

**UNIVERSITY OF VAASA**  
**FACULTY OF TECHNOLOGY**  
**DEPARTMENT OF PRODUCTION**

Bernardo Losada Clemente

**IDENTIFICATION OF POTENTIAL FRAMEWORK  
AGREEMENTS FOR NUCLEAR POWER PLANTS.**

**Process optimization and economic improvements**

Master's Thesis in Industrial Management

Master of Science in Economics and Business Administration

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**UNIVERSITY OF VAASA****Faculty of Technology**

<b>Author:</b>	Bernardo Losada Clemente
<b>Topic of the Master`s Thesis:</b>	Identification of Potential Framework Agreements for Nuclear Powerplants. Process optimization and economic improvements.
<b>Instructor:</b>	Petri Helo
<b>Degree:</b>	Master of Science in Economics and Business Administration
<b>Major subject:</b>	Industrial Management
<b>Year of Entering the University:</b>	2010
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**ABSTRACT:**

This project / idea arose after conversations about the need to perform an analysis of the purchases made by the company BravoSolution to identify which purchases could be made under framework agreements. This project will bring potential benefits such as:

- Optimization of time spent on such purchases
- Economic improvements by achieving new framework agreements with manufacturers and suppliers (general services and industrial supplies).

The operational area includes CNAT warehouses located in Almaraz & Trillo nuclear power plants (Spain).

The working methodology will be applied based on the methodology and tools of CNAT & BravoSolution, and always under the supervision of CNAT. Under these conditions, BravoSolution describes the service offered

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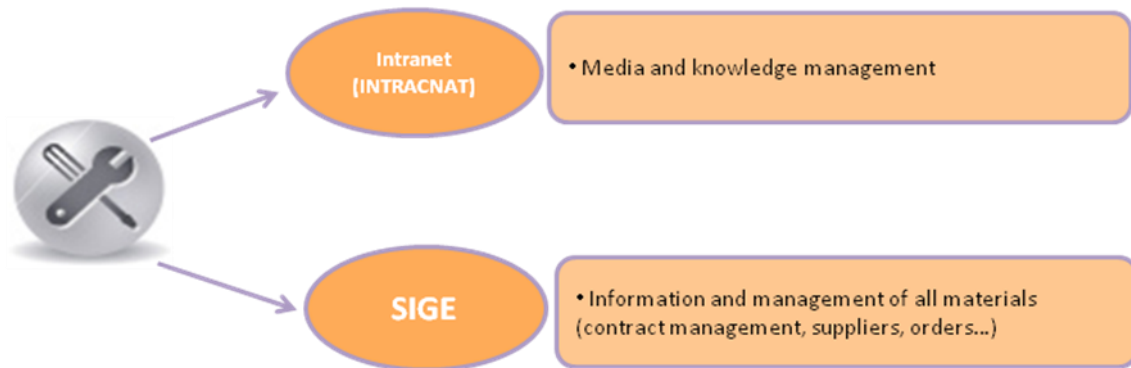
**KEYWORDS:** framework agreement, purchasing, industrial supplies, power plant.



## 1. INTRODUCTION

### 1.1.CNAT Environment

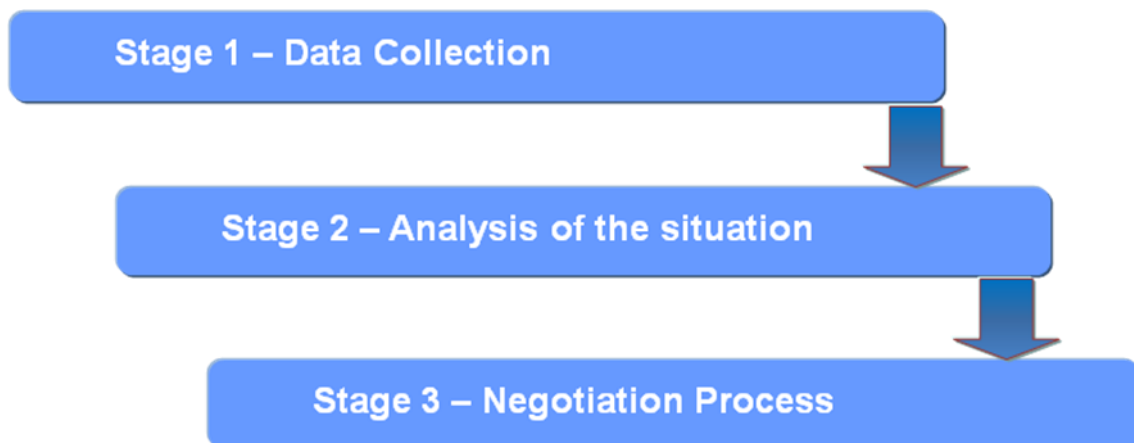
In this figure we represent the IT environment that CNAT Company is using at the moment.



**Figure 1.** CNAT environment

### 1.2.Work Methodology & Background

The project aims to analyze the situation and buying process associated with purchasing notes currently managed by BravoSolution. The current arrangements are also analyzed and a number of improvements to reduce costs and optimize the process are proposed:



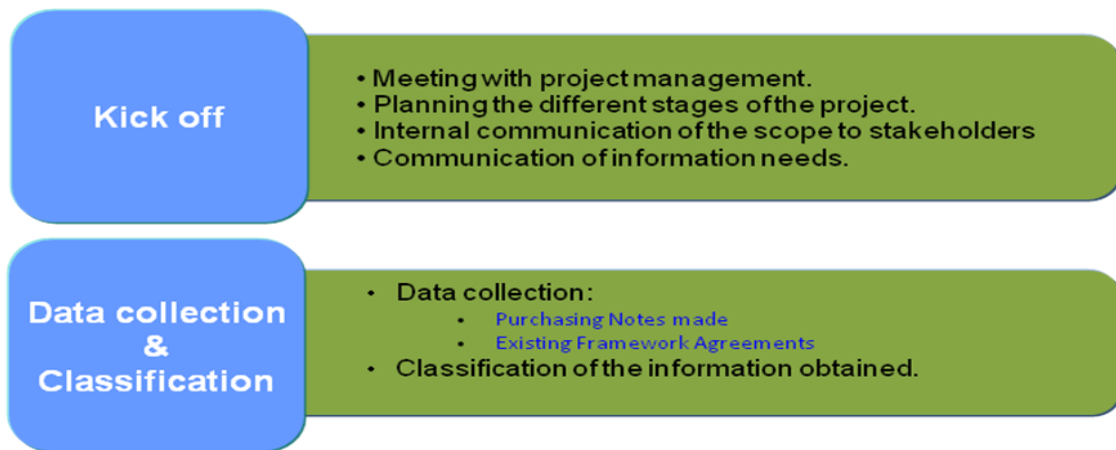
**Figure 2.** Project stages.



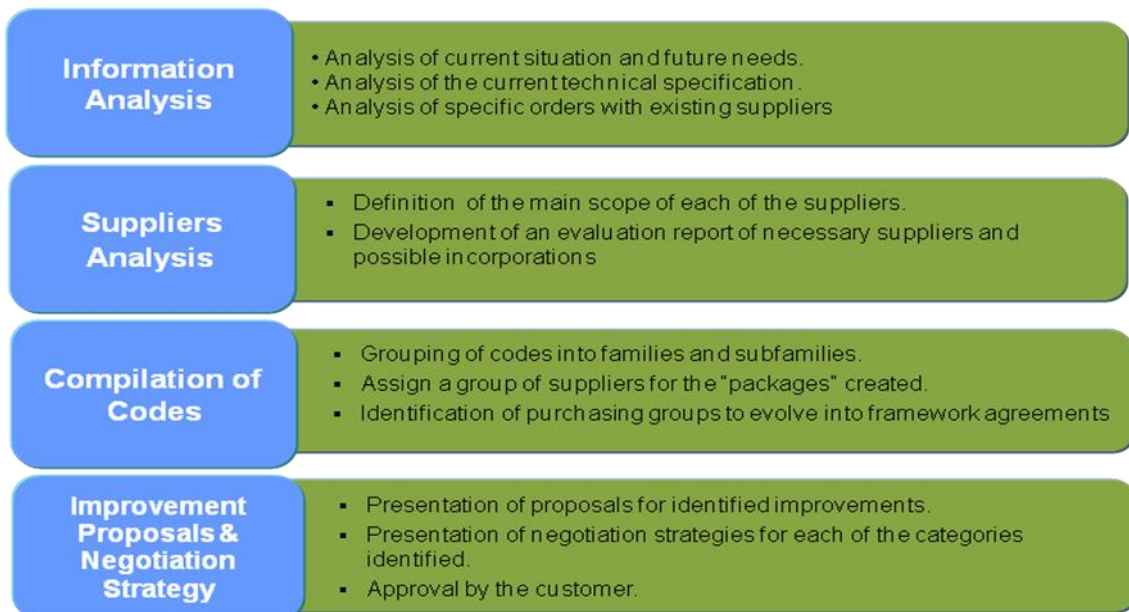
The project is divided in two parts:

- Consulting
  - o Collection
  - o Analysis
- Negotiation

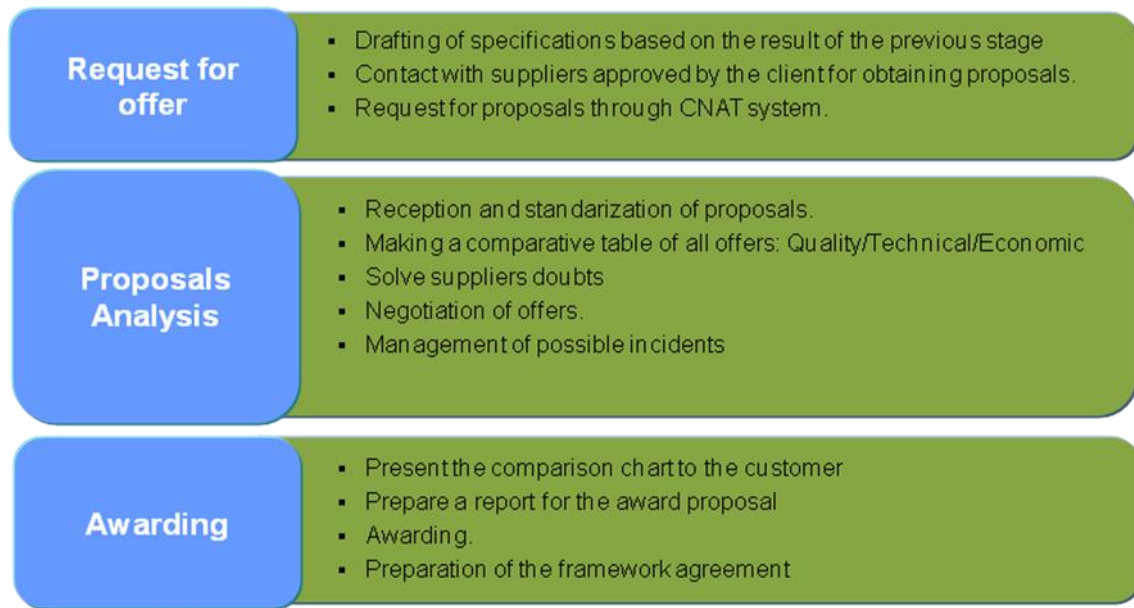
### 1.3. Identification of potential Framework Agreements – Research Structure



**Figure 3.** Stage 1



**Figure 4.** Stage 2



**Figure 5.** Stage 3

After conversations with the client (Trillo and Almaraz nuclear power plants) we detected some issues that can be fixed. In some services (office supplies, gifts ...) and in several "families" of primary products (valves, screws, nuts...) the company is expending big amounts of money.

Nowadays, with periods of economic crisis in some countries of Europe (particularly in Spain), the idea of locating families with many orders to save money and times could help the company.

So, a cost reduction project with products/services that are ordered in large quantities/prices can give us significant savings and performance improvements in the procurement processes of both plants.

## 1.4. Brief Introduction to the companies (BravoSolution & CNAT)

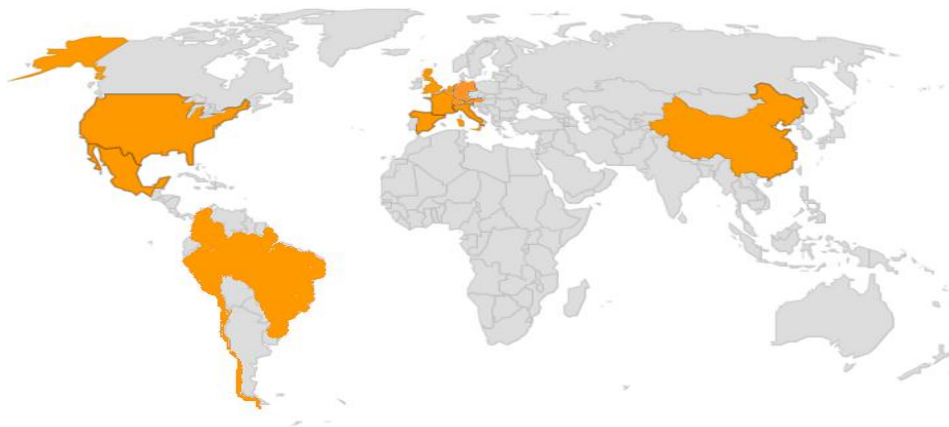
### 1.4.1. BravoSolution (company for which I worked during my 6-month internship and host of the project)

*"Our mission is to create value by advising our clients on optimizing the procurement processes through web-technology and innovative services".*

BravoSolution is an international company in Supply Management solutions, which aims to intensify the performance of a company's sourcing cycle.

Their solutions provide consistency between technology and professional services, a synergy that guarantees businesses will receive optimal support in performing their strategic procurement objectives.

Created in June 2000 by *Italcementi Group* initiative, supports 400 customers in 60 countries, with a transaction value of over 500,000 million € and more than 40,000 buyers worldwide.



**Figure 6.** BravoSolution office (Source: webpage)

Purchasing managers are now more than ever, under high pressure to generate savings, developing and managing strategic supplier relationships, accelerate procurement cycles and maintain excellence in processes. Faced with these

various challenges, purchasing professionals should seek customized solutions that deliver a quick return on investment in their businesses.

The company solutions, offered through software platforms, professional services and greater competition in categories, are used to support clients in improving their provisioning tasks:

- Technology "on demand" (BravoSolution Software Suite) enables organizations to balance supply and procurement prices, features and risks to achieve the lowest costs
- Strategic Solutions Categories: help customers to achieve substantial savings without compromising the functionality of the categories with greatest demand and complexity.
- Professional Services: specialized in supporting the procurement process (spending visibility, change management, finding suppliers, collaboration, software implementation and procurement programs in low cost countries).

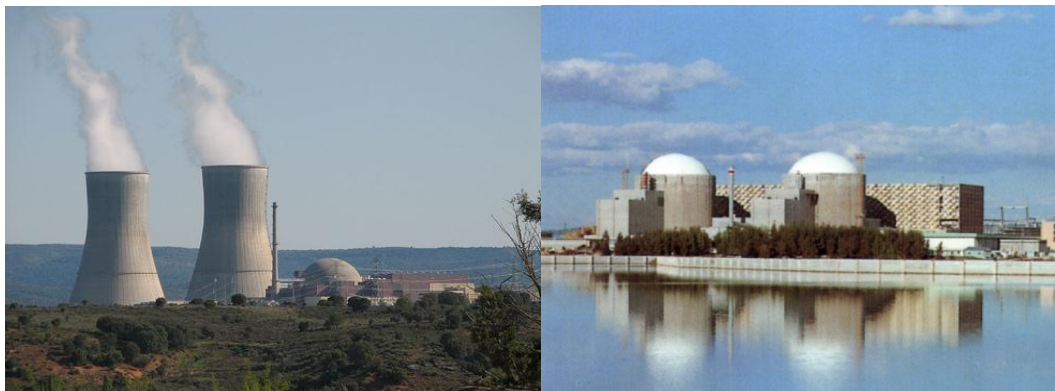
#### 1.4.2. CNAT – Almaraz & Trillo nuclear power plants

The mission of this organization is to produce electricity in a safe, reliable, economical and environmentally friendly way, ensuring long-term production through optimal exploitation of the Almaraz and Trillo nuclear power plants.

The heart of a nuclear plant is the Control Room, from which the Operation staff are responsible for operating the plant safely, within the limits and conditions established in the Operating Specifications and the existing Operating Permit.

In terms of maintenance, facilities are governed by the “*Maintenance Program*” of Nuclear Power Plants Almaraz & Trillo for the planning of all preventive activities and based on two premises:

- Identification of equipment and components to consider.
- Analysis, based on the technical characteristics of equipment, operating conditions, legal requirements applicable and the experience of implementation

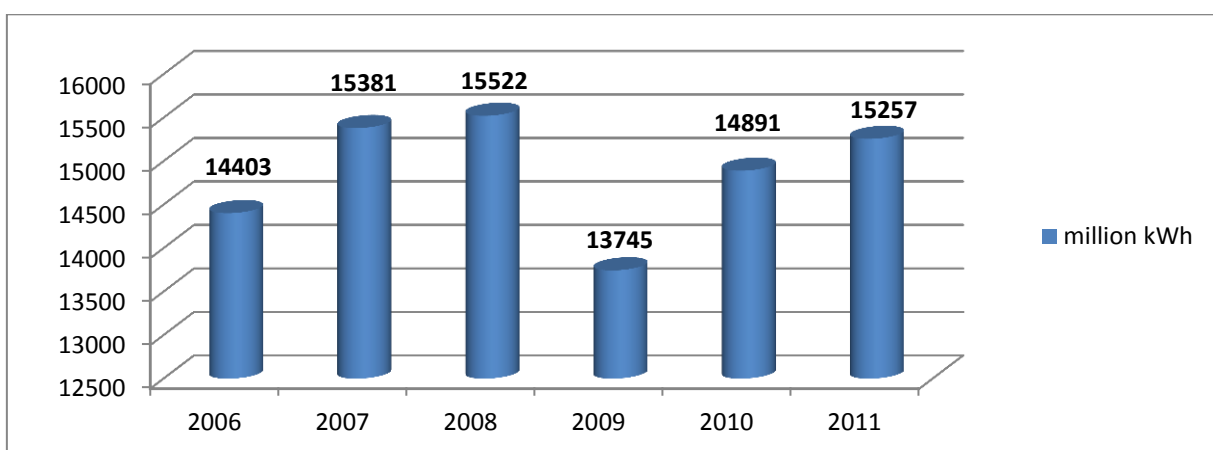


**Figure 7-8.** Trillo & Almaraz Nuclear Power Plants

#### 1.4.2.1. CNAT (Almaraz & Trillo nuclear power plants) – Results

##### Almaraz

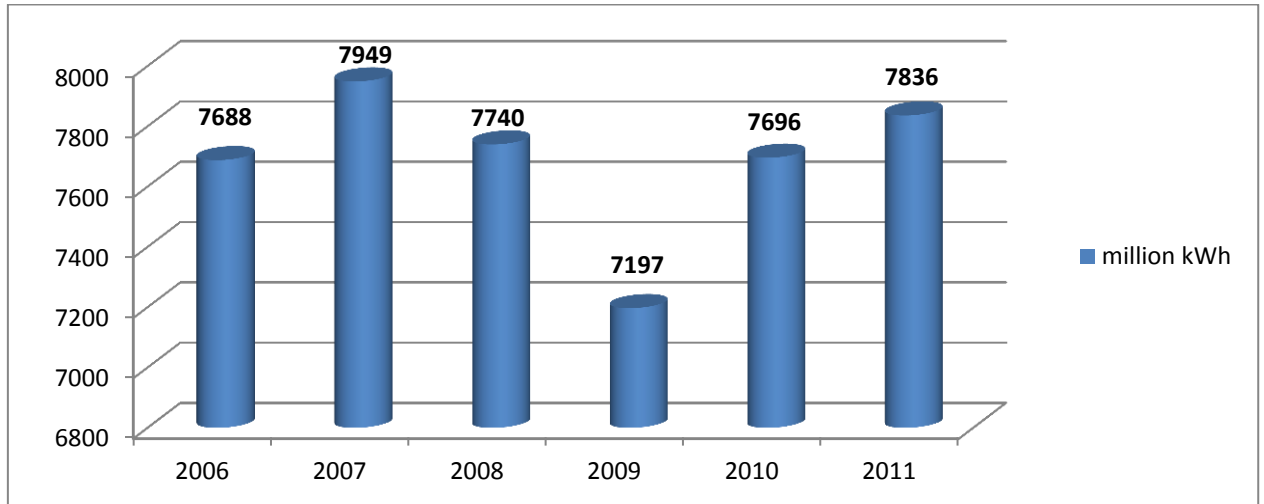
In 2011 the gross production generated by the two units was 15,849 million kWh (27.48% of the Spanish nuclear production and 5.67% of national electricity production). The combined net production was 15,257 million of kWh.



**Figure 9.** Net Production (Almaraz)

## Trillo

In 2011 the gross production generated by the Trillo unit was 8,367.5 million kWh (20.62% of the Spanish nuclear production and 2.99% of national electricity production). The combined net production was 7,836 million kWh.



**Figure 10.** Net Production (Trillo)

## 2. PURCHASING PROCESS

### 2.1. Introduction

Purchasing involves a complex process that goes beyond negotiation and bureaucratic procedures. With proper purchasing management the company achieve cost and time savings, quality, customer satisfaction, and direct business benefit. The purchasing and supply management are critical to the success or failure of the company. The future analysis will be based on purchases (services and industrial supplies).

### 2.2. What is the purchasing process?

The procurement process is the sequence of stages and activities that transform a request for a product or service by a department into the provision of that product or service requested from the supplier, using the available resources of the organization.

Effective management of the purchasing process is that which enables the best quality, price, speed, convenience and simplicity at each stage for all those involved whilst complying with the legal procedure established.

Among the characteristics of the purchasing management process the following should be emphasized:

1. It is a *universal* process. All public entities of any geographical area (local, regional...) must meet their internal needs for goods and services.
2. It is a *dynamic* process. Public authorities must meet new demands and expectations. The purchasing process is dynamic because of its ability to adapt (depending on the control of public spending, quality and timing of service provision, organizational performance and, ultimately, satisfying the needs and expectations of the customers of the Administration at any time).

### 2.3. Stages of the purchasing process.

We are going to present 8 stages of the purchasing process:

- Planning of purchases. This involves a prospective study of the needs in order to be prepared before the need arrives.
- Needs analysis. The purchasing department receives notification for the procurement of materials. The request is analyzed and assigned a level of priority.
- Request for proposals and budget. This is an important element to avoid making decisions that may affect the economy of the company.
- Evaluation of tenders received. Tenders must be studied, compared and reviewed.
- Supplier selection. The factors compared during the selection process are price, quality, conditions and personal guarantees of the prospective suppliers.
- Negotiation of terms. During this stage a number of points relating to the tender that may be negotiable are discussed and specified.
- Order request. When the buyer and the seller reach an agreement they must draw up a document that commits both parts (sales contract or firm order).
- Order tracking and agreements. This is done to verify that all required material has been received, that it corresponds to the specifications detailed in the order and that it has been delivered on time.

The process can vary from one company to another depending on the principal activity. The company focuses its purchases on the industrial materials used to manufacture the product. The selling company seeks to provide the product at competitive prices.

Sometimes the purchasing process can be long and complex because, in order to make a final decision, information from other companies is required.



## 2.4.Types of purchase

### 2.4.1. *Special purchases*

Special purchases must be made when acquiring fixed assets (computer, machine, furniture, vehicles...).

The general characteristic of these purchases is that the investment is large and the purchase decision is consulted with the end users of the company.

### 2.4.2. *Anticipated purchases*

These purchases are made before the item or service is actually required, which may be in the medium or long term. Advance purchasing is a strategy that can be applied to basic items or certain types of merchandise. We can also bring forward the purchase if there is to be a price increase.

### 2.4.3. *Seasonal purchases*

These are purchases made for seasonal products and the aim is to meet seasonal demand for certain items. Advanced purchase of these items is based on data from the same period of the previous year. In our particular case, we have every year fuel reloads in both plants (one in Trillo and two in Almaraz).

### 2.4.4. *Routine purchases*

These purchases involve small quantities, with daily delivery of merchandise. The objective in this case is to meet every day needs with a low risk investment.

### 2.4.5. *Purchasing opportunity*

A purchase opportunity is when we have the chance to buy at very low prices. The investment may be risky but if the outcome is positive, an economic bonus is gained.

#### 2.4.6. *Emergency purchases.*

These purchases do not involve large volumes and are usually made to cover urgent needs. Sometimes the emergency purchase may be a strategic solution to meet customer demand when the company has to keep pace with changes in fashion.

Usually, the purchasing process is shortened in these cases since there is no time to compare tenders.

#### 2.5. Purchasing Techniques

Once the decision to purchase has been taken, one of the following procedures is then implemented:

- *Electronic orders:* This is a contract to purchase certain items from the supplier. It is not an authorization to send something. The item or service is only supplied after receiving an agreed document, which may be a request or a supply release.
- *Purchase without an invoice:* In a purchasing environment without invoices there is usually a single supplier for all units of a specific product.
- *Electronic orders and transfer of funds:* Electronic orders and fund transfers reduce paper transactions. Electronic orders not only reduce paperwork, but also accelerate the acquisition process.
- *Electronic data exchange:* This is a standard form for transferring electronic information between organizations. For example, data for an order (the order, delivery date, quantity, number of parts, purchase order number, address) are arranged in standard format.
- *Purchase without inventory:* In this case the supplier keeps the inventory instead of the buyer.
- *Standardization:* The purchasing department should make attempt to increase levels of standardization

## 2.6. Purchase planning

One of the functions of the purchasing department is to anticipate the needs of the company. Advance planning requires knowledge of possible suppliers of goods and services. Potential suppliers may be found through one or more of the following:

- Phone books, web pages.
- Official organizations.
- Business and professional associations.
- Newspapers and specialized magazines.
- Fairs and exhibitions

When the purchaser needs to contact the supplier directly to obtain information or even request the purchase, the most common methods used are:

- Arrange a meeting with representatives of the supplier
- Visit fairs, exhibitions and importers (companies that offer foreign brand products at reasonable prices).
- Go to purchasing offices or central markets.

To guarantee long term accessibility of “sensitive” materials and components at combative prices, a host of producers will have to assume risks and difficulties of global sourcing.

When a producer must purchase a certain volume of critical articles under difficult conditions, supply management is appropriate. The higher the indecision of supplier connections, technological improvements and physical availability of those articles, the more important supply control becomes.

Producers can also be engaged in product design at starting levels. In that way, they generate better prices, develop different solutions, select the best pieces and technologies and support in design analysis (Monczka et al. 1994; Burt and Soukup 1985).

## 2.7. Needs analysis

Generally, companies centralize their purchases through a supply or purchasing department using an internal document; a procurement form which details the characteristics of the material required and when it must be available. The unification and coordination of purchasing conditions across business units is hard to master. Compact collaboration inside the company between procurement and other areas is needed to promote international outsourcing.

## 2.8. Request for tender

The proposals and budget request stage within the purchasing process is implemented by companies in the following cases:

- Initial start-up of the activity.
- Purchase of a brand-new product.
- Lack of satisfaction with usual suppliers.
- Expand the range of suppliers.
- Response to advertising received.

However, as the request process implies an economic cost, the request will only be sent to those suppliers whose tender is of interest to us.

Furthermore, depending on the purchasing policy adopted by the company, there are several factors that will influence your decision as to whether you purchase from the manufacturer, wholesalers or both. These factors are:

- Type of product
- Quantity requested in each period.
- Location of the store.
- Services offered by the supplier.

## 2.9. Suppliers

### 2.9.1. What information should we ask for?

Once a list of potential suppliers has been elaborated, they should be contacted either by letter or in person to request the necessary information. This information falls into three categories:

#### *Economic conditions.*

- Price per unit and per lot.
- Discounts
- Costs of packaging.
- Shipping and insurance costs.
- Payment method

#### *Technical conditions.*

- Specifications.
- Quality.
- Special packaging.
- Installation and assembly.
- Warranties.
- Training of users.
- Spare parts and after-sales maintenance.

#### *After-sales service.*

- Delivery time.
- Review of prices.
- Other services.

## 2.9.2. Agreements with Suppliers

It is very important when dealing with a supplier, to include two types of basic clauses:

### 1. *Attached terms that can be included to enhance results*

- *Creation of a rate table based on quantity - money.* Price reductions shall be stipulated by increments in order quantity.
- *Establishment of a discount system.* This is related both to the rate table and to the idea that certain activities can "reward" the diligence of the customer when placing their orders with a given supplier. For example, if an order is placed early enough, production costs can be reduced because it no additional costs are generated such as those related to overtime, additional staff, and so on.
- *Inclusion of a breakdown of prices of materials and added value.* This is especially useful because it allows the client to assess the importance of their orders. Ordering small quantities can sometimes work out more expensive and it may be better to defer the order until a larger quantity is required. When additional costs are detailed in this way it makes it easier to take appropriate decisions.
- *Create a price review formula.* This formula is useful in cases where the buyer depends on the supplier for future provision. The medium and long term agreements signed with a supplier may include dates on which both sides are required to get together to renegotiate certain aspects of their agreement.
- *Consumption forecasts.* These allow the customer to put pressure on the supplier to address the needs identified in the forecasts.
- *Order delivery systems.* It is desirable to segregate concepts such as quantity delivered, characteristics, packaging, delivery date, place and time ... This will

allow any changes to be monitored or corrections to be requested where necessary

2. *Those suppliers that fulfill the strict requirements as regards*

- The amount of a given product we wish to acquire.
- The agreed price.
- Delivery.
- Terms of payment for the products, billing time and so on. There are companies that bill at 30, 60 or 90 days.
- Terms of delivery: at the headquarters of the supplier, customer...
- Characteristics of the packaging so that the product reaches its destination in good condition.

2.9.3. Types of Suppliers

This classification is made adopting the typology from *Kamath & Liker*:

- *Partner Suppliers*. Is the supplier in which you trust more. They are involved from the first time and we have trust with them in terms like deliveries and quality levels.
- *Mature Suppliers*. The supplier is involved after the identification of specifications.
- *Child Suppliers*. Involved after all the specifications have been checked and tested.
- *Contractual Suppliers*. Here there is no need of conversations; our company will obtain an article from the supplier's inventory.

2.9.4. What should we value in a supplier?

Without doubt, the most important aspects are quality and price. However, there are other significant factors that can be categorized according to their level of importance:

### 1. *High importance*

Five factors of high importance will be explained below:

- Supplier delays can seriously affect our business.
- Evaluate supplier performance in previous transactions with us to decide on new agreements.
- If the supplier in question is able to provide customer service, repairs, product changes, etc., these aspects will be positively valued.
- Capability of the supplier to deal with medium and large orders.
- It is crucial that the supplier is an economically sound organization.

### 2. *Medium importance*

Seven factors of medium importance showed next:

- Adaptability to external procedures (flexibility to adapt to our ways of working).
- Reputation (Evaluating the experiences of other clients with a given supplier).
- Attitude of the salesperson (it is important to determine their level of knowledge and interest in the product, their interpersonal skills and cordiality).
- Geographical location (transport links with the supply company location).
- Management competence (assessment of the capacity of a supplier to address specific matters relating to performance, speed, results ...).
- Good communication (communicative fluency to avoid delays in the work processes).
- Previous business undertakings (check previous work carried out by the third-party supplier).



### 2.9.4.1. What should we value in a supplier? (Example)

A company wishes to renew 150 chairs in their offices. After a selection process they have reached a final stage in which the most interesting offers (which appear in the table below) are being considered:

**Table 1.** Economic Conditions

<b>Economic Conditions</b>			
<b>Features</b>	<b>Manufacturer A</b>	<b>Manufacturer B</b>	<b>Manufacturer C</b>
<i>Unit Price</i>	60	80	75
<i>Discount</i>	5%	15%	10%
<i>Transport</i>	1.70 / unit	1.75 / unit	1.60 / unit
<i>Insurance</i>	Included	Included	0.75% / unit
<i>"Volume Discount"</i>	5% (purchase>9,000)	10% (purchase>10,000)	8% (purchase>10,000)

**Table 2.** Quality Conditions

<b>Quality Conditions</b>			
<b>Features</b>	<b>Manufacturer A</b>	<b>Manufacturer B</b>	<b>Manufacturer C</b>
<i>Product Quality</i>	Acceptable	Very Good	Good
<i>Delivery Time</i>	30 days	5 days	30 days
<i>Payment Facilities</i>	Cash	30, 60, 90, 120 days	30, 60, 90 days (no surcharge)

Selection priorities:

- Lower final price
- Quality
- Payment facilities
- Terms of delivery

The manufacturer will be selected in accordance with these criteria, providing the goods with an acceptable quality, giving good payment facilities and appropriate delivery conditions. A product will be chosen if it meets the quality requirements and has the lowest final price, unless the next lowest priced product is of better quality and the amount does not exceed the lowest price by more than 8%.

**Manufacturer A**

*Price:  $60 \times 150 = 9,000 \text{ €}$*

*Discount:  $5\% = -450 \text{ €}$*

*(No rappels applied because the price does not reach 9,000 €)*

*Transport:  $1.70 \times 150 = 255 \text{ €}$*

*Total Price: 8,805 €*

**Manufacturer B**

*Price:  $80 \times 150 = 12,000 \text{ €}$*

*Discount:  $15\% = -1,800 \text{ €}$*

*Rappels:  $10\% = -1,020 \text{ €}$*

*Transport:  $1.75 \times 150 = 262.50 \text{ €}$*

*Total Price: 9,442.50 €*

**Manufacturer C**

*Price:  $75 \times 150 = 11,250 \text{ €}$*

*Discount:  $10\% = -810 \text{ €}$*

*Rappels:  $8\% = -1,020 \text{ €}$*

*Transport:  $1.60 \times 150 = 240 \text{ €}$*

*Insurance:  $0.75 \times 150 = 112.50 \text{ €}$*

*Total Price: 9667.50 €*

**Manufacturer A** offers the cheapest product. However, the delivery is delayed 30 days and the payment period is 30 days.

The second lowest total price is that of **Manufacturer B**. This company offers very good quality, excellent payment terms and short delivery time. Since the quality of the product supplied by this second manufacturer is very good, we apply the condition of 8%. Hence, the choice is made as follows:

**Manufacturer A:  $8,805 \times 1.08 = 9,509.40$  €**

This means that the **Manufacturer B** will be chosen because, even allowing for the increase of 8% in the final price of the products supplied by **Manufacturer B** (9,442.50 €) it is 66.90 € lower than the final price of product A after adding the increment of 8%.

## 2.10. Strategies

The purchasing and procurement strategies should be based on an assessment of requirements and market conditions.

It is necessary to consider issues such as the amount and type of suppliers used the type of relationship to be established with them and the contracts to be entered into as well as the management of each partner and each contract.

Companies in many sectors of the economy are constantly readjusting their businesses to the arrival of new competitors in their field; a situation which favors both suppliers and retailers.

The purchaser attempts to attain better conditions (price, quality and guarantee of the goods purchased), while the seller tries to achieve acceptable profit margins. In the end, the balance of the transaction is the result of team work and coordination in the areas of purchasing, marketing and sales.

The purchasing process involves the acquisition of raw materials, supplies and components for the organization. The activities associated with this process include the following:

- Identification and classification of suppliers
- Evaluating supplier performance
- Negotiating contracts
- Comparison of price, quality and service
- Hiring of goods and services
- Scheduling of purchases

- Establishment of the conditions of sale
- Assessing the value received
- Assessing the quality of products from abroad, if not responsible for monitoring quality control
- Forecasting the price, service and sometimes the changes in the demand
- Specifying how the goods are received

The purchasing process indirectly affects the flow of goods within the supply channel, but not all purchasing activities are the direct concern of the person responsible for logistics. Decisions regarding the selection of the supplier's shipping point, determining purchase quantities, timing the flow of supplies, and the choice of form and methods of transportation of the product are some of the important decisions that affect logistics costs.

The purchasing process is a major component in the majority of organizations because the parts, components and supplies purchased usually represent between 40 and 60% of the total costs associated with obtaining a product. This means that relatively small cost reductions obtained in the acquisition of materials can have a big impact on profits

The quantities purchased and the time of purchase affect the price, costs of transportation and inventory management costs.

One strategy is to buy only to meet the requirements as they arise. This is known as the just-in-time strategy or daily purchasing.

Alternatively, an advance purchase approach may be beneficial, particularly when prices rises are expected). Speculative buying may also occur where buyers attempt to cover future price increases.

Purchase quantities may also be affected by special price reductions offered by sellers from time to time. Buyers may wish to "stock up" at a good price. On the other hand,

buyers may seek to negotiate a good price, but not take delivery of the goods until they are needed, thus avoiding inventory accumulation.

#### 2.10.1. Mixed Strategy

When a standard item has a reasonably predictable seasonal price pattern, lower average prices may be attained by using a mixed strategy of daily purchasing and advance purchasing. Advance purchasing involves buying quantities in excess of current requirements, but not beyond the expected future requirements.

This is an attractive strategy when prices are expected to increase, the additional quantities being purchased at lower prices, although a certain inventory is created and this must be weighed against other price advantages.

On the other hand, daily purchasing is advantageous when prices are falling. The effective combination of these two strategies when the requirements are seasonal can lead to substantial price advantages.

#### 2.10.2. Benefits of a proper strategy

Generally, the benefits of an appropriate procurement strategy are: reducing the supplier base, long-term agreements, frequency in responses and a philosophy of continuous improvement. In this way, the organization ensures that the product purchased meets specified requirements. The type and extent of control applied to the supplier and the product must depend on the impact of the item purchased, that is, its subsequent performance as a final product / service.

### 3. ECONOMIES OF SCALE

#### 3.1. Introduction

The subject at the center of this thesis cannot be viewed without touching on another related area, namely, economies of scale. This can be summarized as a situation whereby the production cost of a single product decreases with the number of units produced.

Economies of scale imply a reduction in the number of companies that can efficiently supply the market. The possibility of benefiting from competition between companies is effectively eliminated. In fact, economies of scale can be very large, such that the most efficient situation consists of a single company supplying the entire market (in this case it is termed a natural monopoly). If this happens, economies of scale can lead to market failures that prevent us from achieving an efficient allocation of resources.

The opposite of economies of scale are diseconomies of scale (decreasing returns of scale). These occur when, in order to double its production, a company must more than double its costs. This situation reflects the presence of inefficiencies in the company or industry, which increase the average costs.

#### 3.2. Economies of scale: internal and external

The internal economies of scale are produced when a company reduces its costs as production increases. By contrast, the external economies of scale are created outside the company, particularly in industry. The external economies of scale are produced when an industry expands, causing a reduction in the costs of all firms involved in that industry.

##### 3.2.1. Internal economies of scale

These occur in the heart of a company for various reasons, such as the adoption of new production techniques, improvements in the quality of inputs or, an expansion in the volume of production.

Imagine, for example, a mobile phone company with a network of antennas that incur maintenance costs of 100,000 € per month. This infrastructure provides coverage

for a total of 10,000 telephone terminals, each of which is used to make 100 minutes of calls per month. Thus, the average cost of network maintenance per minute of call time is 0.10 Euros. Now suppose that the monthly use of telephone terminals increases to 150 minutes. If this increase in service can be offered without expanding the infrastructure, the average cost of maintenance decreases to 0.07 Euros.

### 3.2.2. External economies of scale

These are cost savings generated by the entire industry. Consider, for example, the expansion of Internet which has taken place in the majority of developed countries over the last decade. As a result, telecommunications companies have increased their economies of scale as the increase in its offer has not been proportionally greater than the costs.

### 3.3. Classification of economies of scale according to their origin

There are several factors that can lead to the creation of economies of scale:

- Discounts on the purchase of inputs. A big company can get discounts on the price of inputs when purchasing large volumes. Such discounts are common practice between companies supplying inputs and the purchasers.
- Specialized inputs. As the scale of production increases, the company may have more specialized workers and machines, which increases efficiency and reduces costs.
- Techniques and systems of organization. As the scale of production increases, the firm can improve their techniques for organizing their productive assets.
- Learning. Learning and experience gained during the production process helps towards costs reduction.

## 4. METHODOLOGY

### 4.1.1. Stage 1 - Kick Off

The main purpose of this stage was to have an initial meeting with the company for which the project has been developed (CNAT). At this meeting, the steps to be followed in the optimization project were outlined.

Initial planning was undertaken to define the approximate time needed to carry out the different stages (data collection, situation analysis, improvement proposals and offer requests).

In addition, we asked CNAT for the information and files necessary to complete the project, such as the purchasing notes for all orders made by BravoSolution, and the existing framework agreements.

At the beginning of the work, we explained topics like purchasing process (all of the categories follow the process mentioned before), how to choose the best supplier (in the analysis we will see potential providers and how can we try to sign framework agreements to save time and costs). We can summarize at this point that our challenge will be the task to find improvements and present it to the company.

### 4.1.2. Stage 1 - Data Collection & Classification

CNAT provided us with three files (Purchasing notes issued, Purchasing Codes & Descriptions):

- Purchasing notes issued: Excel file showing the orders issued by BravoSolution during the years 2010 and 2011.
- Purchasing Codes: PDF file detailing the meaning of different purchasing codes used by CNAT for internal planning.
- Descriptions: We requested this Excel file in order to analyze the industrial supplies. It provides a complete and extended description of the purchasing notes of 17 different suppliers.



To perform the analysis, extract the information, etc. the Excel file will be used. To group and classify the different "families" of supplies we will use the file in PDF format.

	A	B	C	D	E	F	G	H	I	J	K	L
1	Trdor	Seccod	Pedido	Revis	Denom	Descemp	Natped	Ultesped	Fultesped	Festpe		
2	TML	VP	GF10VP23341		0 MANTENIMIENTO ANUAL DE LA PLATAF HAULOTTE IBERICA		PB	CC	19-may-11	04-may-10		
3	TML	SF	GF10SF23406		0 SUMINISTRO DE MATERIAL ELECTRICO INABENSA		PM	CC	02-jul-10	13-may-10		
4	ADL	EL	SN09EL19329		1 MONTAJE DE ANDAMIOS PARA TRANSF BURTON		PS	PV	24-may-10	13-may-10		
5	JGFE	CT	SZ10CT03851		0 CUOTA ANUAL CONFEDERACION PROVI COFEG		PB	CC	02-jun-10	26-may-10		
6	TML	SF	GF10SF23506		0 TRATAMIENTO DE HERBICIDA EN ZONA QUERCUS JARDINERA		PB	CC	19-may-11	26-may-10		
7	TML	FS	GF10FS22350		0 SUMINISTRO DE MATERIALES DETECCI TURSON		PM	CC	24-jun-10	27-may-10		
8	ADL	LR	SN10LR22396		0 SERVICIO DE APOYO ADMINISTRATIVO ELECTROMONTAJES ANION		PS	AN	22-jun-10	11-jun-10		
9	JGFE	CI	SZ10CI07969		0 CONVENIO DE COLABORACION CON LA UNIVERSIDAD DE EXTREMADU		PB	PV	28-jul-10	21-jul-10		
10	JGFE	DO	SZ10DO03886		0 Copias exceso fotocopiadoras Ricoh Alm COPIADORAS SUROESTE		PB	CC	13-feb-12	23-jun-10		
11	JGFE	ME	SZ10ME07971		0 MOBILIARIO PARA EL DESPACHO DEL JE MUEBLES SANCHEZ GIL		PM	CC	09-ago-10	29-jun-10		
12	MMD	TB	EC10TB22456		0 REPUESTOS MECANICOS. VEJIGAS PAR OLAER OILTECH IBERICA		PM	AN	09-ago-10	29-jun-10		
13	MMD	TB	EC10TB22472		0 TUBO MEDIDOR ROTAMETRO ABB		PM	CC	13-may-11	30-jun-10		
14	MMD	TB	EC10TB22493		0 SENSOR/TRANSMISOR VE43F001 ENDRESS Y HAUSER		PM	AN	14-sep-10	05-jul-10		
15	MMD	TB	EC10TB22494		0 JUNTAS PLANAS SAIDI		PM	CC	27-sep-11	05-jul-10		
16	TML	AT	EP10AT23795		0 SUMINISTRO DE INTERRUPTORES, BOR COMELEX		PM	CC	10-sep-10	07-jul-10		
17	MRMA	QU	TS10QU22501		0 REACTIVOS DE LABORATORIO : NITRO ACSYR		PM	CC	16-mar-11	08-jul-10		
18	MMD	TB	EC10TB22513		0 MATERIALES PARA PERNOS DEL TURBI SOLJET ENERGIA		PM	CC	06-ene-11	09-jul-10		
19	ADL	TB	EC10TB22516		0 ACEITE REPSOL SERIE 3 SAE-40 REPSOL YPF LUBRICANTES		PM	CC	18-nov-10	12-jul-10		
20	TML	ME	EZ10ME23812		0 SUMINISTRO DE CAMARA TERMOGRAF ADLER INSTRUMENTOS		PM	CC	02-dic-10	12-jul-10		
21	TML	JR	EZ10JR238151		0 REPOSICIÓN DE MATERIAL PARA INGEN KAISER KRAFT		PM	CC	02-dic-10	12-jul-10		
22	TML	SN	EP10SN23825		0 SUMINISTRO DE MATERIAL (PIPE CLIPS PROMEINSA		PM	CC	24-sep-10	14-jul-10		
23	MRMA	TB	EC10TB22543		0 RENOVACION TOTAL PLACAS DE TECHELECTROMONTAJES ANION		PM	CC	09-nov-10	15-jul-10		
24	ADL	TY	EP10TY22571		0 4-MDR-02225-01 MATERIALES PARA SCPROMEINSA		PM	CC	21-sep-10	20-jul-10		

Figure 11. Purchasing Notes (Excel file)

SE - Código Sección peticionaria de la n.e.	
Código	Sección
AH	ADMINISTRACION DE PERSONAL
AL	ALARA TRILLO
AM	ARCHIVO MADRID
AO	ADMINISTRACION
AR	ARCHIVO PLANTA ALMARAZ
AT	INGENIEROS DE SISTEMAS Y M.D.S
AV	ARCHIVO PLANTA TRILLO
CA	CONTRATACION DE PROYECTOS
CC	COSTES Y ESTRATEGIAS DE GESTION
CF	PROTECCION CONTRA INCENDIOS TRILLO
CG	CONTROL DE GESTION
CI	CENTRO INFORMACION C. N. ALMARAZ
CL	GARANTIA Y GESTION DE CALIDAD
CH	APROVISIONAMIENTOS Y LOGISTICA
CN	COMUNICACION
CO	COMBUSTIBLE
CP	COMPRAS
CR	ALARA ALMARAZ
CS	ADMINISTRACION DE SERVICIOS
CT	CENTRO INFORMACION C. N. TRILLO
CY	CERTIFICACIONES Y SEGUROS
DA	DIRECCION DE CONTROL Y MEDIOS
DF	DESARROLLO RR.HH.
DG	DISEÑO Y SEGURIDAD DE RECARGAS
DO	ARCHIVOS
DR	DIRECCION GENERAL
EF	FORMACION ALMARAZ

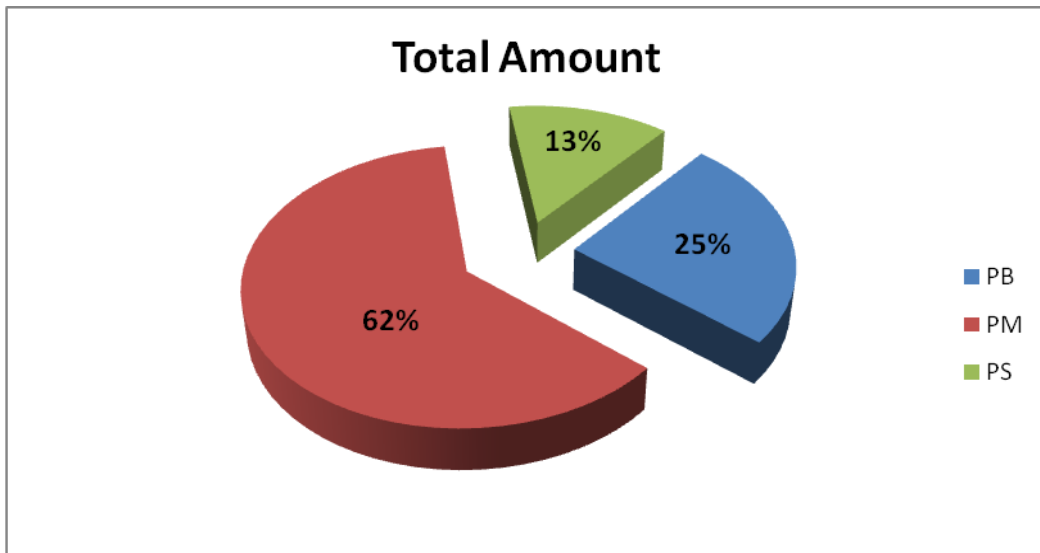
Figure 12. Purchasing Codes (PDF file)

#### 4.2.1. Stage 2 – Analysis of the Situation

For this stage of the analysis we will work with an Excel file using dynamic tables. Previous steps are performed in order to obtain a “global vision”.

- In a first step, the number of purchases made from each supplier along a description of each is generated. This will be useful at a later stage to detect possible similarities in repeated purchases from more than one supplier.
- The total amount of purchases made by BravoSolution from each supplier in the period 2010-2011 is then generated. With this data we can identify the suppliers from which the largest volumes are acquired in economic terms.
- One of the most interesting dynamic tables allows us to verify the number of orders per supplier (potential suppliers or “most used”) . With this information we are able to obtain a global vision of the suppliers with the greatest volume of purchasing notes. This analysis allows us to focus on the suppliers with the largest number of orders.
- Using the initial table which shows all the orders issued, we are able to make a classification into 3 main blocks (a more detailed segregation will be presented later on). These blocks are:
  - o Purchase of Materials
  - o Purchase of Goods
  - o Purchase of Services.

Using this classification we will be able to identify the group with the greatest number of orders and their corresponding percentage of the total. After reviewing and analyzing the Excel file we obtain the following graph (the percentage corresponds to the total amount in €):



**Figure 13.** Total amount in percentages

PB → Goods orders

PM → Material orders

PS → General services orders

Purchases of materials make up the largest amount, with a total sum of 21,780,204.74 € for 2010 and 2011.

The second largest block (for 2010 and 2011) corresponds to the purchase of goods, which totals 8,832,790.88 €.

General service orders make up an amount of 4,706,206.94 €

In order to implement the agreements we must also bear in mind a peculiarity of both nuclear power plants, namely, the existing policy of social responsibility (summarized in three points):

- To support initiatives which promote not only the economic and social development of the communities in which our facilities are located but also the professional development of its inhabitants
- The promotion of activities that support the cultural development of the local area.

- The implementation of initiatives aimed at improving the understanding of the activity undertaken at our facilities and its implications in different areas (academic fields, business, neighborhood...)

#### 4.2.2. Stage 2 – Analysis of specific orders with existing suppliers (General Services)

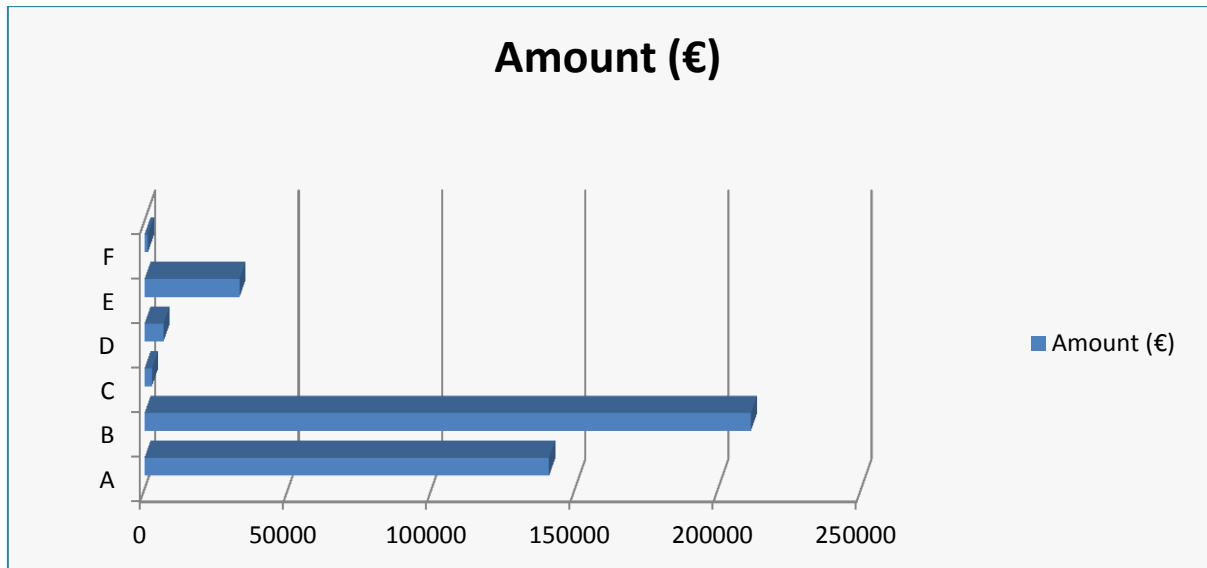
In addition to the elements explained above, we complete the analysis by filtering the Excel "keywords". For this purpose, we considered the orders that might involve a greater load or which were repetitive. The words used for the search were (among others): furniture, office supplies, telephone bills, printing materials, warehouse supplies... Below we present two examples of the post-search analysis (names of the suppliers will not be shown for reasons of confidentiality). Note that the file used covers the years 2010 and 2011.

##### 4.2.2.1. Furniture

After filtering the Excel file using the word "furniture" and verifying that it corresponds to a purchase (in the description column), we obtained the following analysis with six different suppliers and amounts (total and subtotal by supplier).

**Table 3.** Furniture (Orders & Amount)

<b>Supplier</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>Total</b>
<b>Orders</b>	16	12	4	1	1	1	35
<b>Amount (€)</b>	141,040.16	211,514.71	2,570.82	6,592.07	33,140	1,200	396,057.79



**Figure 14.** Furniture (Amount)

From the table and the graph it can be clearly seen that two of the six suppliers (A, B) are the most used. 28 of the 35 total orders (**80%**) correspond to these two suppliers, which in economic terms is 352,554.9€ of a total 396,057.79€ (**89%**).

We have also found that a number of orders for furniture have been recorded incorrectly. For accounting purposes, furniture should be treated as assets order (investments). However, some of these purchases have been classified as orders for materials. We will speak with the client about the need to fix this issue to avoid potential problems in the audit process.

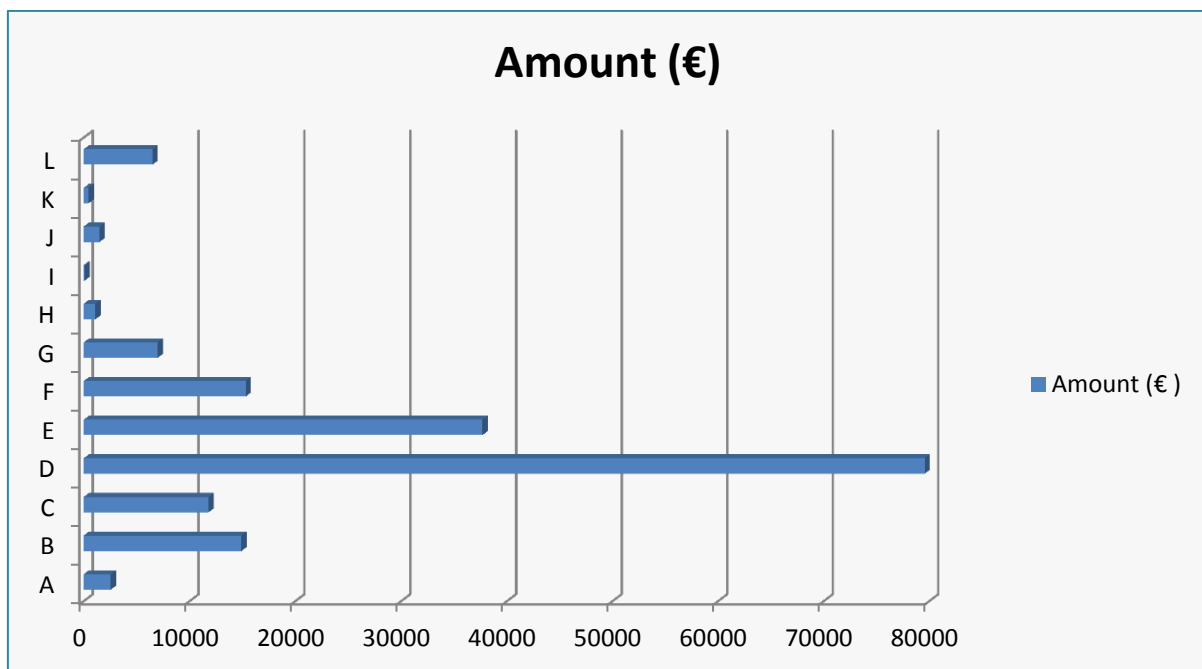
#### 4.2.2.2. Office Supplies

In this particular case, we conducted a search using the sentence "office supplies" to verify the number and amount of orders per supplier. The results are shown in the following graphs.

**Table 4.** Office Supplies (Orders & Amount)

Supplier (12)	Orders (35)	Amount (€)
<b>A</b>	1	2,570.82
<b>B</b>	3	14,916.20
<b>C</b>	1	11,800
<b>D</b>	6	79,575.13
<b>E</b>	3	37,693.95

<b>F</b>	4	15,312.47
<b>G</b>	1	7,000
<b>H</b>	1	1,120
<b>I</b>	1	92.60
<b>J</b>	1	1,500
<b>K</b>	1	467.9
<b>L</b>	1	6,500



**Figure 15.** Office Supplies (Amount)

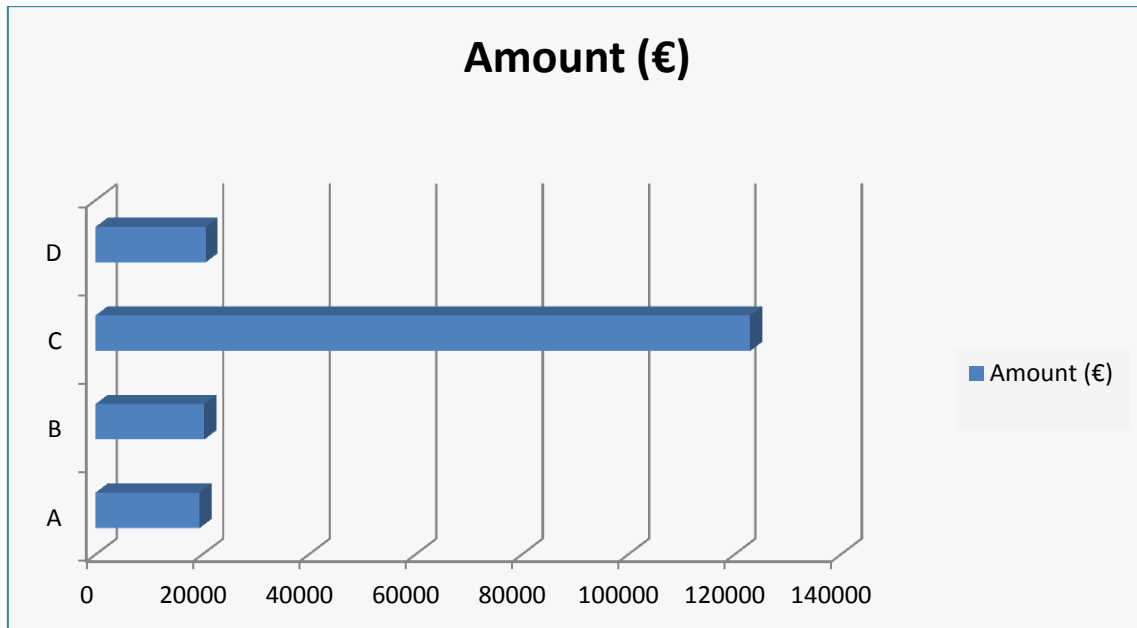
In this case it can be seen that the volume of business corresponding to two of the twelve suppliers (D and E) amounts to 117,269.08€ out of € 141,519.07€ (**82.9%**).

#### 4.2.2.3. Printing Materials

The results are shown in the following graphs / tables

**Table 5.** Printing Materials (Orders & Amount)

<b>Supplier</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>
<b>Orders</b>	3	2	4	1
<b>Amount (€)</b>	19,533.9	20,417.81	122,994	20,675



**Figure 16.** Printing Materials (Amount)

In this case it can be appreciated that 67% of the business (122,994€ out of € 183,620.71€ ) corresponds to one of the four suppliers (C).

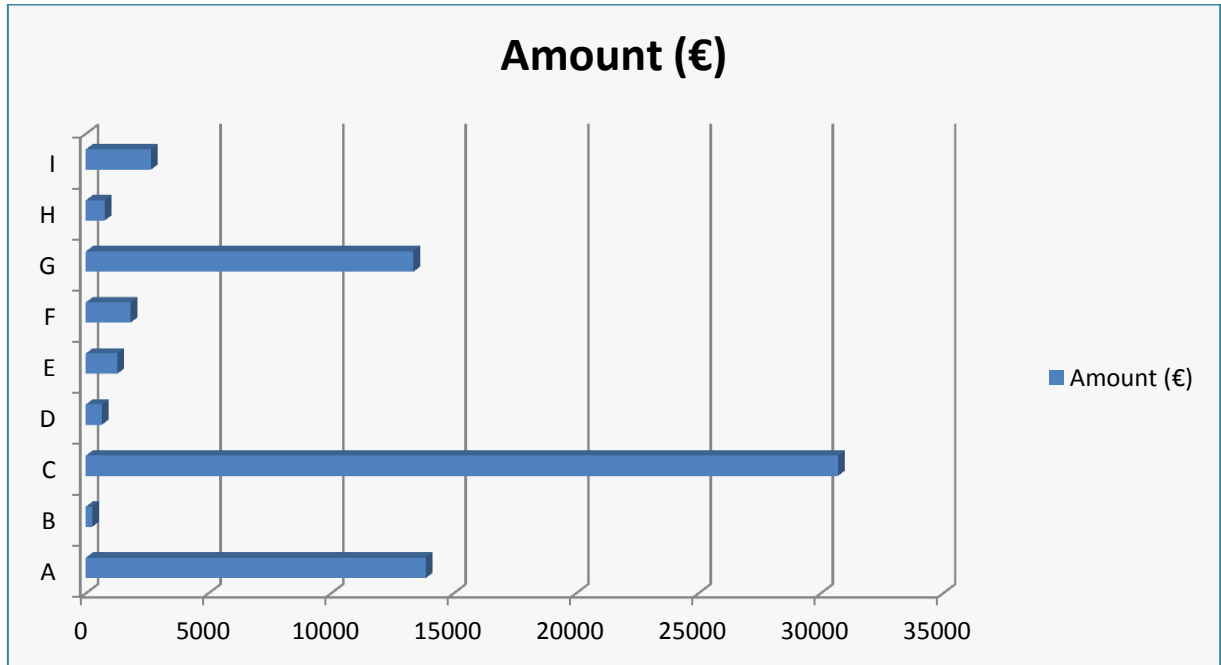
#### 4.2.2.4. Paper

From the analysis of the Excel file containing the purchasing orders, it can be seen that there is substantial paper consumption throughout the organization. For the purposes of the analysis we have removed specific paper orders such as that used in the control room of both plants (few suppliers are specialized in the production of this material). The analysis is summarized in the following table and graph.

**Table 6.** Paper (Orders & Amount)

Supplier	A	B	C	D	E	F	G	H	I
Orders	1	1	5	2	1	2	1	1	1
Amount (€)	13,860	250.9	30,697.46	648.8	1,275	1813,88	13,358	795.5	2,650

In the table it can be seen that there were 15 separate orders for paper from 9 different suppliers in 2010-2011. This section would benefit from grouping suppliers and creating open orders with larger annual amounts to optimize costs.



**Figure 17.** Paper (Amount)

5 orders of the 15 (**33%**) were placed with supplier C; in economic terms, an amount of 30,697.46€ of a total of 65,313.92€ (**47%**).

#### 4.2.2.5. Gifts / Presents

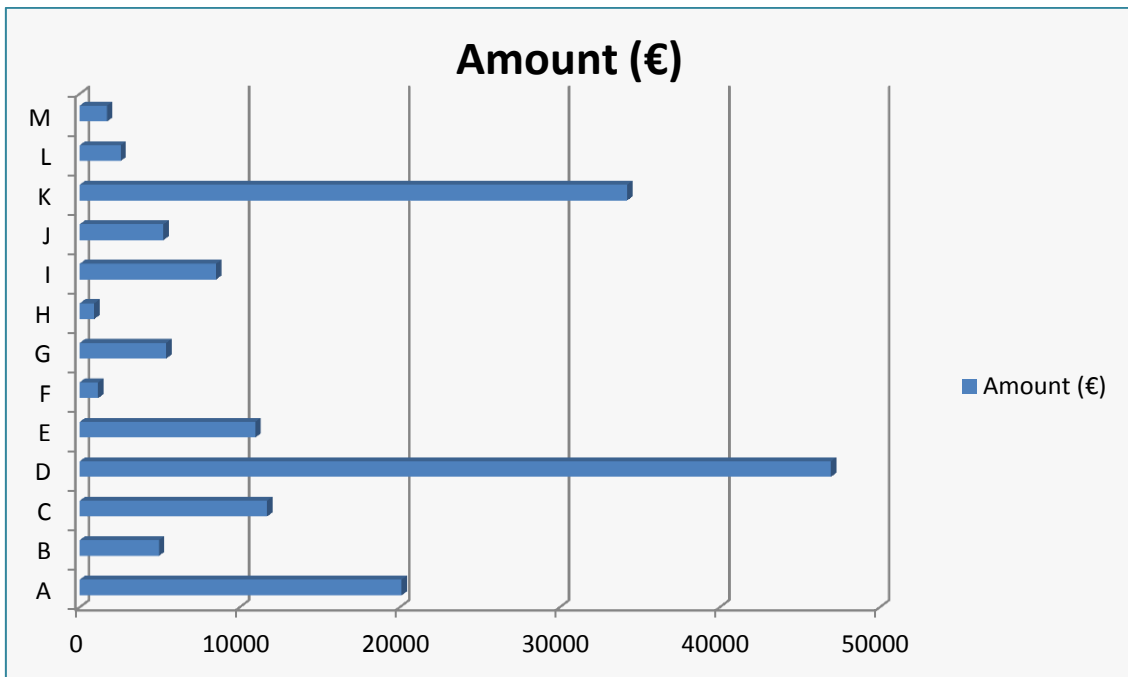
The analysis of the Excel file also revealed that there are two different categories that could be grouped into one. On the one hand there are orders which include the word "gifts" and on the other, those with the word "presents". Both categories comprise orders such as gifts to educational institutions which visit the plants (schools, colleges, universities ...), institutional books with information about nuclear energy, gifts for visiting mayors and other distinguished guests, Christmas gifts for employees of the company etc.

For the purposes of the analysis, separate tables and graphs are elaborated for the orders associated with each word (gift or present). These are then joined together in order to identify the repeated orders. The tables/graphs also reveal the large number of suppliers.



Gifts**Table 7.** Gifts (Orders & Amount)

Supplier (13)	Orders (33)	Amount (€)
A	7	20,118
B	3	4,950
C	3	11,710
D	3	46,936
E	4	10,971
F	1	1,155
G	1	5,400
H	1	900
I	3	8515.45
J	3	5,234
K	2	34,204.14
L	1	2,555
M	1	1,705.5

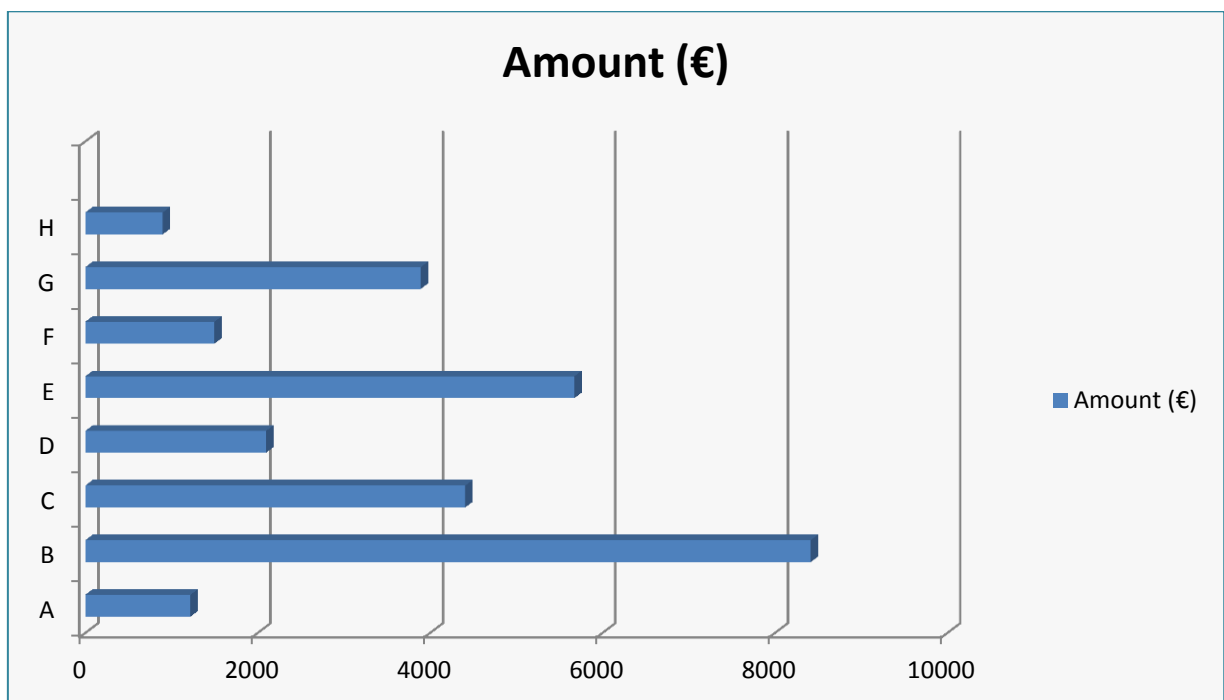
**Figure 18.** Gifts (Amount)

As can be seen from the graph, an economic volume of 101,258.14€ (or **65.6%** of the total) is apportioned to just 3 of the 13 suppliers. If we enter into greater detail, we find that suppliers D and K are those from which the employees' Christmas gifts are ordered. In conclusion, these two suppliers could be grouped.

### Presents

**Table 8.** Presents (Orders & Amount)

Supplier (8)	Orders (12)	Amount (€)
A	1	1,221
B	3	8,417.94
C	1	4,410
D	1	2,098.2
E	3	5,675
F	1	1,500
G	1	3,893.4
H	1	900



**Figure 19.** Presents (Amount)

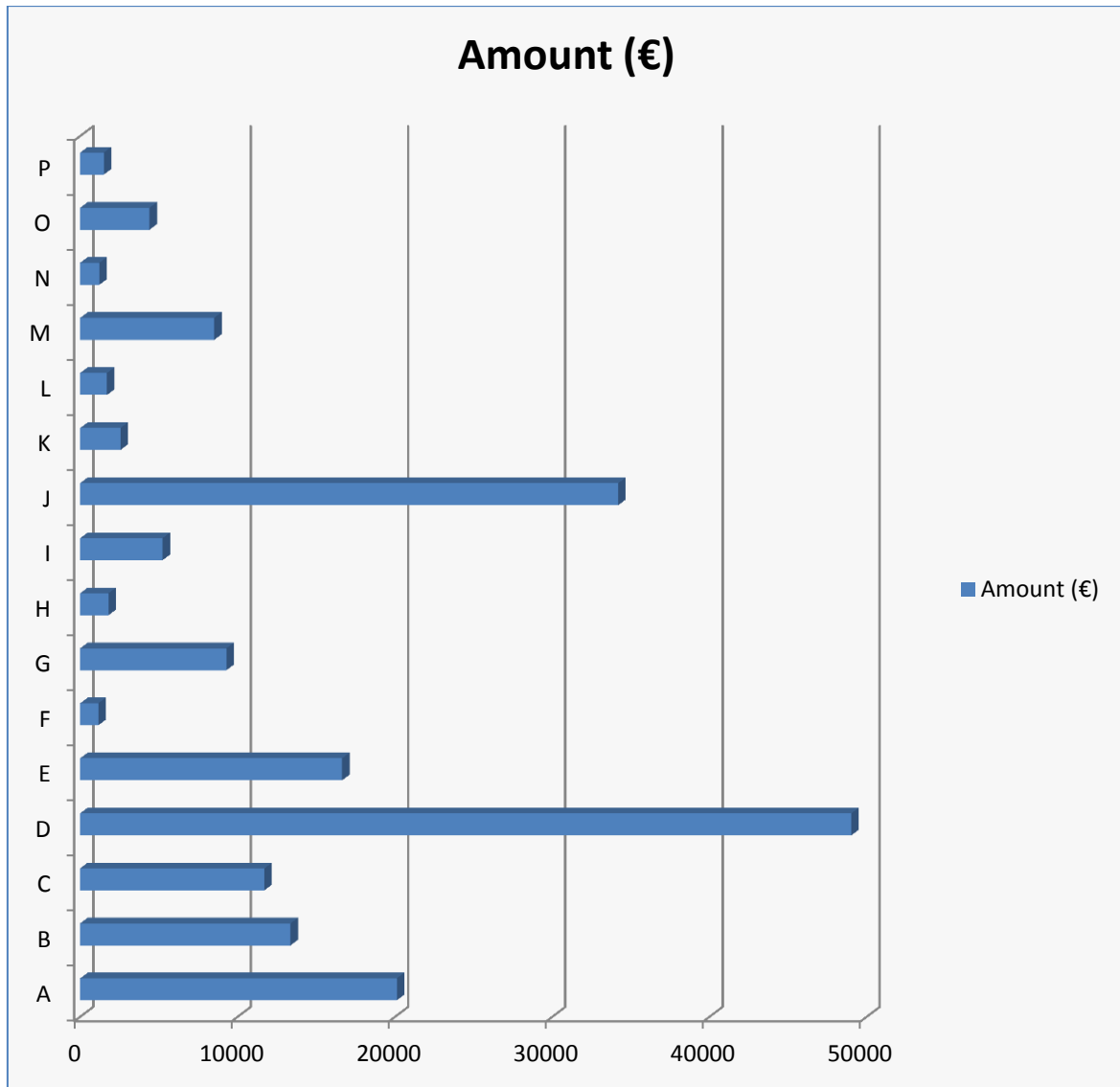
In this case it can be seen that the orders are more evenly split although 6 of the 12 orders correspond to suppliers B and E. Between the two, this represents an economic volume of 14,092.94€ or **50.1%** of the total.

### Gifts + Presents

Now, if we join the two categories the result is 16 different suppliers with a total economic volume of 182,469.63€:

**Table 9.** Gifts + Presents (Orders & Amount)

<b>Supplier (16)</b>	<b>Orders (45)</b>	<b>Amount (€)</b>
<b>A</b>	7	20,118
<b>B</b>	6	13,367.94
<b>C</b>	3	11,710
<b>D</b>	4	49,034.2
<b>E</b>	7	16,646
<b>F</b>	1	1,155
<b>G</b>	2	9,293.4
<b>H</b>	2	1,800
<b>I</b>	3	5,234
<b>J</b>	2	34,204.14
<b>K</b>	1	2,555
<b>L</b>	1	1,705.5
<b>M</b>	2	9,293.4
<b>N</b>	3	8,515.45
<b>O</b>	1	4,410
<b>P</b>	1	1,500



**Figure 20.** Gifts + Presents (Amount)

The graph clearly shows the large spread mentioned above with regard to this area of purchasing. We found 16 suppliers for 45 orders.

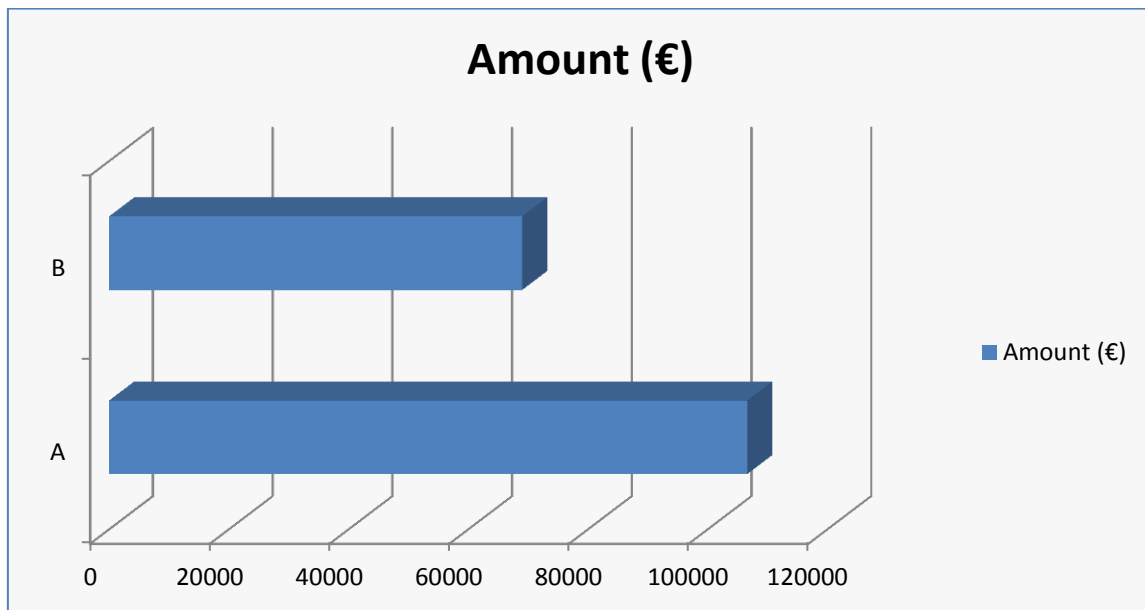
An amount of 83,238.34€ (**45.6% of the total**) corresponds to suppliers D and J. As regards the number of orders, 18 of the 45 (**45%**) correspond to suppliers A, B and E.

#### 4.2.2.6. Courier

In the case of courier services, grouping suppliers would not be necessary (in order to negotiate an open order). The analysis reveals that two suppliers are responsible for the courier services required by the company. Grouping is not done in this case because it is considered prudent to work with two different companies in case one or other of them is unable to respond at any given time (hence the service should always be covered).

**Table 10.** Courier (Orders & Amount)

Supplier (2)	Orders (4)	Amount (€)
A	2	106,597.02
B	2	69,000

**Figure 21.** Courier (Amount)

In this case it can be seen that each supplier has received the same number of orders (2 each), although in economic terms a greater percentage corresponds to supplier A (106,597.052€ or **60.7%**). It may be possible to group the orders and cover the service using just one supplier but it is considered preferable to maintain the current situation to ensure the constant availability of the service.

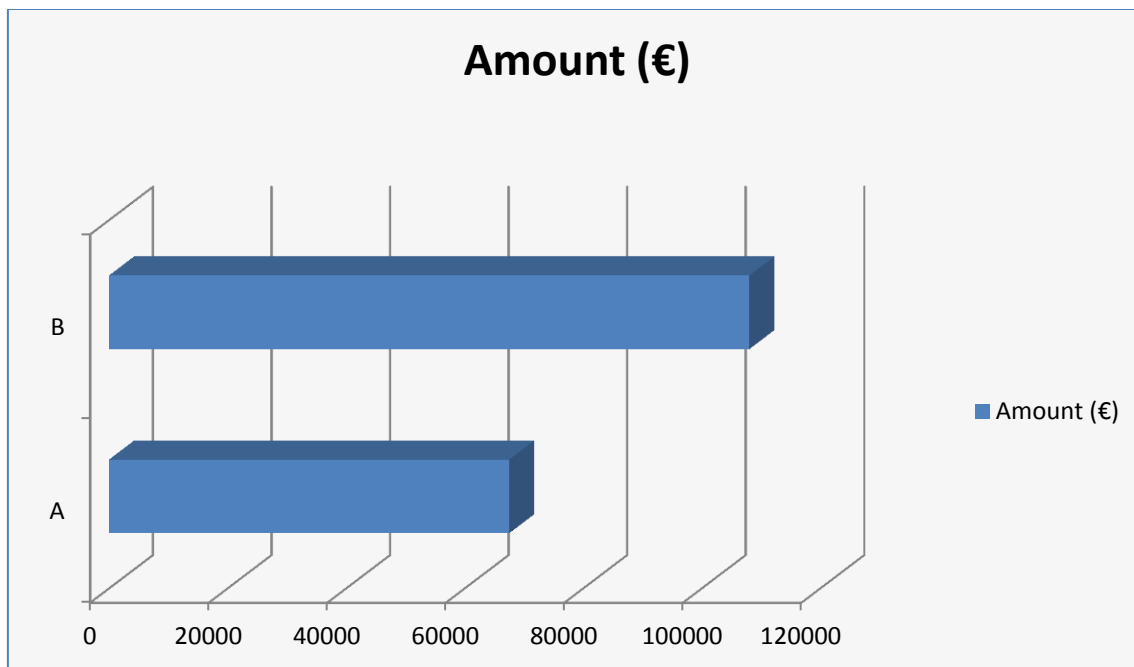
We found that some of the orders in this case were being accounted for as purchases of goods. To fix this issue the company must assign these purchases as services.

#### 4.2.2.7. Fixed- line telephony

This case is similar to that of the courier service. The fixed-line telephony for the plants is split between two different operators. As with the courier services, in order to avoid possible problems due to loss of lines or other technical difficulties in one or other telephone company it is considered necessary to work with two suppliers.

**Table 11.** Fixed line telephony (Orders & Amount)

Supplier (2)	Orders (6)	Amount (€)
A	3	67,523.74
B	3	108,046.95

**Figure 22.** Fixed line telephony (Amount)

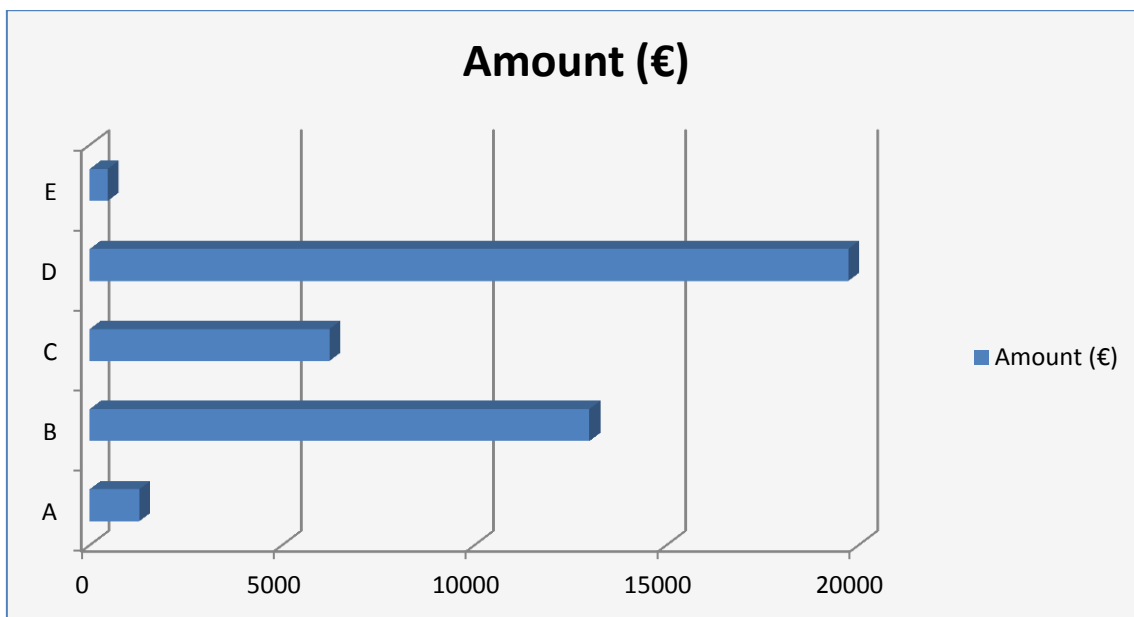
As can be seen from the table, the two suppliers “share” the orders (3 each) although 108,046.95€ (**61.5%**) corresponds to supplier B.

#### 4.2.2.8. Air conditioning

As regards air conditioning, the analysis revealed that there are a large number of suppliers in relation to the number of existing orders. A major impediment relates to the installation of such equipment since external (non-plant) workers must receive a number of health checks and risk prevention courses in order to carry out tasks of any kind within the plants. Hence, what currently happens is that the air conditioning equipment acquired is assembled by workers of the plant.

**Table 12.** Air conditioning (Orders & Amount)

Supplier (5)	Orders (7)	Amount (€)
A	1	1,290
B	1	12,993
C	2	6,228.76
D	2	19,736.28
E	1	467.61

**Figure 23.** Air conditioning (Amount)

Two out of 5 suppliers carrying out the installation tasks and maintenance of air conditioning received 4 out of 7 total orders (**57.14%**) and an economic volume of 25,965.04 € of a total of € 40,715.65€ (**63.77%**).

In conclusion, it may be beneficial to limit the air conditioning equipment to a single supplier (installation and maintenance) in conjunction with "approved" personnel to do the work in the plant.

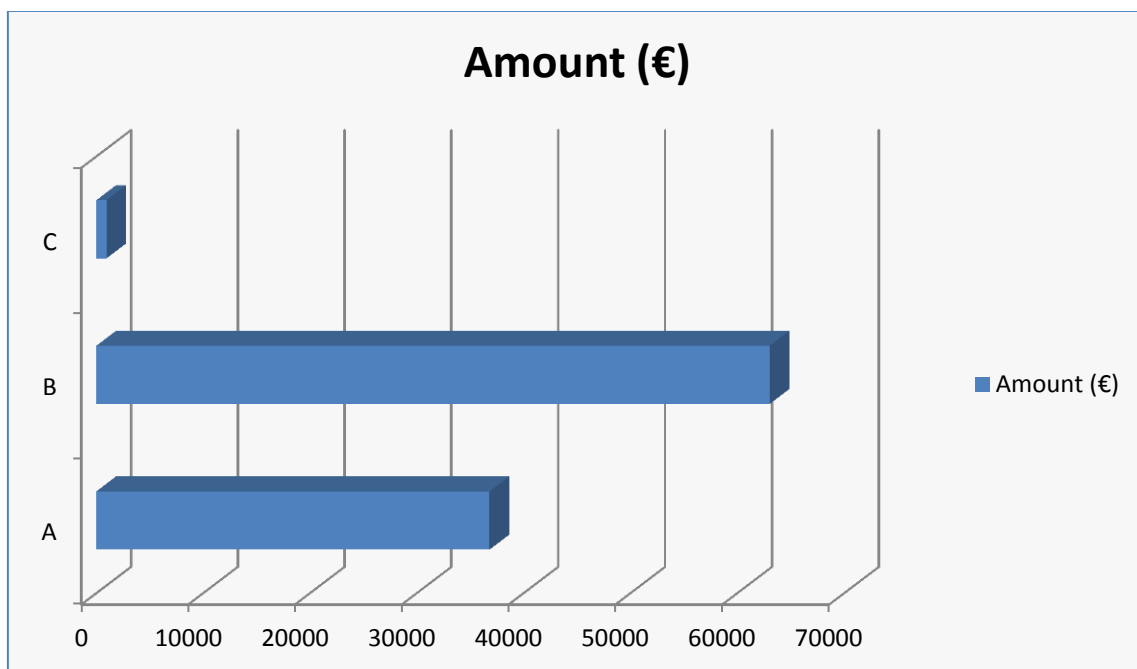
#### 4.2.2.9. Multimedia

In this section we include everything related to multimedia such as video, audio, recording and post – production of corporate contents. Again, in this case it will also be

possible to group everything under one supplier because the 3 companies identified from the data all carry out the same tasks.

**Table 13.** Multimedia (Orders & Amount)

Supplier (3)	Orders (5)	Amount (€)
A	2	36,830
B	2	63,030
C	1	950



**Figure 24.** Multimedia (Amount)

Supplier B was given 2 of the 5 orders (**40%**) and an amount of 25,965.04 € out of a total of € 40,715.65€ (**63.77%**). Supplier B is also a bigger company than the others so, again, it would be possible to group all the orders under the one supplier.

#### 4.2.3. Stage 2 – Analysis of specific orders with existing suppliers (Industrial Supplies)

In this section we undertake a detailed analysis given the singularity of the orders.

We will attempt to verify whether orders for similar industrial components are placed with different suppliers or whether it is possible to make framework agreements to optimize the purchasing processes.



The categories to be analyzed are specific to industrial supplies for electricity generating plants such as valves, gaskets, pumps, electrical equipment...

Two suppliers will be left out of the analysis since they enjoy exclusivity as regards operating tasks in the two plants and therefore their parts are unique and cannot be purchased from other suppliers.

In the first two sections we perform a wide search using the keywords “Mechanical spare parts” and “Supported materials”. We also take into consideration a large number of suppliers.

We then use another Excel file with 17 suppliers that are relatively similar in terms of Industrial Supplies. A more detailed search is then conducted using keywords such as “screws”, “gloves”, “metal sheet”, “pipes”, “cable” etc. The result will provide us with a general idea as regards the most used supplier per amount of orders. Additionally, the creation of framework agreements will be relatively straightforward due to the similarity of the 17 suppliers.

As regards the graphs provided below, it should be mentioned that in some cases the exact percentage is not given but rather, a default estimation (for example: 0.6% → 1% ||| 3.2% → 3%)

#### 4.2.3.1. Mechanical spare parts

Firstly, we searched the excel file to find repeated rows using the keyword "mechanical spare parts." (A more detailed analysis is made later on).

The search returned 188 rows (giving us a general idea as regards some of the supplies purchased). We then searched this data for keywords with specific names of mechanical spare parts. The following table summarizes the results (once again we will not display the name of the suppliers for reasons of confidentiality):

**Table 14.** Mechanical spare parts (Supplier & Amount)

Type of Spare Part	Supplier	Amount (€)
<b>Turbine Set</b>	(A - B)	(562,284.55 – 792.7)
<b>Valves WWPCF</b>	(C - D)	(243,279.88 – 31.84)
<b>Industrial Joints</b>	(E - F)	(460.26 – 255.68)
<b>Spare Parts (Herion Manufacturer)</b>	(G - H - I)	(730.4 – 69,201.55 – 400.24)
<b>Various Valves</b>	(B - I - J)	(289.9 – 6,745.44 – 2,102.23)
<b>Bearings</b>	(D - K)	(463.2 – 22,953.55)
<b>Valves (Ringo Manufacturer)</b>	(C - L)	(12,930.88 – 52,024)
<b>Parts for batteries</b>	(M - N)	(2,299.08 – 859.06)
<b>Bolts &amp; Rods</b>	(O - P)	(1,024.8 – 1,953.6)
<b>Mechanical Seals</b>	(Q- R)	(9,906.66 – 7,463.4)
<b>Rubber boards &amp; Connectors</b>	(I - S)	(93.3 – 2,123.7)
<b>VK11D001 - VK61D001 Equipment</b>	(T - U)	(1,293.75 – 3,067.86)

## 4.2.3.2. “Supported” materials

Performing the search with the keywords returns 73 rows of orders for support materials. We were able to identify three types of supplies that are purchased from different suppliers and which could be grouped into the same "family". Below we present a table detailing these purchases and another that shows the load and the overall amount ordered. The latter of these two tables is particularly useful since it is possible that more types of material can be grouped under the company with the highest percentage.

**Table 15.** “Supported” materials (Supplier & Amount)

Type of material	Supplier	Amount (€)
<b>4-MDR-02643-00 Materials for support *</b>	(A - B)	(244.2 – 959.2)
<b>Materials of catalogue for supported</b>	(C - D)	(307.81 – 255.04)
<b>Clamps &amp; Semi - Clamps</b>	(E - F)	(3,873.9 – 6,512.4)

*\*MDR: Design modification (Plant machinery)*

**Table 16.** “Supported” materials (Orders & Amount)

Supplier (6)	Orders	Amount (€)
A	2	285
B	2	1,269.15
C	10	5,623.82
D	37 (50.7%)	52,308.32 (50.4%)
E	6	6,748
F	16	37,453.31
<b>Total</b>	<b>73</b>	<b>103,687.6</b>

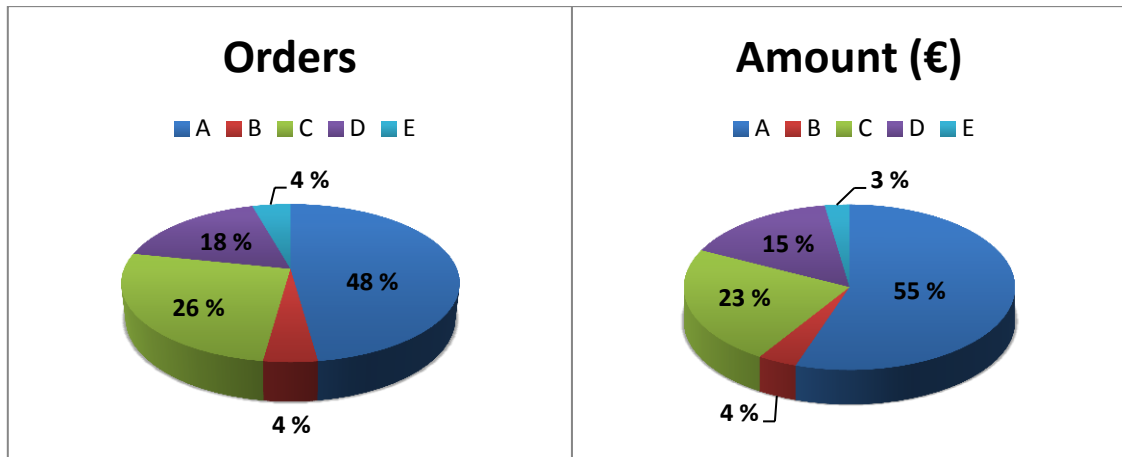
37 out of 73 total orders correspond to supplier D (50.7%), an amount of 52,308.32 € out of a total of 103,687.6€ (50.4%).

#### 4.2.3.3. Chemical Tools

In this section we perform a search using the keyword “chemical tools”. This covers a wide range and includes materials like test tubes, pipettes, flasks etc. The results are detailed in the following table:

**Table 17.** Chemical Tools (Orders & Amount)

Supplier (5)	Orders	Amount (€)
A	11	19,462.39
B	1	1,354.04
C	6	8,189.04
D	4	5,365.70
E	1	846.90
<b>Total</b>	<b>23</b>	<b>35,218.07 €</b>



**Figure 25.** Chemical Tools (Orders & Amount)

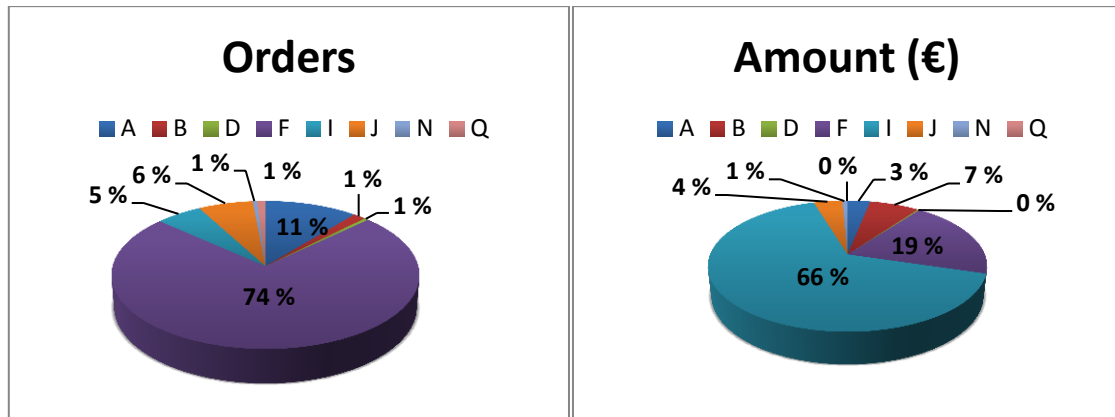
11 out of 23 total orders correspond to supplier A (**47.8%**), and 19,462.39 € out of a total of 35,218.07€ (**50.4%**).

#### 4.2.3.4. O-Rings (Toric joints)

This is a type of gasket that can be found in certain equipment to prevent the exchange of liquids or gases in the connections between removable parts. They are placed in slots located on the closure elements.

**Table 18.** Toric joints (Orders & Amount)

Supplier (8)	Orders	Amount (€)
A	22	1,414.21
B	3	3,105.54
D	1	102.40
F	148	8,758.62
I	11	29,652
J	13	1,788.44
N	1	300
Q	2	14
<b>Total</b>	<b>201</b>	<b>45,135.21 €</b>



**Figure 26.** Toric joints (Orders & Amount)

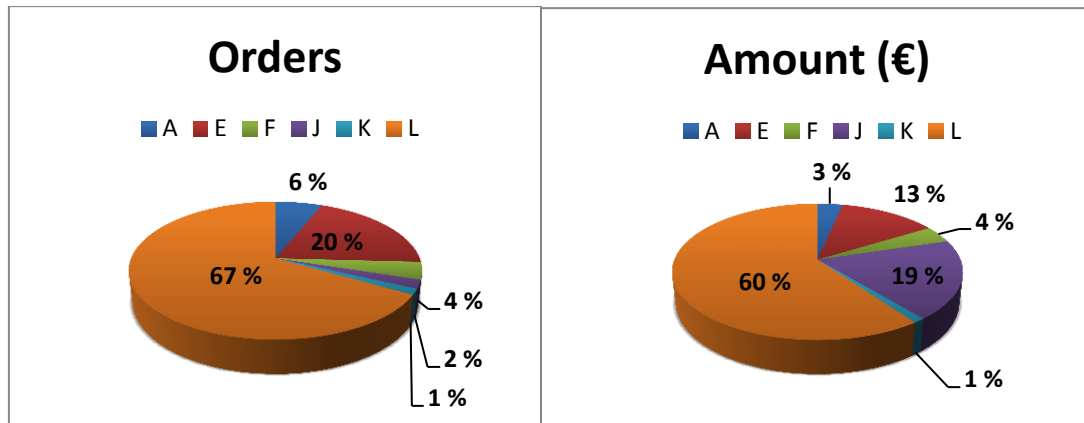
148 out of 201 total orders correspond to supplier F (**73.6%**). As regards the total economic volume, 29,652 € out of 45,135.21 € corresponds to supplier I (**65.7%**). This case is different in that one supplier has the greatest number of orders but another has a greater economic volume.

#### 4.2.3.5. Washers

Commonly used to carry a compressive load. They may be made of steel or plastic.

**Table 19.** Washer (Orders & Amount)

Supplier (6)	Orders	Amount (€)
A	9	395.75
E	29	1,538.40
F	6	479.70
J	3	2,230.60
K	2	134.14
L	98	7,125.6 €
<b>Total</b>	<b>147</b>	<b>11,904.20 €</b>



**Figure 27.** Washer (Orders & Amount)

98 out of 147 total orders correspond to supplier L (**66.67%**), an amount of 7,125.6 € out of a total of 11,904.20€ (**59.85%**).

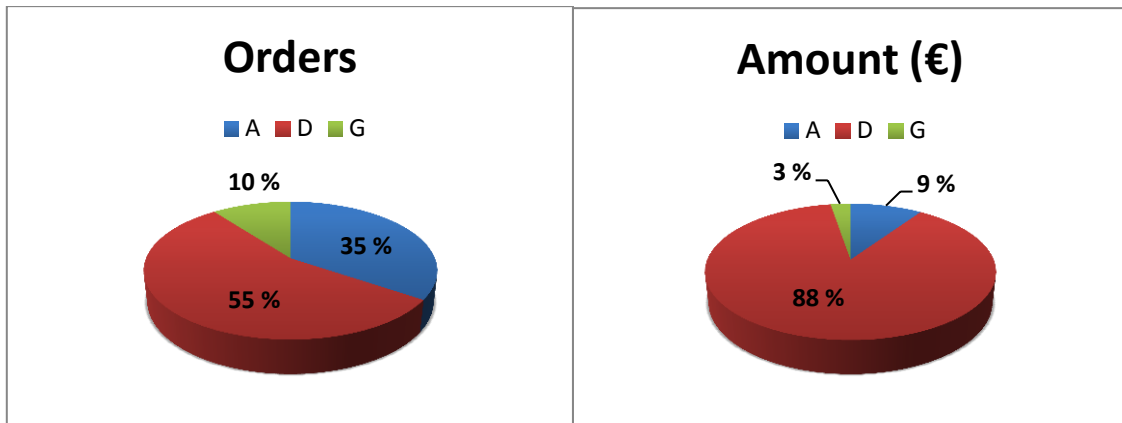
Considering that this is a relatively generic material and widely used in the field of industry, it is possible to establish a framework agreement.

#### 4.2.3.6. Gloves

The organization also coded gloves orders as industrial supplies. Since this type of purchase represents a large sum of money (25,568.92 €) the situation should be analyzed:

**Table 20.** Gloves (Orders & Amount)

Supplier (3)	Orders	Amount (€)
A	10	2,525.92
D	16	23,344
G	3	699
<b>Total</b>	<b>29</b>	<b>25,568.92 €</b>



**Figure 28.** Gloves (Orders & Amount)

16 out of 29 total orders correspond to supplier D (55%) and an amount of 23,344 € out of a total of 25,568.92€ (91.3%).

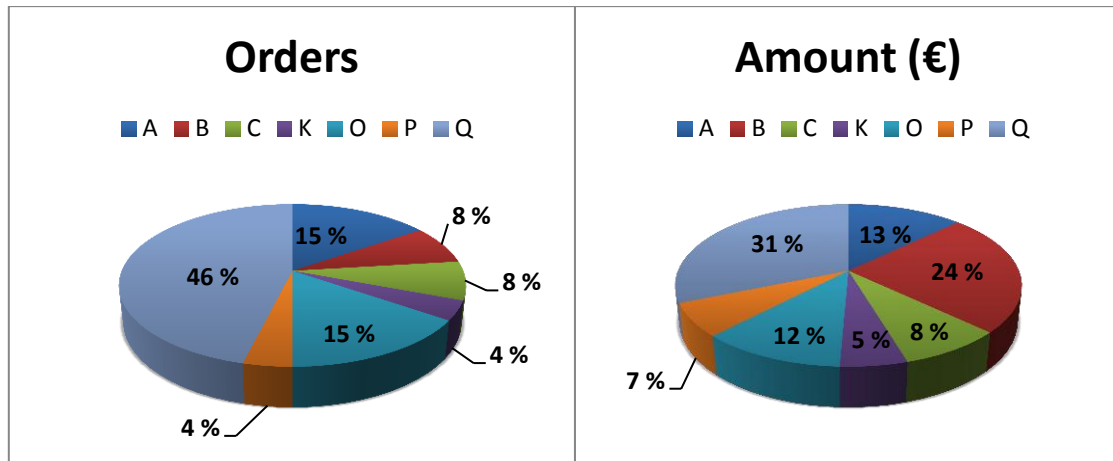
#### 4.2.3.7. Relay

A relay is an electromechanical device that works like a switch controlled by an electrical circuit. It is able to control an output circuit of higher power than the input, so it can be seen, in a broad sense, as a power amplifier.

In this particular case it can be seen that there is a more even distribution of the total economic volume among the suppliers.

**Table 21.** Relay (Orders & Amount)

Supplier (7)	Orders	Amount (€)
A	4	1,475.82
B	2	2,790.21
C	2	956
K	1	610.20
O	4	1,320.26
P	1	758.40
Q	12	3,598.46
<b>Total</b>	<b>26</b>	<b>11,509.35 €</b>

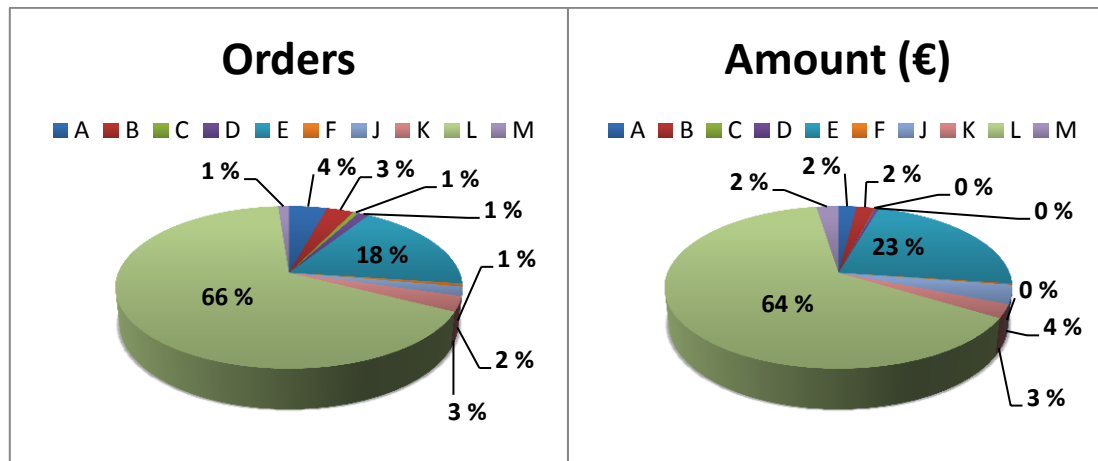


**Figure 29.** Relay (Orders & Amount)

12 out of 26 total orders correspond to supplier Q (**46,1%**) and an amount of 3.598,46 € out of a total of 11.509,35€ (**31,26%**). If we group Q and B (suppliers with the greatest economic volume) we obtain 6.388,67 € and a percentage of (**55,5%**)

#### 4.2.3.8. Screws

Screws, like washers, are common industrial supplies. Hence, it may be possible to reach framework agreements. A search was performed and the following results were:



**Figure 30.** Screws (Orders & Amount)

**Table 22.** Screws (Orders & Amount)



<b>A</b>	<b>7</b>	<b>731.55</b>
<b>B</b>	5	729.80
<b>C</b>	1	15.30
<b>D</b>	2	164.20
<b>E</b>	30	8,276.70
<b>F</b>	1	99
<b>J</b>	3	1,357.60
<b>K</b>	5	976.20
<b>L</b>	110	23,336.2
<b>M</b>	2	896
<b>Total</b>	<b>166</b>	<b>36,582.55 €</b>

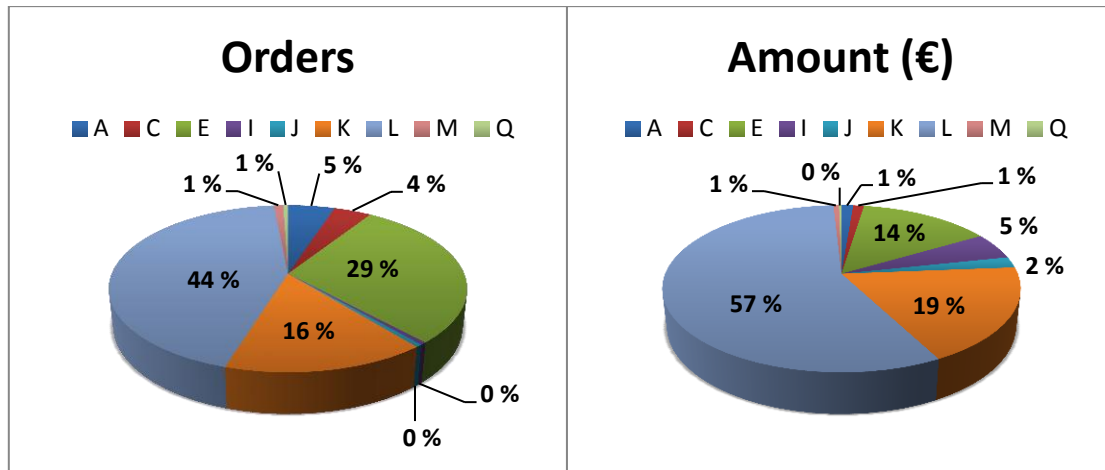
110 out of 166 total orders correspond to supplier L (**66.26%**) and an amount of 23,336.2 € out of a total of 36,582.55€ (**63.8%**).

#### 4.2.3.9. Bolt

Bolt also represent a very common industrial supply. Nine different suppliers were identified and around two hundred orders.

**Table 23.** Bolt (Orders & Amount)

<b>Supplier (9)</b>	<b>Orders</b>	<b>Amount (€)</b>
<b>A</b>	10	358.32
<b>C</b>	8	327.60
<b>E</b>	58	4,022
<b>I</b>	1	1,452
<b>J</b>	1	601.10
<b>K</b>	31	5,298.16
<b>L</b>	87	16,181.13
<b>M</b>	2	170
<b>Q</b>	1	77
<b>Total</b>	<b>199</b>	<b>28,487.31 €</b>



**Figure 31.** Bolt (Orders & Amount)

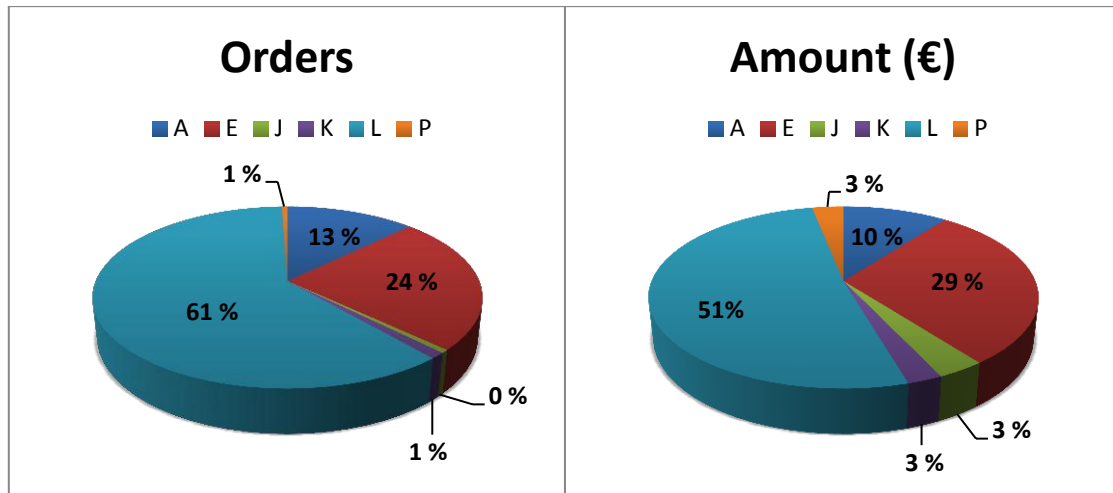
87 out of 199 total orders correspond to supplier L (**43.7%**) and an amount of 16,181.13 € out of a total of 28,487.31€ (**56.8%**).

#### 4.2.3.10. Tinplate

Tinplate is used for mechanical constructions. It comes in different thicknesses, typically from 1 to 12 mm depending on the use and type of manufacturing.

**Table 24.** Tinplate (Orders & Amount)

Supplier (6)	Orders	Amount (€)
A	23	6,985.26
E	44	19,756.60
J	1	2,290
K	2	1,672.28
L	110	34,709.1
P	1	2,091.60
<b>Total</b>	<b>181</b>	<b>67,504.84 €</b>



**Figure 32.** Tinplate (Orders & Amount)

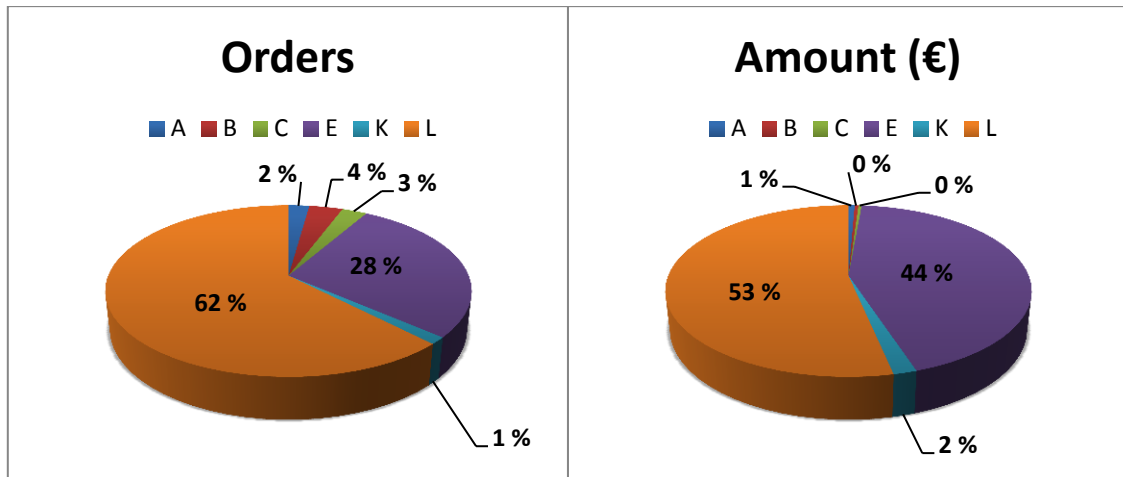
110 out of 181 total orders correspond to supplier L (**60.7%**) and an amount of 34,709.1 € out of a total of 67,504.84€ (**51.4%**).

#### 4.2.3.11. Industrial Profile

These are laminated products, usually manufactured to be used in building structures. It is made with different forms: U, T, double T, right angle (90°) etc. There are a large number of orders for this product which also implies a high economic volume.

**Table 25.** Industrial Profile (Orders & Amount)

Supplier (G)	Orders	Amount (€)
A	5	682.80
B	8	414.71
C	6	362
E	64	45,985.20
K	3	1,845.26
L	142	56,290.85
<b>Total</b>	<b>228</b>	<b>105,580.92 €</b>



**Figure 33.** Industrial Profile (Orders & Amount)

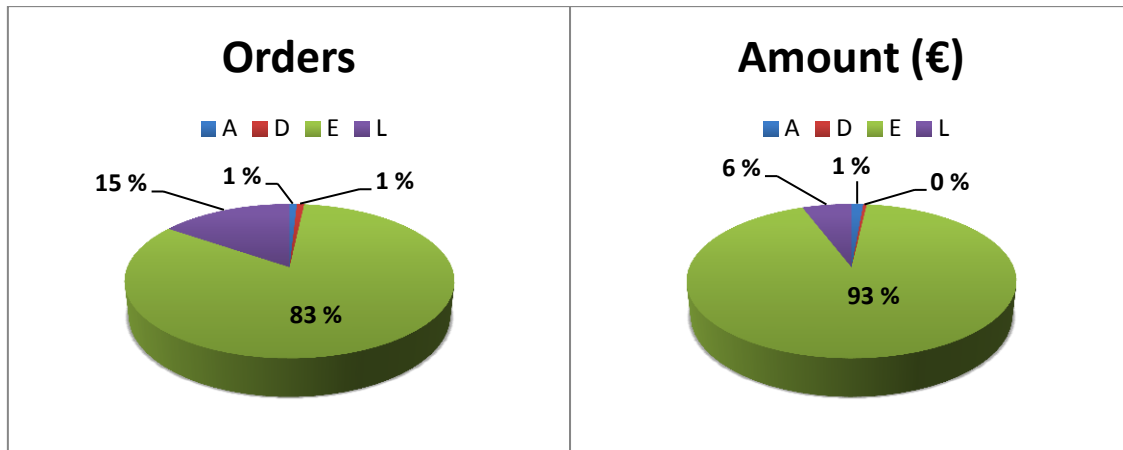
142 out of 228 total orders correspond to supplier L (**62.3%**) and an amount of 56,290.85 € out of a total of 105,580.92€ (**53.3%**).

#### 4.2.3.12. Pipes

In this context, pipes are conduits used for transporting water or other fluids. Such pipes can be made of various different materials depending on the exact function they are to perform. In the transport of high-energy steams, chromium steel is employed. For large volumes of water (cooling) the pipe is manufactured using polyester reinforced with fiberglass, ductile cast iron (up to 2m diameter) or carbon steel.

**Table 26.** Pipes (Orders & Amount)

Supplier (4)	Orders	Amount (€)
A	1	1,288.44
D	1	378.50
E	97	86,952
L	18	5,416.30
<b>Total</b>	<b>117</b>	<b>94,035.24 €</b>



**Figure 34.** Pipes (Orders & Amount)

97 out of 117 total orders correspond to supplier E (**83%**) and an amount of 86,952 € out of a total of 94,035.24€ (**92.46%**).

#### 4.2.3.13. Conduit bodies

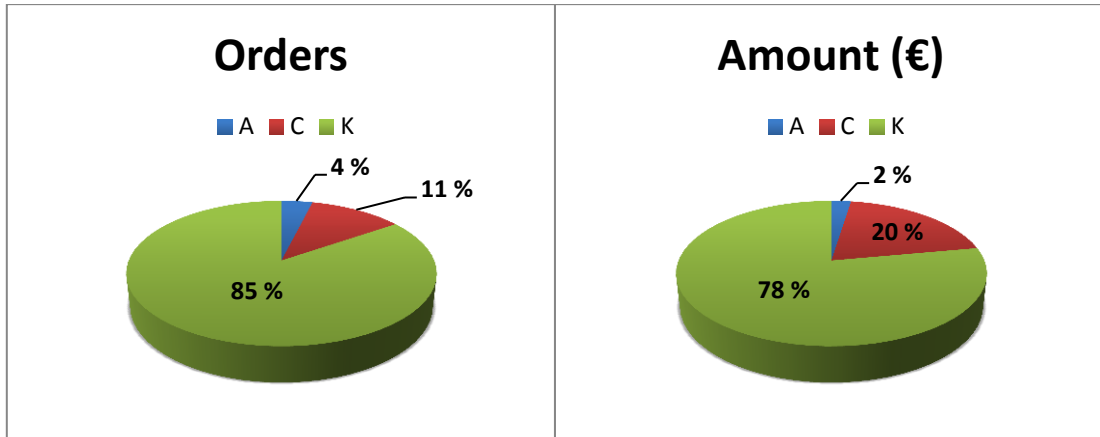
These used as distribution boxes in electrical installations where tubes are used to protect electrical conductors.

Conduit bodies facilitate changes in direction of piping without the need to increase the diameter. They also provide easy access to conductors for improved future maintenance.

In this case, there are only 3 suppliers, one of which has by far the greatest number of orders as well as the largest economic volume.

**Table 27.** Conduit Bodies (Orders & Amount)

Supplier (3)	Orders	Amount (€)
A	2	1,724.10
C	6	14,117.20
K	44	55,842.67
<b>Total</b>	<b>52</b>	<b>71,683.97 €</b>



**Figure 35.** Conduit Bodies (Orders & Amount)

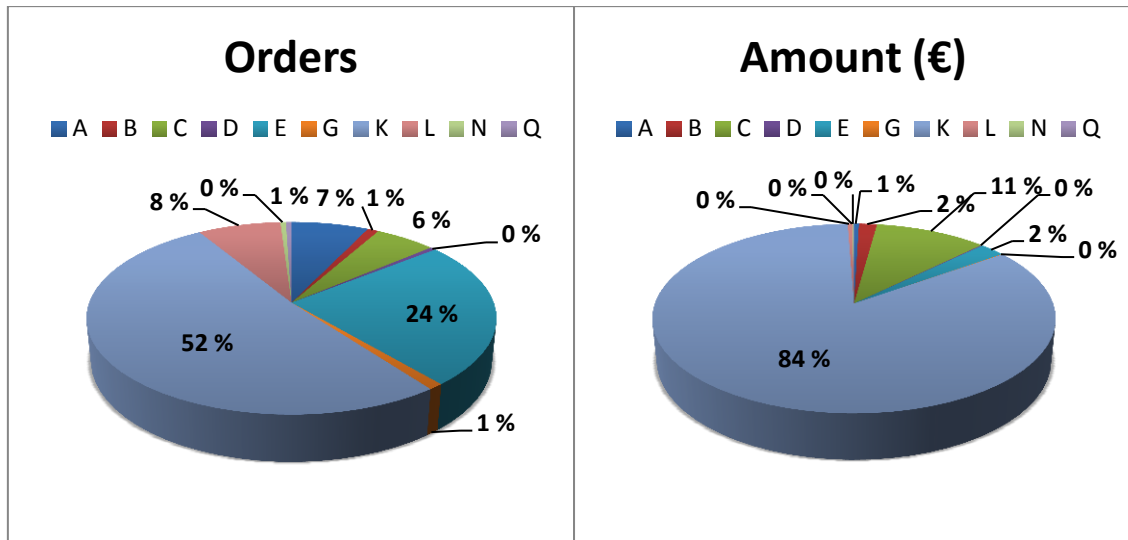
44 out of 52 total orders correspond to supplier K (**84.6%**) and an amount of 55,842.67 € out of a total of 71,683.87€ (**77.9%**).

#### 4.2.3.14. Sleeves

A sleeve is a tube used for joining cylindrical pieces. In this case, the orders have been spread across a large number of suppliers and the almost 200 orders account for a considerable economic volume.

**Table 28.** Sleeves (Orders & Amount)

Supplier (10)	Orders	Amount (€)
A	14	765.47
B	2	2,734.70
C	11	17,084.30
D	1	194.00
E	48	3,856.10
G	2	97.20
K	101	137,417.26
L	15	699.15
N	1	156.00
Q	1	104.50
<b>Total</b>	<b>196</b>	<b>163,108.68 €</b>



**Figure 36.** Sleeves (Orders & Amount)

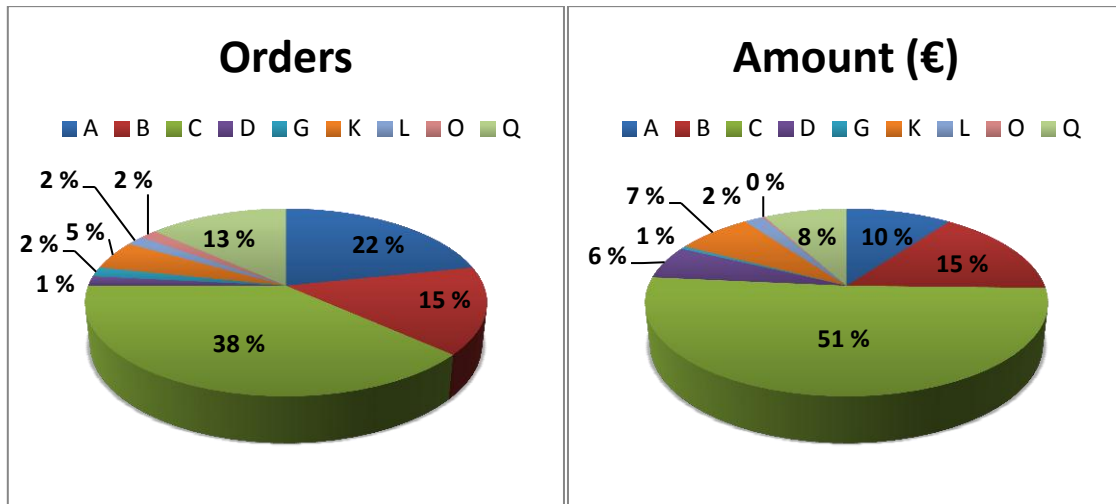
101 out of 196 total orders correspond to supplier K (**51.53%**) and an amount of 137,417.26 € out of a total of 163,108.68€ (**84.25%**).

#### 4.2.3.15. Switches

In this context, a switch is defined as a device used to deflect or interrupt the flow of electric current. In cases where minimum loss of current is required, pure copper is used due to its excellent electric conductivity. The search revealed a number of different types of switches such as automatic, flow, level, pressure and micro switches etc.

**Table 29.** Switch (Orders & Amount)

Supplier (9)	Orders	Amount (€)
A	13	2,249.25
B	9	3,406.06
C	23	11,397.14
D	1	1,279.00
G	1	114.75
K	3	1,616.97
L	1	410.72
O	1	49.10
Q	8	1,769.60
<b>Total</b>	<b>60</b>	<b>22,292.59 €</b>



**Figure 37.** Switch (Orders & Amount)

23 out of 60 total orders, or **38.3%** correspond to supplier C (in this case we observe a greater spread of orders with other suppliers accounting for percentages of 22%, 13%, 15%). The economic volume corresponding to supplier C is 11,397.14 € out of a total of 22,292.59€ (**51.12%**).

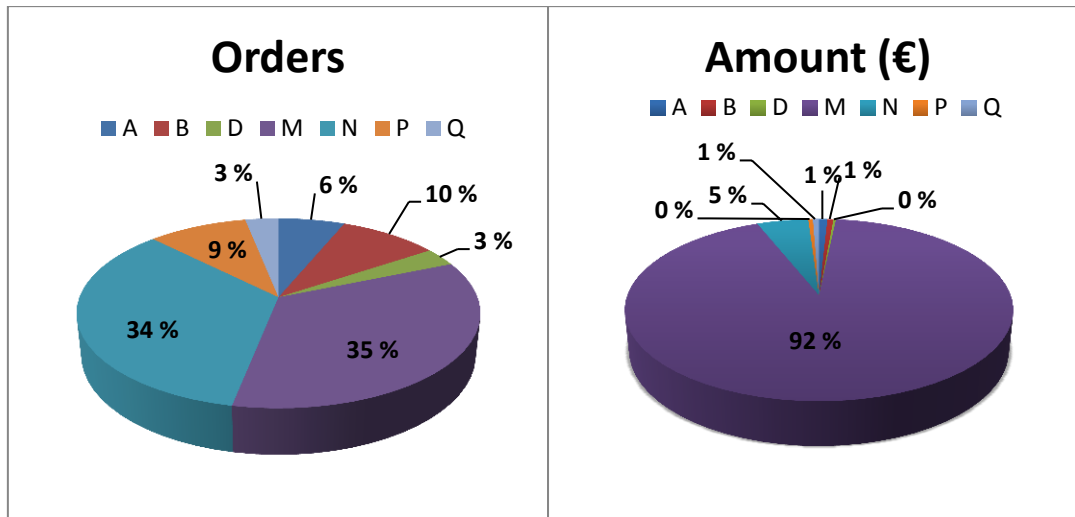
#### 4.2.3.16. Valves (ball)

A ball valve, also known as a "sphere" is a mechanism which serves to regulate the flow and is characterized by a regulatory mechanism located on the inside shaped like a perforated sphere.

**Table 30.** Valves - Ball (Orders & Amount)

Supplier (7)	Orders	Amount (€)
A	2	483.96
B	3	343.95
D	1	140.30
M	11	54,375
N	11	2,944.75
P	3	270.90
Q	1	351
<b>Total</b>	<b>32</b>	<b>58,909.86 €</b>





**Figure 38.** Valves - Ball (Orders & Amount)

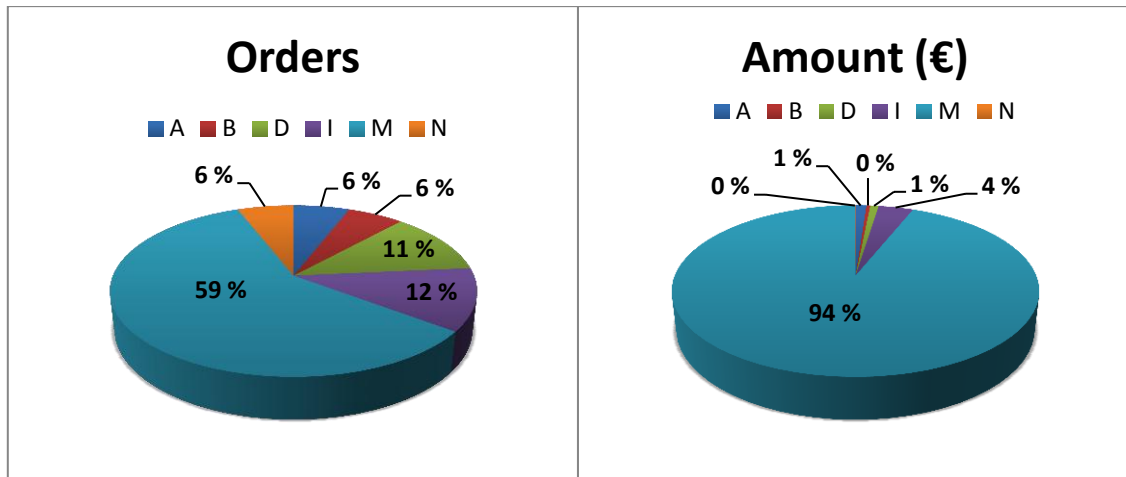
11 out of 32 total orders correspond to supplier M (a similar number to supplier N), which represents **34.37%** of the total. As regards the economic volume, supplier M accounts for 54,375 € of a total of 58,909.86€ (**92.30%**).

#### 4.2.3.17. Valves (retention)

The essential function of a retention valve is to prevent the flow of fluid in a given direction. If the direction of flow is correct, the valve remains open. When fluid pressure drops the valve closes, preventing a decrease in the level of the fluid.

**Table 31.** Valves - Retention (Orders & Amount)

Supplier (6)	Orders	Amount (€)
A	1	1,236.74
B	1	433.11
D	2	931.60
I	2	3,930
M	10	101,190
N	1	46.94
<b>Total</b>	<b>17</b>	<b>107,768.39 €</b>



**Figure 39.** Valves - Retention (Orders & Amount)

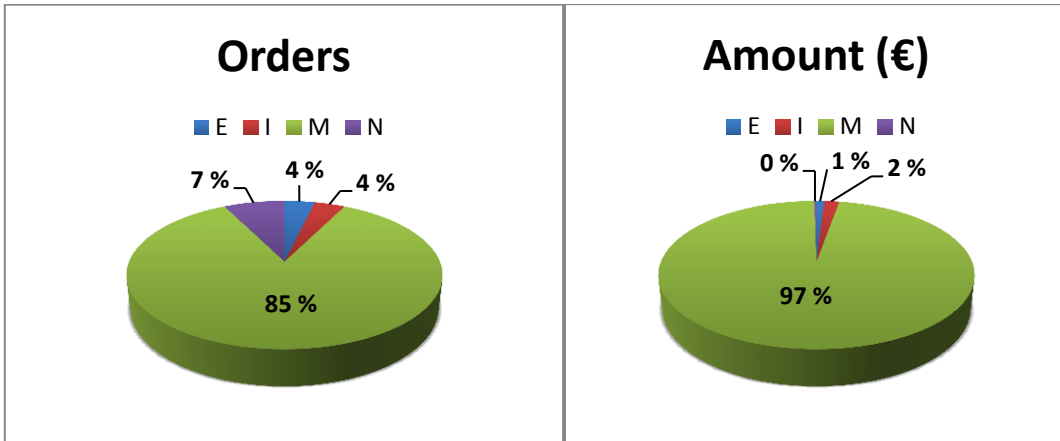
10 out of 17 total orders correspond to supplier M (**58.82%**) and an amount of 101,190 € out of a total of 107,776.39€ (**93.9%**).

#### 4.2.3.18. Valves (globe)

This type of valve consists of a hole, generally round or oval, and a tapered plug, generally disc-shaped, placed at the end of a rod.

**Table 32.** Valves - Globe (Orders & Amount)

Supplier (4)	Orders	Amount (€)
E	1	1,920.60
I	1	3,675
M	23	196,448
N	2	491.24
<b>Total</b>	<b>27</b>	<b>202,534.84 €</b>



**Figure 40.** Valves - Globe (Orders & Amount)

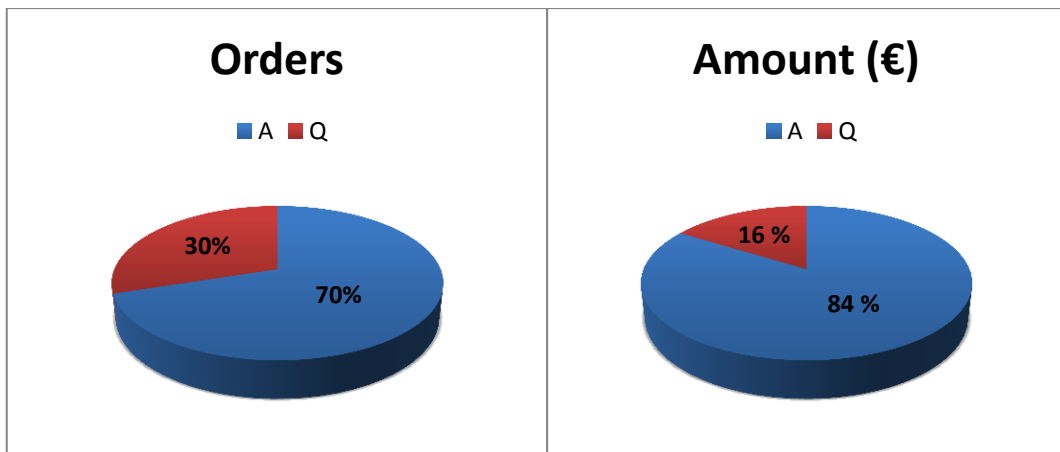
23 out of 27 total orders correspond to supplier M (85.2%) and an amount of 196,448 € out of a total of 202,534.84€ (97%).

4.2.3.19. Valves (electrovalves)

Electrovalves are designed to control the flow of a fluid through a conduit such as a pipe. The valve is controlled by an electric current through a solenoid coil. In this case we only identified orders from two suppliers.

**Table 33.** Valves – Electro valves (Orders & Amount)

Supplier (2)	Orders	Amount (€)
A	7	19,374.47
Q	3	3,726.80
<b>Total</b>	<b>10</b>	<b>23,101.27 €</b>



**Figure 41.** Valves – Electro valves (Orders & Amount)

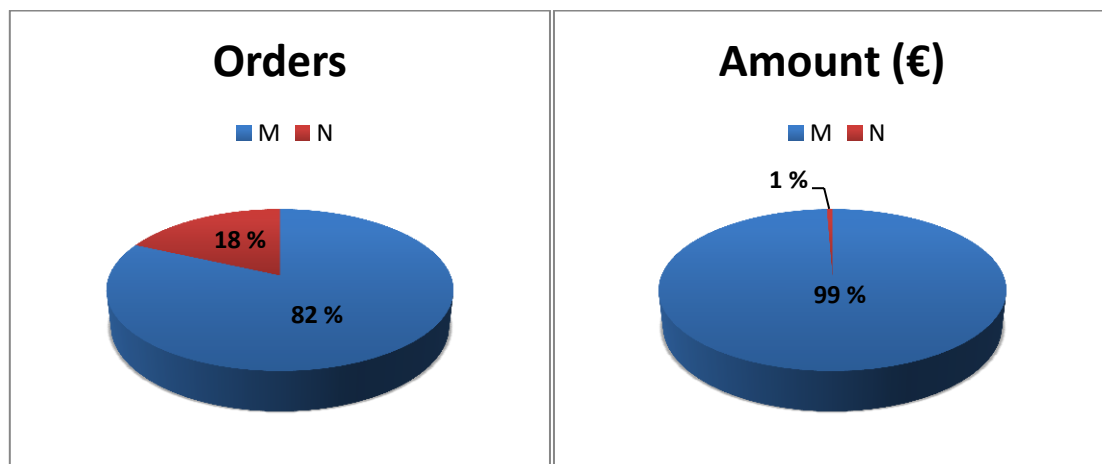
7 out of 10 total orders correspond to supplier A (**70%**) and an amount of 19,374.47 € out of a total of 23,101.27€ (**83.86%**). It seems clear that we could group orders for these valves under one supplier. However, the option of having an alternative supplier should be evaluated as problems may arise with the main supplier.

#### 4.2.3.20. Valves (Gate valves)

These are valves that open by lifting a gate or “blade” (which can be round or rectangular) to allow passage of fluid. They have certain advantages such as high capacity, low cost, simple design and low resistance to movement. Again, there are only two suppliers for this type of valve.

**Table 34.** Valves – Gate valves (Orders & Amount)

Supplier (2)	Orders	Amount (€)
M	9	53,750
N	2	339.36
<b>Total</b>	<b>11</b>	<b>54,089.36 €</b>



**Figure 42.** Valves – Gate valves (Orders & Amount)

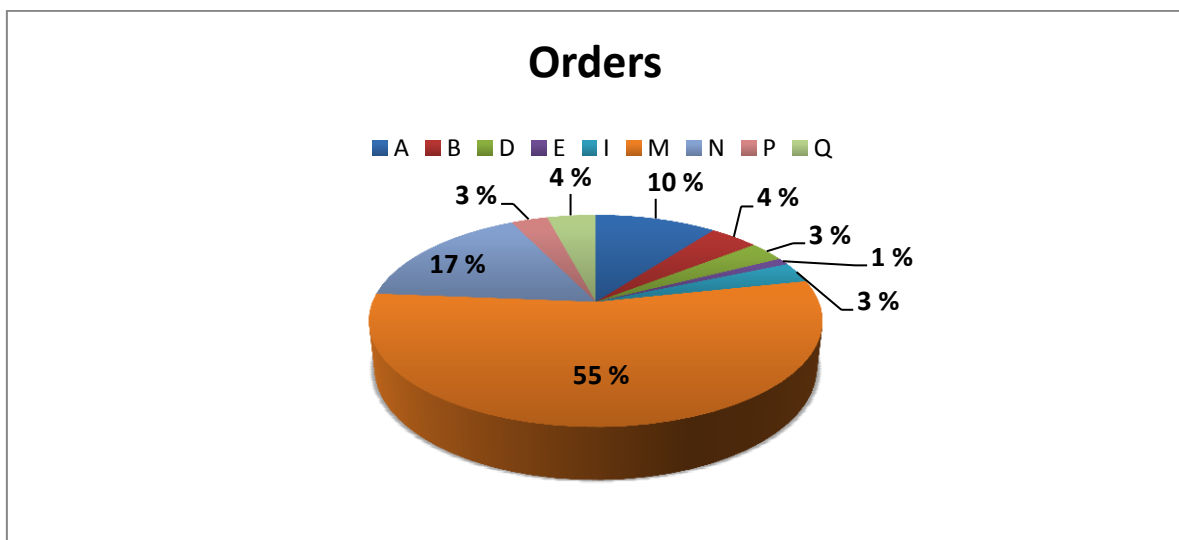
9 out of 11 total orders correspond to supplier M (**81.8%**) and an amount of 53,750 € out of a total of 54,089.36 € (**99.37%**).

## 4.2.3.21. Valves – Overview

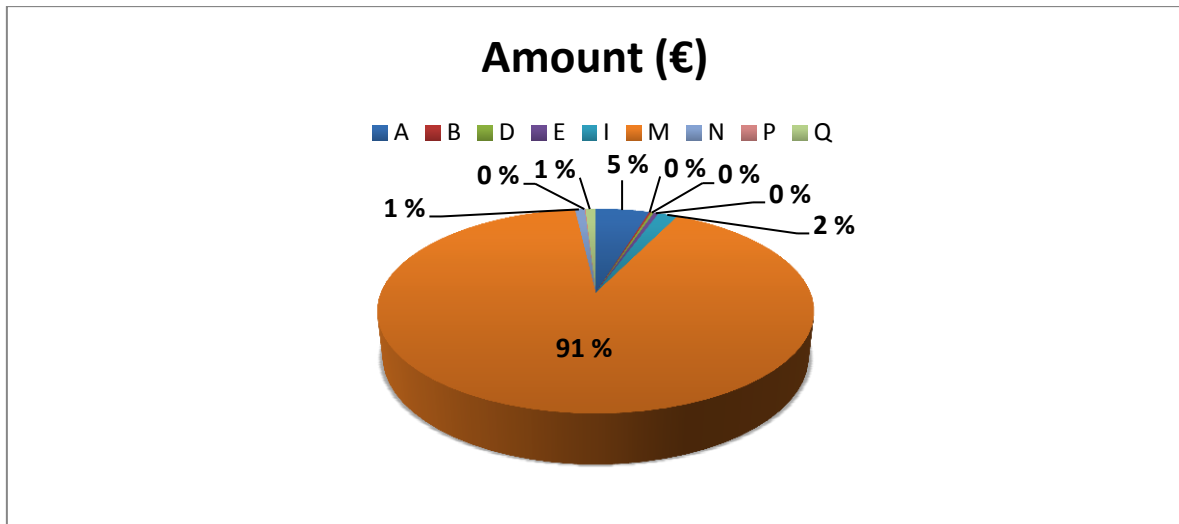
In this final section, all the available data from the previous five sections is pooled in a single table and two graphs in order to determine the main suppliers of these components.

**Table 35.** Valves – Overview (Orders & Amount)

Supplier(9)	Orders	Amount (€)
A	10	21,095.17
B	4	777.06
D	3	1,071.9
E	1	1,920.6
I	3	7,605
M	53	405,763
N	16	3,822.29
P	3	270.9
Q	4	4,077.8
<b>Total</b>	<b>97</b>	<b>446,403.72</b>



**Figure 43.** Valves – Overview (Orders)



**Figure 44.** Valves – Overview (Amount)

53 out of 97 total orders correspond to supplier M (**54.64%**) and an amount of 405,763 € out of a total of 446,403.72 € (**90.9%**). We examined a representative sample which included the five different types of valve and determined that M could potentially meet all the supply needs for these components.

## 5. COMPILATION OF CODES – GROUPING INDUSTRIAL SUPPLIES FOR POSSIBLE CREATION OF FRAMEWORK AGREEMENTS.

After making a detailed analysis of the number of orders and economic volume per supplier associated with the industrial supplies, we attempt to generate “groups”.

Due to the short time schedule available to us, the packages are presented so that the client has enough information to make possible future framework agreements.

The conclusions from the previous section regarding the different types of valves can also be included in this section.

The groups were created after analyzing the industrial supplies offered by different suppliers.

Below are the three groups created and a summary of the percentages of the total (orders & economic volume or amount):

### 5.1. Group 1 – Supplier E

In this case, five different supplies are grouped into one family. The supplies, showing the totals (in red) are:

	<b>PLATES</b>	
	<b>ORDERS</b>	<b>AMOUNT</b>
E	23 (45.1%)	3,207 € (38.40%)
<b>4 SUPPLIERS</b>	<b>51</b>	<b>8,439.86 €</b>

	<b>PIPES</b>	
	<b>ORDERS</b>	<b>AMOUNT</b>
E	97 (83%)	86.952 € (92.46%)
<b>4 SUPPLIERS</b>	<b>117</b>	<b>94,035.24 €</b>

	<b>BRIDLE</b>	
	<b>ORDERS</b>	<b>AMOUNT</b>
E	54 (73%)	4,630.6 € (24.3%)
<b>7 SUPPLIERS</b>	<b>74</b>	<b>19,058.22 €</b>

	<b>PIPE ELBOW</b>	
	<b>ORDERS</b>	<b>AMOUNT</b>
E	99 (66.4%)	61,037.31 € (86.8%)
<b>8 SUPPLIERS</b>	<b>149</b>	<b>70,263.88 €</b>

	<b>FIXING STUD</b>	
	<b>ORDERS</b>	<b>AMOUNT</b>
E	56 (71.8%)	7,692.8 € (50%)
<b>3 SUPPLIERS</b>	<b>78</b>	<b>15,391.22 €</b>

**Table 36.** Group 1 – Supplier E

	<b>ORDERS</b>	<b>AMOUNT</b>
<b>GROUP TOTAL</b>	<b>329 (70.15%)</b>	<b>163,519.71 € (78.92%)</b>

Creating a group in this way for selected industrial supplies, it can be seen that a high percentage of orders are covered (70.15%) and an economic volume of 78.92%.



## 5.2. Group 2 – Supplier K

In this case three products are grouped. The supplies, with the totals shown in red, are:

SLEEVES		
	ORDERS	AMOUNT
K	101 (51.53%)	137,417.26 € (84.25%)
<b>10 SUPPLIERS</b>	<b>196</b>	<b>163,108.68 €</b>

CONDUIT BODIES		
	ORDERS	AMOUNT
K	44 (84.6%)	55,842.67 € (77.9%)
<b>3 SUPPLIERS</b>	<b>52</b>	<b>71,683.97 €</b>

CONDUIT TUBES		
	ORDERS	AMOUNT
K	23 (76.67%)	38,065 € (83.5%)
<b>3 SUPPLIERS</b>	<b>30</b>	<b>45,578.34 €</b>

**Table 37.** Group 2 – Supplier K

	ORDERS	AMOUNT
GROUP TOTAL	168 (60.43%)	231,324.93 € (82.50%)

Again, a high percentage of the orders are included (60.43%), accounting for an even greater percentage of the economic volume (82.50%).

## 5.3. Group 3 – Supplier L

Seven products are grouped in this case. The supplies, with the totals shown in red, are:

WASHER		
	ORDERS	AMOUNT
L	98 (66.67%)	7,125.60 € (59.85%)
<b>6 SUPPLIERS</b>	<b>147</b>	<b>11,904.20 €</b>

CIRCULAR GASKET		
	ORDERS	AMOUNT
L	27 (38%)	6,567.24 € (70.58%)
<b>6 SUPPLIERS</b>	<b>71</b>	<b>9,304.12 €</b>

BOLTS		
	ORDERS	AMOUNT
L	110 (66.26%)	23,336.2 € (63.8%)
<b>10 SUPPLIERS</b>	<b>166</b>	<b>36,582.55 €</b>

NUTS		
	ORDERS	AMOUNT
L	87 (43.71%)	16,181.13 (56.8%)
<b>9 SUPPLIERS</b>	<b>199</b>	<b>28,487.31 €</b>

FILTERS		
	ORDERS	AMOUNT
L	4 (25%)	8,823.84 € (62.65%)
<b>7 SUPPLIERS</b>	<b>16</b>	<b>14,084.51 €</b>

TINPLATE		
	ORDERS	AMOUNT
L	110 (60.77%)	34,709.10 € (51.41%)
<b>6 SUPPLIERS</b>	<b>181</b>	<b>67,504.84 €</b>

INDUSTRIAL PROFILE		
	ORDERS	AMOUNT
L	142 (62.3%)	56,290.85 (53.3%)
<b>6 SUPPLIERS</b>	<b>228</b>	<b>105,580.92 €</b>

**Table 38.** Group 3 – Supplier L

	ORDERS	AMOUNT
GROUP TOTAL	404 (40%)	152,952.96 € (55.93%)

## 6. CASE STUDY – MULTIMEDIA PROJECT OPTIMIZATION

For an overall idea of the steps that are followed in order to optimize a particular purchasing process, we will take as an example, an optimization that has been carried out during the 6 month duration of my internship. The steps described are, in most cases, common to other purchases.

Note that other processes that have been analyzed are currently under consideration by CNAT for possible new framework agreements (especially those related to industrial supplies and that are more complex. Therefore, given the lack of time available with regard to the latter, we present the following case, detailing the process followed.

Again we have had to remove data as regards suppliers for confidentiality reasons.

### 6.1. Purchase Note

The first step in the optimization process is the generation of a purchase note produced by the demanding unit (in this case CNAT). This must contain information such as:

- Description of supply / project / service
- Date of requirement
- Reason for the necessity
- List of possible suppliers (if available)
- Initial Economic evaluation.

Once the purchase note has been produced, the "Workflow" begins.

### 6.2. Technical specifications

This is a document generated by the demanding unit which details the technical conditions to be met by companies offering their services. The technical specifications for the multimedia process (post-production & editing of audio and video) are shown below. This document describes what has to be done in the projects and services contracted. It specifies the relationship that is to exist (and which

must be satisfied) between the owner and the executor of any project, service or administrative concession.

**TITLE: SPECIFICATION FOR TENDERS FOR THE RECORDING, EDITING AND POST-PRODUCTION OF VIDEO.**

**1. PURPOSE**

The present specification is to establish the technical conditions for tenders for the recording, editing and post-production of a 'First Aid' training VIDEO aimed at CNAT staff.

**2. SCOPE OF SERVICE**

The work requested involves the recording, editing and post-production of a piece of "Corporate Video", which will last approximately ten (10) minutes. The work is to be carried out at the CNAT installations.

In order to make the piece of video, the company hired must provide the necessary technical equipment (lighting, sound, etc). Additionally, they must specify the work process to be followed in advance for approval by CNAT.

**3. TECHNICAL SPECIFICATIONS**

The recording will take place in three (3) different rooms designated for the purpose at the CNAT headquarters. The tender must include at least the following items:

**3.1 Pre-production & Project:** preparation and study of the project, creation and screenplay adaptation, specialist consulting.

**3.2 Recording:** two (2) days of recording: recording staff, technical material.

**3.3 Editing and post-production:** editing, Post-production

**3.4 Sound and lighting:** hall, dump mixes, speech on “*off*” and “*live*”, music library, lighting materials

**3.5 Direction and production:** staff shuttle service, meals and Production Coordinator

#### 4. SUBMISSION OF TENDERS

Tenders shall be submitted for the required work including all the specified conditions (installation of equipment, shuttle of personnel, etc...).

A sufficient breakdown of unit prices must be provided to permit an economic evaluation of the service. Tenders that do not permit evaluation and comparison as stated in this document will be rejected.

For any inquiries about the content of this specification, or in general regarding the required work, companies may contact the Environmental Section of CNAT.

#### 6.3. Company tenders

A search was made for suppliers, taking into account the type of work to be performed. The table below shows the suppliers contacted, associated data and whether or not they have submitted a tender. Again, for reasons of confidentiality, names of companies and other specific information is withheld.

**Table 39.** Company Tenders

COMPANY	VAT	Corp. Name	City	P.Code	Address	Contact Person	e-Mail	Phone n°	Tender
A	XX	A S.L.	Madrid	28010	Calle Zur	Rodrigo	prod@A.com	9131020	<b>Received</b>
B						Gustavo	info@B.com	6538162	<b>Received</b>
C						Anabel	anabe@C.com	9163239	<b>Received</b>
D						Alfonso	info@D.es	6579705	<b>Received</b>
E	XX	E S.L.U.	Madrid	28004	Calle Arge	Alvaro	alvaro@E.com	9170201	<b>Received</b>
F	XX	F S.L.	Madrid	28050	Av. Man	Marifé	m@F.com	6398864 6565826	<b>Received</b>
G	XX	G S.L.	Madrid	28036	Profesor Waks	Antonio	in@G.com	91 81756	XXX

In this particular case, we contacted 7 different suppliers, 6 of which had submitted tender bids in accordance with the specifications supplied by CNAT. In the following section we will present an example of budget presented by a company (translated into English).

**TENDER BID FOR C.N.A.T.:**

**2 Days of production + filming: 1,000 Euros**  
**3 Days of editing / post-production: 1,200 Euros**  
**Rental of 2 cameras and accessories: 800 Euros**  
**Lighting equipment: 400 Euros**  
**Second camera operator: 500 Euros**  
**2 Days of live sound recording: 1,000 Euros**  
**Recording of audio speakers (2): 1,144 Euros**  
**Music: 200 Euros**  
**Miscellaneous expenses: 150 Euros**

Expenses (excluding VAT)

**TOTAL: 6,394 EUROS**

<b>D.</b> <b>Alfonso</b> Calle Puerto de Suebe 28038, Madrid, SPAIN +34 91 430 ** info@D.es / www.D.es
---

**Figure 45.** Tender bid

After comparing all the offers, 3 suppliers were shortlisted for the final selection process:

**Table 40.** Company Selection

COMPANY	VAT	Corp. Name	City	P.Code	Address	Contact Person	e-Mail	Phone n°	Budget
A	XX	A S.L	Madrid	28010	Calle Zur	Rodrigo	prod@A.com	9131020	<b>Received</b>
E	XX	E S.L.U.	Madrid	28004	Calle Arge	Alvaro	alvaro@E.com	9170201	<b>Received</b>
F	XX	F S.L.	Madrid	28050	Av. Man	Marifé	m@F.com	6398864 6565826	<b>Received</b>

#### 6.4. Evaluation

The result of the evaluation of the tenders must contain at least the following information:

- Companies consulted and corresponding bid value.
- Description of the goods or services subject to acquisition.
- Comparison of prices.
- Single supplier justification (if applicable).
- Justification of the need for the supplies / services.

Below, we present the analysis conducted for the 3 suppliers selected.



**Company A****RECORDING**

Days of recording in HDV format (Camera operator, recording in HDV, tripod, direct sound recording with microphone or wireless microphone and LCD monitor 15")

Days of basic lighting set (4 x 750W) + LED torch camera

Days of camera and lighting assistant

**RECORDING**

Quantity	Unit Price (€)	Cost (€)
2	360	<b>720</b>
2	90	<b>180</b>
2	150	<b>300</b>
<b>TOTAL</b>		<b>1,200</b>

**POST - PRODUCTION**

Days of post - production in HDV format (capture and material selection, image edition and enhancement, labeling and 2D graphics, sound reinforcement, in these formats HDV or DVD and FLV (for internet) or similar

Speech "off"

Hours of sound studio

Musical themes with transfer of rights to the client for free use.  
(Average length 3 minutes / song)

**POST - PRODUCTION**

Quantity	Unit Price (€)	Cost (€)
3	390	<b>1,170</b>
2	350	<b>700</b>
2	65	<b>130</b>
2	125	<b>250</b>
<b>TOTAL</b>		<b>2,250</b>

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**PRODUCTION**

Performing screenplay based on material provided by the customer

Design and production: creativity, storyboard, production meetings and audiovisual consulting with the client

Raw Material

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**PRODUCTION**

Quantity	Unit Price (€)	Cost (€)
1	250	<b>250</b>
1	500	<b>500</b>
4	12	<b>48</b>
<b>TOTAL</b>		<b>798</b>

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**PRODUCTION (Optional)**

DVD (programming with interactive menus and buttons). Button with extra content (material provided by the customer: pictures, manuals, presentations .... etc)

DVD graphic design

Optional subtitles in Spanish

Making 3D logo animation

Original songs with transfer of exclusive rights

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**PRODUCTION (Optional)**

Quantity	Unit Price (€)	Cost (€)
-	90	-
-	60	-
-	100	-
-	350	-
-	275	-
<b>TOTAL</b>		-

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**RECORDING (Optional)**

Insertion of specific backgrounds in post-production, suitable for cases where there is a speaker or an action is being explained (video example will be attached)

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**PRODUCTION (Optional)**

Quantity	Unit Price (€)	Cost (€)
-	250	-
<b>TOTAL</b>		-

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**Table 41.** Company A

Company A	
<b>COST</b>	<b>4,248 €</b>
<b>18% TAX</b>	<b>764.64 €</b>
<b>TOTAL BUDGET</b>	<b>5,012.64 €</b>

**Company E (no “Optional” provided)**

---

**RECORDING**

Quantity	Unit Price (€)	Cost (€)
-	-	<b>1,260</b>
-	-	<b>0</b>
-	-	<b>0</b>
<b>TOTAL</b>		<b>1,260</b>

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**POST – PRODUCTION**

Quantity	Unit Price (€)	Cost (€)
-	-	<b>3,620</b>
-	-	<b>1,400</b>
-	-	<b>0</b>
-	-	<b>0</b>
<b>TOTAL</b>		<b>5,020</b>

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<b>PRODUCTION</b>		
<b>Quantity</b>	<b>Unit Price (€)</b>	<b>Cost (€)</b>
-	-	<b>3,000</b>
-	-	<b>5,720</b>
-	-	<b>0</b>
<b>TOTAL</b>		<b>8,720</b>

Table 42. Company E

<b>Company E</b>	
<b>COST</b>	<b>15,000 €</b>
<b>18% TAX</b>	<b>2,700 €</b>
<b>TOTAL BUDGET</b>	<b>17,700 €</b>

Company F (no “Optional” provided)

<b>RECORDING</b>		
<b>Quantity</b>	<b>Unit Price (€)</b>	<b>Cost (€)</b>
-	-	<b>4,850</b>
-	-	<b>0</b>
-	-	<b>0</b>
<b>TOTAL</b>		<b>4,850</b>

<b>POST – PRODUCTION</b>		
<b>Quantity</b>	<b>Unit Price (€)</b>	<b>Cost (€)</b>
-	-	<b>4,740</b>
-	-	<b>1,400</b>
-	-	<b>0</b>
-	-	<b>0</b>
<b>TOTAL</b>		<b>6,140</b>

<b>PRODUCTION</b>		
<b>Quantity</b>	<b>Unit Price (€)</b>	<b>Cost (€)</b>
-	-	<b>2,600</b>
-	-	<b>6,300</b>
-	-	<b>0</b>
<b>TOTAL</b>		<b>8,900</b>

**Table 43.** Company F

<b>Company F</b>	
<b>COST</b>	<b>19,890 €</b>
<b>18% TAX</b>	<b>3,580.20 €</b>
<b>TOTAL BUDGET</b>	<b>23,470.20 €</b>

### 6.5. Concession

Taking into consideration the above presented analysis of all the proposals, a decision can be made as to which company will be awarded the project. In this case, the economic factor will be decisive as it is a corporate video project.

If the case study had been of a more technical nature or concerning industrial supplies, technical as well as economic issues would have been important; aspects such as quality control to make sure that the product meets all technical requirements stipulated by the applicant unit (CNAT).

The company awarded the project will receive a letter similar to the following, stating that it has been selected to carry out the work:



Madrid, May 30th 2012  
A.SL.  
Calle Zur.  
28010- Madrid  
ATT.: D° Rodrigo

**SUBJECT:**

**Recording, editing and post-production of a "Corporate First Aid training Video"  
for C.N.A.T**

Dear Sirs:

In relation to your tender bid associated with our project request, we inform you that your company has been selected.

We will contact you in the near future to arrange a launch meeting to define the actions and timetable for carrying out your contractual obligation.

A purchase order number will be sent to you shortly and this must be used in all documentation associated with this project.

Best Regards,

**A. P. A.**

**CNAT Control Manager**

**Figure 46.** Concession Letter

## 7. CONCLUSION

The main objective of this project, as was made clear from the beginning, was to identify and specify potential framework agreements with suppliers to optimize both time and cost for the nuclear power plants located in Trillo and Almaraz (Spain)

A clear description of different content-related purchases has been presented, beginning with a comprehensive approach to dealing with content and techniques (2.5), planning (2.6), needs, budgets, economies of scale (chapter 3), etc. Also we made some examples to understand easily some of the concepts explained.

The methodology used in the technical part of this project was based on a detailed analysis of different Excel files with specific orders for the two plants and which were divided into two large blocks (services and industrial supplies).

In the first section, we were able to detect areas where potential improvements could be made:

- Optimization of furniture purchases (orders spread over a large number of suppliers)
- Grouping and creation of a framework agreement for office supplies, printing material and paper orders.
- Grouping of institutional gifts and presents due to the large number of orders and total amount.
- Grouping everything related to the air conditioning into a single supplier to be responsible for both supply and equipment maintenance.

**Table 44.** Resume (Services)

Category	Suppliers n°	Orders n°	Amount (€)	Proposal
Furniture	5	34	394.857,76	Centralize all orders of furniture in one or two suppliers.
Office Supplies	12	24	178.549,07	It is recommended the creation of a framework agreement with a provider specialized in supply of material and office solutions.  We can also invite different providers to deal by parts (office / printing materials / Paper)
Printing Materials	4	10	183.620,71	
Paper	8	15	65.313,92	
Gifts / Presents	15	43	180.669,63	It is recommended the possibility of creating a framework agreement with a company that specializes in this type of material to optimize time and costs.
Air Conditioning	5	7	40.715,65	It would be recommended a search for a single provider for both plants (acquisition and maintenance of equipment).

In the second group of orders we focused on industrial supplies requested by the plants and attempted to put them into "packages". We have presented more than 20 different types of industrial supplies. The analysis led to the following results:

- The suppliers most used for each industrial supply were determined (we introduced notions of suppliers in the chapter 2.9).
- Creation and grouping of multiple industrial supplies into 3 different suppliers for the negotiation of framework agreements. With that and supported in the topic explained in the chapter 3, we try to obtain good savings in costs and time of delivery).

Finally, as a brief case study, we have presented the steps included in the approach, starting from the request for tenders for a service / supply for the company (CNAT) to the selection of the “winning” company.

My personal opinion is that the project has been successful and the client is currently studying the viability of the improvements recommended. It should be born in mind that the large number of orders (almost 5,000 in 2010 and 2011) added to the complexity of the work performed.



Future research might focus on the negotiation stage presented in this thesis at which the framework agreements are drawn up and implemented.

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