series of features extracted from all the data detected by the sensors and based on its knowledge, it generates a suggestion for the customer that if implemented allows it to be included in the EnPIs provided for by the Energy Policy.

GENERAL STRUCTURE OF THE DATA

```
{
  "sectorType": "nameSectorCompany",
  "machineType": "machineType",
  "environmentType": "office",
  "measuresMachine": [
                        {
                            "timestamp": "04-04-2021",
                            "unit": "Kw/h",
                            "value": 23.25
                        },
                        ...
                        ...
                    ],
  "measuresEnvironment": [
                            {
                                "timestamp": "04-04-2021",
                                "unit": "°C",
                                "value": 26.5
                            },
                            ...
                            ...
                          ]
}
```

Figure 5.12: Algorithm: General Structure of the data

5.13 Cost Estimation

Our company estimate the operating cost for the first year:

- **DIRECT COSTS**

  In this year as we mentioned in the marketing section, we consider that only 7 companies (40% of our target) will require the installation of the sensors.

  Installation cost: Sensor installation* number of firms = €1.800 * 7 customers = €12.600

  Data Center License/ Cloud cost: €860,39 per month = €860,39 * 12 months = €10.324,68

  Labor Costs

  - **R&D cost:** €1.600 salary * 4 employees * 12 months = €76.800
  - **CTO salary:** €2.000 salary *(1 CTO)*12 months €24.000

  Total Direct Cost: €12.600 + €10.324,68 + €76.800 + €24.000 = €123.724,70

- **INDIRECT COSTS**

  Rent cost: €2.000 per month = €2.000 * 12 months = €24.000

  Utilities cost: €1.000 per month = €1.000 * 12 months = €12.000

  Commercial sector cost (Salesman): €30.000 salary + €150 for each closed project*16 project + €1.000 bonus = €33.400

  Company car (leasing): €5.000 premium payment + €300 monthly payment*12 months = €8.600

  Labor indirect cost

  - **Managers Salary:** €2.000 salary * 12 months = €24.000 * 4 (Project, Marketing, Operation, finance Managers) = €96.000

  Total Indirect Cost: €24.000 + €12.000 + €33.400 +€8.600 + €96.000 = €174.000

- **OVERHEAD**

  - **Initial equipment:** 6 PC * €1.500 + 4 PC * €700 = €9.000 + €2.800 = €11.800

Material	Quantity	Price(€)
Computers R&D area	6	€1.500
Computer Administrative area	4	€700

Table 5.5: Initial equipment

- **Office material:** €10.000

Total Material cost: €11.800 + €10.000 = €21.800 **Training Costs:**

- IOT training: €1.700 * 2 employees = €3.400
- **ISO 50001 Training:** €300 (40 hours) * 1 Operation manager = €300

Total Training Cost: €3.400 + 300 = €3.700 **Advertisement:** €15.000 **Total overhead:** €21.800 + €3.400 + €15.000 = €40.200

- **Total cost for the first year:** €123.724,70 + €174.000 + €40.200 = €337.924,7

Chapter 6

Finance

6.1 Cost Accounting System

The cost accounting system of our company is based on two principles:

1. Ensure and support the compliance with the Law, especially the Law on taxes and accountability

2. Provide data and information to improve the company balance sheet, by implementing actions aimed to cost savings and to an early definition of the financial needs so that we can find the better way to be funded

6.1.1 Compliance with the Law

It is very clear to understand that our company must comply with the Law and in particular with the Law concerning tax and accountability. This is a mandatory requirement and it is one of the main concern when setting up and running a business.
The strategy implemented by our company is to outsource both the tax service and the accountability service. For this, it will be necessary to make a selection through a tender procedure (procurement) with the aim of finding a reliable and competent service provider at the lowest possible cost.
We will split the service into two contracts, one for the tax advisory and one for administration, accounting and bookkeeping.
The main reason why we plan to split this finance services is that the tax issue is a very specific one and require a competence that is very specific and must be constantly updated and state-of-the-art. The tax advisor will be very important even at the start-up of our company because it must provide us a tax study to exploit all the incentives and tax benefits reserved to start-up by the Government. This topic must not be underestimated because we can earn money with a proper start-up strategy and on the contrary we can lose money if we will not implement our new business in a way that allow us to exploit the most of the tax benefit.
After the start-up, the tax advisor will continue to be a very key factor for our success because the implementation of a year-to-year tax strategy will allow us to earn from our business the maximum value we can.
As for the administration accounting and bookkeeping we are aware that this is a critical issue for our company. Therefore it is very important to select a service provider that

can take on all the issues related to this topic. This service will prove itself essential not only in ensuring the compliance with the Law, but also in making our way of running the business effective and efficient. This service will be entrusted not only for all the payments that our company will do, both mandatory by Law and to providers and contractors, but even in managing the issuance of the invoice to our clients and the control about the payment of those invoices up to the registration of the transfer of the money into our bank account. This last point is very important because our company will be funded mainly through the payment of the invoices from our clients and therefore it is crucial to setup a system that monitors and controls this issue from the issuance of the invoice to the registration in the bank account. For instance, this service provider will take care that every invoice that our company will issue will be compiled and filled in the correct way so that to avoid delays in the payment due to rejection by the clients. About the payments that our company must do for mandatory reasons (for example taxes) even in this case it is very important that all the payments will be performed on time so that to avoid to be extra charged with penalties for delayed penalty. Last, it is very important also to do a very complete examination of the invoices issued by our suppliers and service providers to be sure that the invoice are due because the service or the supply are correspondent to the contract that we have signed. This administration accounting and bookkeeping is the basic service even for the preparation of the Financial Statements (the Balance Sheet and the Income Statement) because it will be the duty of this service provider to collect all needed data and information during the year (invoices paid, invoices accounted as an example), to prepare the documents in the way required by the Law, to certify the Financial Statements in front of the concerned authorities. This services will also provide us with assistance and support in event of controls and audits by the authorities.

6.1.2 Cost management

The Cost Accounting System of our company will be not limited to the topic of the compliance with the Law, but it will be created and run a structured way of cost accounting to get data and information about the nature of the costs in order to make analysis that will be aimed at cost reduction and at running our business in a profitable way. We will setup and run such a system with the assistance of the administration accounting and bookkeeping service provider, relying on its advice and experience.

The Cost Accounting System proposed by our company will:

1. establish a list of cost items
2. identify the cost
3. attribute the cost to the correct cost items
4. provide charts and reports on costs
5. define, control and monitor KPI
6. drive in performing corrective actions

7. provide information for investments and make-or-buy analysis

The cost management will be based on the Cost Accounting System and a responsible manager will be appointed for every cost. It will be duty of each responsible manager to monitor and control the costs, making use of reports and KPI in order to find area of improvements and take corrective actions in event of costs overrun.

6.2 Cost Configuration

In order to help and support the costs control process, it is necessary to establish a cost configuration system and ensure that the day-to-day management of the business is done according to the cost configuration system. This will allow the collection of the data, the preparation of reports, the realization of charts to show the situation in a graphic way. It will be also necessary to define some KPIs in order to perform quantitative analysis and to facilitate the cost management.

As a starting draft (beacuse the final release will be closed after the advice of the administration accounting and bookkeeping service provider) we can make reference to the table below:

Item	**Description**	**Code**	**Responsible**
Client Acquisition	Every cost related to the acquisition of new clients	BD	Marketing Manager
Client Management	Every cost that occur after the signature of the contract with a client	CM	Project Manager
Accounting Activity	Every cost related to the accounting activity	AA	Finance Manager
Human Resources Activity	Every cost related to any activity about the management of human resources	HRA	Finance Manager
General Costs	Every general cost (eg. office rental, travels)	GC	Finance Manager
Mandatory Costs	Every mandatory cost due to Law and Regulations	MC	Finance Manager
Personnel Costs	Every costs related to the personnel	PC	Operations Manager
ICT	Every cost related to the supply and services of ICT resources	ICT	Operations Manager
Research and Development	Every cost related to the R&D activity	R&D	Chied Technology Officer (CTO)

Table 6.1: Cost Table of Reference

As we have mentioned, to support each responsible to manage the costs, it is helpful to

define some KPIs (Key Performence Indicator) and some pre-definite charts and graphs that can be addressed as a quick reference. The draft list of KPIs (again the final list will be closed with the assistance of the administration, accounting and bookkeeping service provider) is shown in the table below.

KPI	**Description**	**Value**	**Responsible**
Costs YTD	Comparison between budget and cost to the date	€	Finance Manager
Costs multi-year	Comparison of general costs vs revenues in a multiple year period	%	Finance Manager
Operational costs YTD	Comparison of operational costs vs budget to the date	€	Operations Manager
Project Acquisition costs YTD	Comparison of project acquisition costs vs budget to the date	€	Marketing Manager
Project Management costs YTD	Comparison of project management costs vs budget to the date	€	Project Manager
Personnel costs YTD	Comparison of personnel costs vs budget to the date	€	Operations Manager
R&D costs YTD	Comparison of R&D costs vs budget to the date	€	Chief Technology Officer (CTO)

Table 6.2: KPIs Table of Reference

6.3 Break-Even Analysis

The break-even analysis is conduct to determine when the business gets to the break-even point. This analysis is made on the assumption of both the cost incurred and the revenues.
Our analysis is focused on finding out how many clients are needed to get to the break-even point, starting from the first year of operations. The analysis is based on these assumptions:

- Per-client revenue: €15.500
- Per-client variable costs: €3.000
- Fixed cost (1 year): €285.000

It can be calculated that the break-even point is reached at 23 clients, when revenues are €356.500 and costs €351.000. The result of the analysis is shown in the graph below:

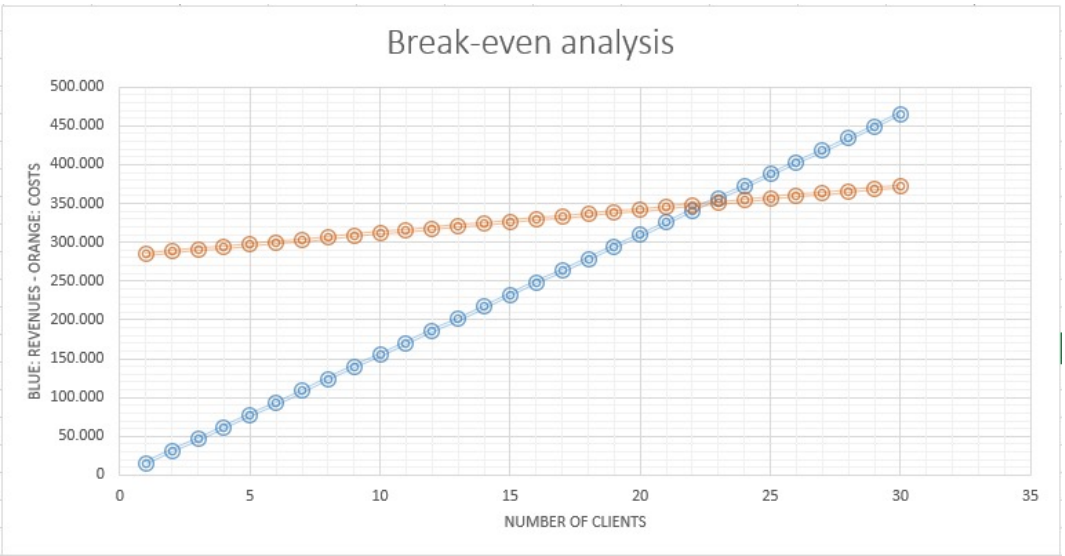

Figure 6.1: Break-Even Analysis

6.4 Budget (1/2 years)

As our company is a start-up, the first two years assume a very high importance. For this reason, it is necessary to write the budget of this first 2-years term in order to plan all financial needs and give the baseline for accounting controls.
The share capital is €200.000, €50.000 from each of the four founders of the company. In addition, the bank provides us with a loan of €70.000 to ensure the achievement of the necessary liquidity and to be able to meet the expenses of the first years.

6.4.1 Profit and Loss

PROFIT AND LOSS		
	Year1 (€)	**Year2 (€)**
REVENUES		
Revenues	248.000	511.500
Other Revenues	13.230	15.120
Total Revenues	261.230	526.620
COSTS OF SALES		
Rent	24.000	24.000
Utilities	12.000	12.000
Sensor installation costs	13.230	15.120
Cloud	10.324,7	10.324,7
Salaries	191.800	225.200
Car leasing	8.600	12.200
Personnel costs	3.700	0
Advertising	15.000	12.000
Legal costs	10.000	10.000
Stationery	10.000	0
Data Sim	12.600	27.000
Depreciation	20.320	20.320
Total Costs of Sales	331.574,7	368.164,7
Passive interests	1162,58	1.162,58
Total Passive interests	1162,58	1.162,58
Taxes	0	62.917,09
Net Profit		
Net Profit/Sales	**71.507,28**	**94.375,63**

Table 6.3: Income statement

6.4.2 Assets and Liabilities

BALANCE SHEET		
	Year1 (€)	**Year2 (€)**
ASSETS		
A) Current assets		
Cash	110.212,72	217.908,35
Total Current Assets	110.212,72	217.908,35
B) Fixed assets		
R&D	76.800	61.440
Start-up	3.000	2.400
PC	11.800	9.440
Furniture	10.000	8.000
Total Fixed Assets	101.600	81.280
C) Depreciation		
Depreciation	20.320	20.320
Total Depreciation	20.320	20.320
Total Assets (A+B-C)	191.492,72	278.868,35
Net Profit or Loss	71.507,28	0
Total Assets + Net Loss	**263.000**	**278.868,35**
LIABILITIES		
Paid-in capital	200.000	200.000
Income (losses) carried forward	0	71.507,28
Net Profit (Loss) for the year	0	94.365,63
Debts and Loans	63.000	56.000
Total liabilities	**263.000**	**278.868,35**

Table 6.4: Balance Sheet

6.5 Economical and Financial Ratios

RATIO ANALYSIS		
	Year1 (€)	**Year2 (€)**
FINANCIAL		
A) Total Revenues	261.230	526.620
B) Total Operating Cost	331.574,70	368.164,70
C) EBIT (A-B)	70.344,70	158.455,30
D) INTERESTS	1.162,58	1.162,58
E) EBT (C-D)	71.507,28	157.292,72
F) TAX	0	62.917,09
G) EAT (E-F)	71.507,28	94.375,63
H) DIVIDEND	0	0
I) RE (G-H)	71.507,28	94.375,63
PROFITABILITY		
L) Total Assets	191.492,72	278.868,35
M) ROTA (C/L)	37%	57%
N) Capital Employed	263.000,00	263.000,00
O) ROI (C/N)	27%	60%
P) Owner's fund	200.000,00	200.000,00
Q) ROE (C/P)	35%	79%
LIQUIDITY		
R) CURRENT RATIO	1,75	1,97
S) QUICK RATIO	1,75	1,97
SOLVENCY		
T) EQUITY RATIO	0,76	0,78
U) DEBT TO EQUITY RATIO	0,315	0,28

Table 6.5: Economical and Financial Ratios

6.6 Risk Assessment

The risk assessment process is a key factor for the success of our business. The process will be performed in order to be prepared and have an adequate strategy to face events that can be harmful to our company, especially if they are not managed properly.

The risk assessment will be performed following these steps:

- Identify the risks
- Write a description of the risks
- Calculate the probability that the risk will occur
- Evaluate the impact of risk to our company (especially taking into account economic and reputation factors)
- Determine a risk response
- Assign a Responsible for the management of the risk response

These assessment will be done by preparing and compiling a Risk Assessment Table, that is a table in which all the above mentioned activities will be performed. The table is shown below.

Risk Description	**Probability**	**Impact**	**Mitigation Measures**	**Responsible**
Bugs and failures of the algorithm	Low	Medium	Constant monitoring and updates of the app	Operations Manager
Loss of data from the client's datalogger	Medium	High	Setup a stand-by and backup procedure	Operations Manager
Delay in client's payments	Low	Medium	Strict monitoring of the entire invoice process	Finance Manager
New competitors entering the market	Medium	High	Strict follow up of the market and define a strategy for the loyalty of the clients	Marketing Manager
Claims from the clients	High	High	Define clear scope of works and ascertain that the client agrees on the scope of works	Project Manager
Increase in interest rates	Low	Low	Strict follow up of the market of loans	Finance Manager

Table 6.6: Risk assessment table

The table shows both the probability of the risk and the impact to the company. To determine which risks are more critical to our company we can prepare a table in which the probability is on the horizontal axis and the impact on the vertical. This way the region is divided in nine sub-regions and the risks that fall in the upper right side (high

probability, high impact) are those that can cause the main threats to our company.

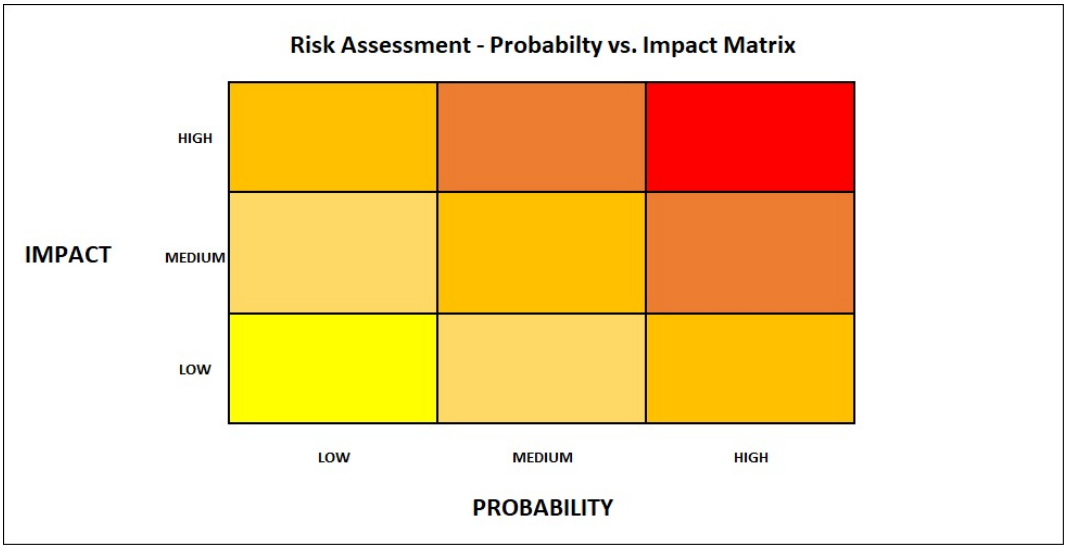

Figure 6.2: Probability vs Impact Matrix

It is important to highlight that The Risk Assessment Table is a document that will be subject to a periodic review and update (initially we will start this process every six months) by the board of directors.

Along with the Risk Assessment Table, the risk management process will make use of two other documents: the Risk Register and the Lesson Learned report.

The Risk Register is a table in which every risk that will happen will be recorded since its occurrence to its end. This Register will collect all data and information related to the Risk, its occurrence, the response, all the actions undertaken, the consequences, the situation at the closure. This document will be very useful when performing the periodic review and update of the Risk Register.

The Lesson Learned document is a document reserved for risks that will have a very significant impact on the business. This document will be focused to describe in detail what happened, what impact has derived, what knowledge the company has taken out of the event, what improvements can be undertaken and what must be done to avoid that the event will occur again in the future. Even this document, that will be prepared by the Risk Manager, will be useful when reviewing and updating the Risk Register.

Chapter 7

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