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INFOSMES
A RESEARCH PROJECT ON
INNOVATION, INFORMATION AND SMES

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Abstract

The purpose of this report is to identify the information needs of SMEs to enable them to innovate and determine whether or not there are any serious obstacles to the innovation process.

The report is divided into four chapters. In the first chapter we explain the conceptual framework that has guided us in the INFOSMES (Innovation, Information and SMES) research.

In the second chapter we present the reasons why we have chosen the furniture sector and the objectives and methodology used in the research. In the third chapter we summarize the results of the questionnaire and present a statistical analysis of the collected data. Then, finally, in the fourth chapter we draw some conclusions.

This is a preliminary work that is currently being expanded in the hope of designing a conceptual framework to facilitate SMEs' access to information. The aim of the resulting framework is to assist non technical personnel in their quest for supplying crucial information to SMEs.

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Foreword

The process of innovation has been widely studied in the context of the large company. Innovation is the process that, through creativity, gives organizations new perspectives in its strategic development. Experience and literature[1] show us that the innovation process is more often than not a key factor in success.

However, small and medium sized companies[2], seem to have greater difficulties in innovating. What, therefore, are the barriers that prevent SMEs from innovating?

There are many definitions of innovation in the literature. For us Innovation is *new ways of doing things, either old or new*. Thus, innovation covers the whole spectrum of the company's activities and in every case presupposes a substantial change in the company´s way of doing things. This definition covers *products, processes and managerial procedures and systems*, alike.

The word "new" has an explicit meaning above. For one, it implies that the new ways of doing things were not commonplace before the change occurred. The second implication is that, newness being a state of mind, most of the company personnel were largely ignorant about the details of the "new way of operating".

Existing research has shown that innovation is the result of a combination of different factors [4&5]. Some of these are:

- the commitment of the manager to seek it out,

- an appropriate human resource base for carrying out the new job,

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[1] See bibliography

[2] In this paper we will always refer to Small and Medium size enterprises as SMEs. There is no official E.E.C. definition of an SME. However, we will follow the definition that sees an SME as a company that has at least two of the following characteristics:

	Small	Medium
Total assets	<1.5 MECUs	<6.2 MECUs
Sales	<3.2 MECUs	<12.8 MECUs
Employee	<50	<250

- market conditions that make the new challenge affordable,

- the necessary monetary pull to be able to absorb the cost

- *access to the required knowledge and information.*

SMEs assume a greater *financial risk* than large enterprises. They are more sensitive to the fluctuations of the market and have less capacity to absorb both the immediate cost of innovation and the associated financial risk.

SMEs also have a higher level of *managerial risk.* The spectra of skills and knowledge of its management is usually narrower than that of a large enterprise. A large enterprise may have a highly skilled staff in certain areas of knowledge, whereas a small enterprise may lack the necessary range of staff skills, simply because of a shortage of personnel. This is the critical mass phenomenon, usually associated with discontinuities in the level of technological or managerial capability of a company.

Managerial and financial risk could become decisive factors in a manager's not daring to finance an innovative scheme. One might, however, find an owner-manager who has both the commitment to get the job done and the backing of a financial institution. Nevertheless, he or she may still face other challenges, such as a need for special skills among the technical personnel; new ways of setting up the production process; or simply the need for basic information about the relevant industry in order to help evaluate the financial risks involved. Thus, he usually faces a problem of *information* and *knowledge acquisition.*

In addition, a new scenario is nowadays being defined. Competitiveness is no longer attained by simply achieving and maintaining product quality. Products require R&D&D[3], global markets heighten the arousal of creativity, competition is focused on the commercial networks and information channels make the world a much smaller place. In this context, information seems to be ever further from the reach of SMEs.

It can be argued that the information needs described above imply a serious commitment to information collection. Maybe the need exists, but the required information is proprietary or represents a competitive advantage for a competitor within the industry and, as such, is almost completely inaccessible to other companies.

However, there are even more simple information needs that remain out of the reach of an average SME. These are simple because they may be collected easily or because another company is even able to collect them systematically. However, SMEs need this kind of information in order to innovate. They need to know answers to very simple questions such as whether or not an idea has already been developed by someone else, or whether someone else has developed a product that bears some relationship to the respective idea. They are often aware of what technologies are needed, but do not know how to obtain and install said technologies.

In addition, they often feel the need for information but lack a precise knowledge of the specifics involved. They may feel that they need something because they have encountered a problem, but the solution to this problem is beyond their reach. Perhaps all they require are

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[3] This is a concept developed out of the technical experience of the researcher. It implies that design is an intermediary step which lies between research and development and should be seen as an added step in all R&D development processes.

some helpful hints for innovating or information that can create an idea or environment that prompts new ways of behaving or modifying behavior.

In summary, innovation requires flexibility and an open mind, prerequisites that could be claimed to be more commonly associated with SMEs. Thus, SMEs may have the advantage of being more flexible because of their size, without suffering from the rigidity of a large company. Nevertheless, SMEs lack important properties that are often present in large companies. They lack the "portfolio effect", [Arrow] which arises from the diversification capabilities afforded by size. And they are also denied the type of easy access to the information base available in, and by, large companies. The lack of such properties *gives rise to barriers to innovation, a problem which represents a huge hindrance to SMEs and which is largely caused by a fundamental lack of information.*

The purpose of this report is to *identify the specific information needs* SMEs have in order to enable them to *innovate* and identify whether or not there are any serious obstacles to innovation.

The report is divided into four chapters. In the first chapter we explain the conceptual framework that has guided us in the INFOSMES (**In**novation, In**FO**rmation and **SMES**) research.

In the second chapter we present the reasons why we have chosen the furniture sector and the objectives and methodology used in the research.

In the third chapter we summarize the results of the questionnaire and present a statistical analysis of the collected data. Finally, in the fourth chapter we draw some conclusions.

This is a preliminary work that is presently being expanded in the hope of designing a conceptual framework to facilitate SMEs' access to information. The aim of the resulting framework is to assist non technical personnel in their quest for providing essential information to SMEs.
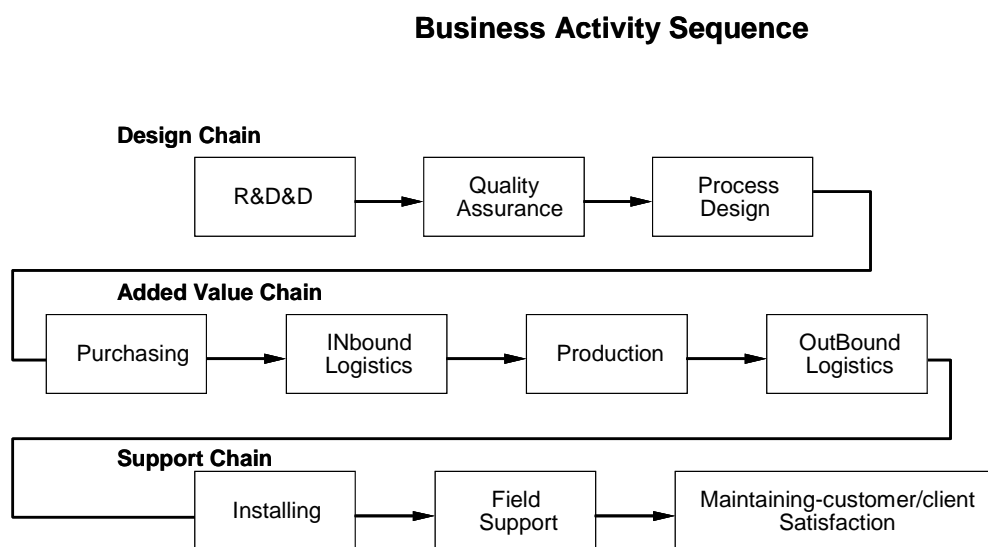
Acknowledgements

Chapter I
Conceptual framework for the INFOSMES research

Part of the conceptual framework for the Infosmes research has its roots in the Promesa[4] project. The main contribution of this project was that it described a generalized process of operations in terms of the Business Activity Sequence (BAS).

Figure 1
BAS

Business Activity Sequence

The BAS divides the operations chain of a product into three separate chains:

- the design chain

- the added value chain

- the support chain

Each chain has several stages that affect the overall service offered by the enterprise. The design chain covers the conception of the product. The added value chain covers the production process that leads from raw material acquisition to the production of the finished product. Finally, the support chain refers to the strategy and activity required to secure maximum customer satisfaction once the product has been purchased.

With this conceptual framework we deduced the information needs that each stage of the chain might require. By doing this, we aimed to create a clear road map of the information needs an SME might encounter in *creating, developing* and *producing* a product. Figure2-4 shows these pre-supposed information needs.

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[4] Ribera, J & Riverola, J. Project Promesa, to be published. Project Promesa was a research project undertaken for a public company with a grant from the Institute of Small and Medium Size Industrial Enterprises (IMPI). Its aim was to develop a process to involve the company's sub-contractors in the company's scheme and production operations.

Figure 2

Information needs of the design chain

Design Chain

RESEARCH
- Market trends
- Consumer needs
- Competition
- Technological innovations
- Pre-competitive research

DEVELOPMENT
- Production technologies
- Costs standards (similar prod.)

DESIGN
- Designers
- Similar products
- Materials
- Available technologies

R&D&D

Quality Assurance

Process Design

Standard controls for materials
Standard controls for products
Market quality specifications
Consumer quality standards
Availability of test centers

Target cost
Process technologies
Subcontractors

Figure 3

Information needs of the added value chain

Added value chain

Suppliers
Costs
Cost analysis of competitors
Purchase
Standarization
Normalization
Alternative sellers

Time standards & costs of other companies
Workers'skills
Methods of techn. process evolution
Training programs
Information systems
JIT, OPT
Quality control

Purchasing

INbound Logistics

Production

OutBound Logistics

Transports
Delivery time
Packaging

Stocks
Distribution
Specif local regulations

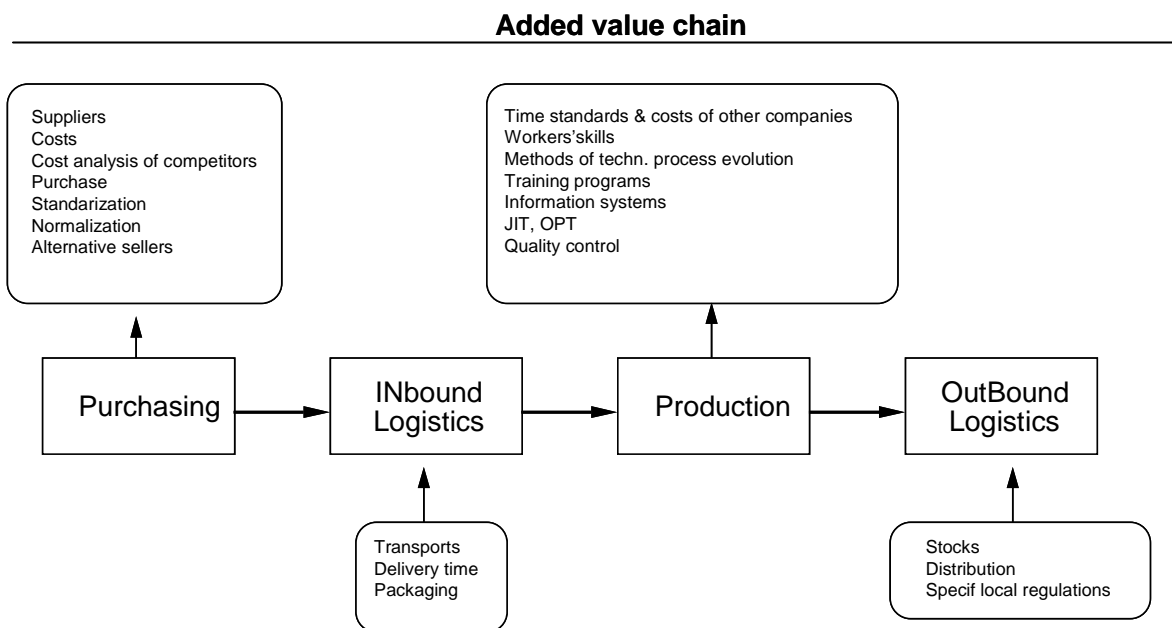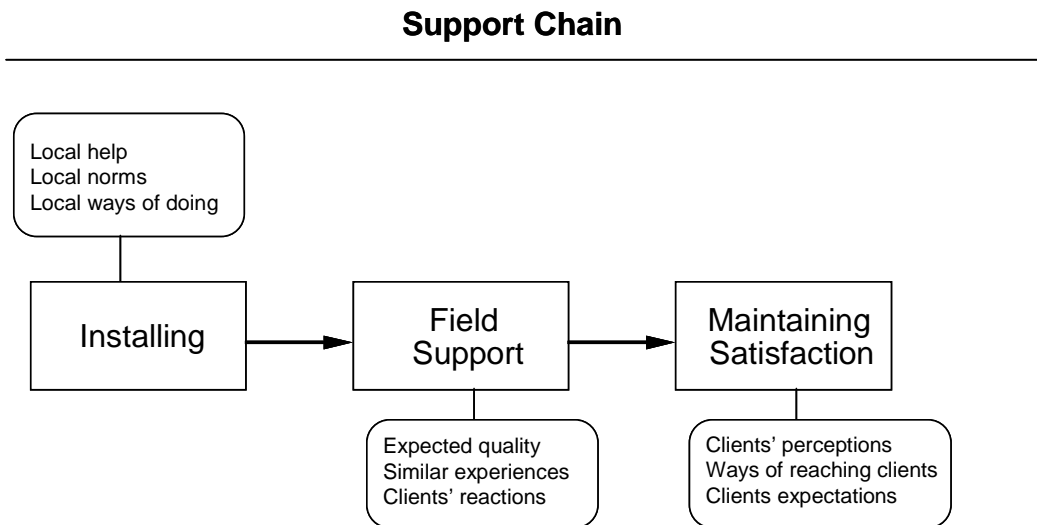## Figure 4

Information needs of the support chain

Support Chain

We therefore had a list of information needs that we could use as a basis for a questionnaire to ask SMEs:

– which issues they considered relevant in spurring them to create new products, thus helping them to innovate

– whether they had difficulties obtaining about information such issues

Nevertheless, we did not assume that information needs were enough on their own to provide us with a clear idea of the barriers to innovation that SMEs were encountering.

We were aware that the stage in the life cycle of the SME was relevant for this type of question. Therefore we decided once more to adopt, as a starting point in the research, the scheme presented in "The Five Stages of Business Growth" [5] and followed its conceptual framework.

This study typifies the characteristics of business in each stage of its development or life cycle. It considers five stages, as follows:

– Stage I. *Existence*: The company has a very simple organization, with no formal system and it bases its business strategy on the simple struggle for survival. Factors critical to the company are: its owner's ability to perform his or her job as well as its financial and business resources.

– Stage II. *Survival*: The company has a management style of supervised supervision, a minimal range of formal systems and its strategy is still focused on survival. The key management factors are the same as in Stage I.

– Stage III. *Success-disengagement*: a company that has attained "true economic health" and can stay at this stage indefinitely. It has a functional management style and its strategy is focused on maintaining profitable status quo.

  Success-Growth: the owner aims for expansion, and takes risks in attaining it. There is a functional management style, and the gradual development of formal systems in the company. The strategy is focused on securing resources for growth.

- Stage IV. *Take off*: the company has a divisional management style, a wide range of formal systems and its main focus is on how to finance growth. Essential factors are: the quality and diversity of its staff, strategic planning, systems and control and the owner's ability to delegate.

- Stage V. *Resource maturity*: the company has to consolidate; it has a line and staff management, a broad range of formal systems and is concentrating on returns on investment.

Adopting this typification serves a twofold purpose:

- to determine whether there are any correlations between the business life cycle defined above and the innovation process.

- to discern, if possible, any different patterns of information needs.

We also had to consider the human factor in innovation. We decided to focus on managers as the driving force in developing innovation practices and securing information. Managers in innovative companies work within a very uncertain environment, where there is a great need for progress and consolidation, and they are, therefore, key factors in achieving innovation.

In order to innovate, managers must obtain information. We worked under the hypothesis that one of the main factors impeding the ability to obtain information is the psychological risk-factor involved in the activity. Sometimes a crucial phase is the first step of acknowledging the need for information. However, when this information is not easily obtained, it produces total despair and feeds in the idea that any task is ultimately futile. This often develops into a vicious cycle.
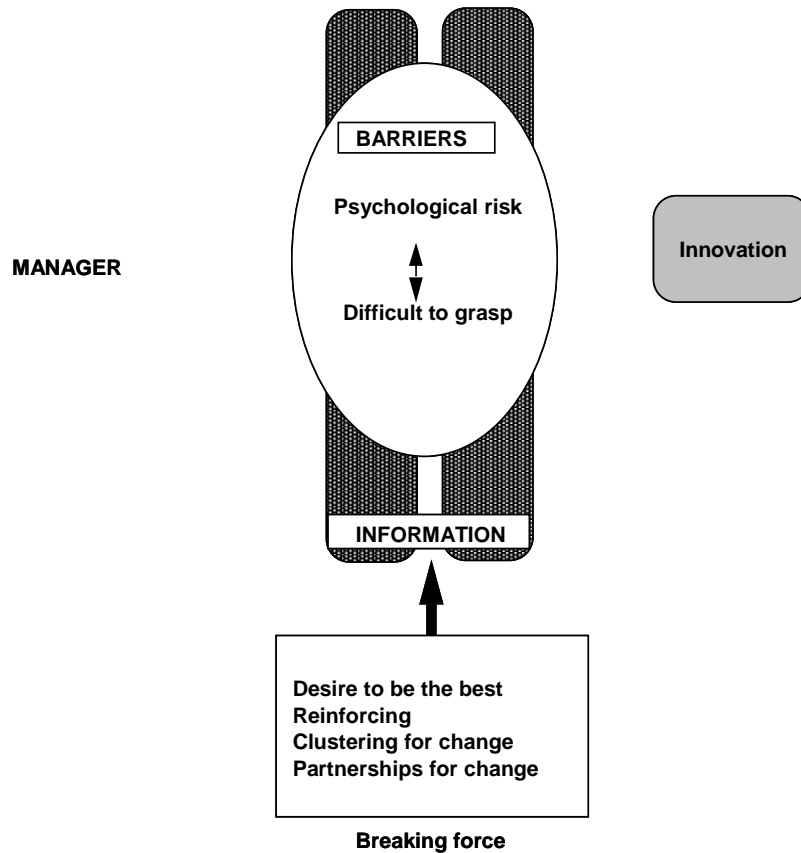
Thus, we worked with the hypothesis that the only way to break this vicious cycle was by focusing on the "driving forces" (Figure5) of innvoation and asking our target companies in the questionnaire to outline the forces that helped them in their search for innovation. The main ones under consideration are the following:

1. *Desire to be the best,* which is the main driving force in trying out new methods, processes, etc.

2. *Reinforcing and clustering for change*: managers find themselves very much alone and in need of support. Such a need is sometimes fulfilled by the knowledge that other managers are in the same position as they are, and struggling with the same problems.

3. Partnerships *for change*: the need to collaborate and seek innovation together.

Finally, our previous work had already shown us that a key competitive factor for all SMEs was the way they built things: i.e. their Operations Management. Questions relating to operational procedures, workers' tasks, types of machinery or production capacity would give us a real indication of the type of business we, as innovation consultants, were in the process of analyzing.

Figure 5

Breaking forces that help the search to innovate

BARRIERS

Psychological risk

Difficult to grasp

MANAGER

Innovation

INFORMATION

Desire to be the best
Reinforcing
Clustering for change
Partnerships for change

Breaking force

Chapter II
The research

The main bulk of European SMEs belong to mature sectors experiencing low growth rates and increasing competition based mainly on price. Due to this, the research did not focus on emerging sectors with high growth rates. Instead, we selected a mature sector experiencing some change and the furniture sector seemed to offer an ideal sample.

The furniture sector

The furniture sector is both a very important sector and an interesting example of the type of issues we are discussing. It is also a very important sector in terms of employment in SMEs and over the last 15 years it has undergone a significant transformation.

15 years ago, furniture styles were highly dependent upon the traditional styles and tastes which had dominated in the different countries in which the furniture was being produced. For example, the northern countries had a wooden furniture tradition which had evolved into a "Nordic style", France had a "provençal style", Spain had a "rustic style", etc.

However, there were a few isolated nuclei in Europe - especially in the north of Italy - that realized that a change in lifestyle was taking place, and that it required new and bold solutions to the home furniture concept. It was a truly revolutionary concept. This very innovative approach had to be successfully implemented. However, very few of the entrepreneurs concerned had either the means, the information or perhaps the drive that was required to succeed.

In previous research, most notably in the "Promesa project[5] ", there has been evidence of key factors that determined the success of the Italian approach. Essentially, the following three factors were the most important in this development:

1. The geographical *proximity* of the firms involved. This proximity allowed an easier interchange of information, enhanced communication and encouraged personal involvement.

2. Strong *leadership* from one of the firms involved. This firm was capable of clustering around it the efforts, resources and willingness of the rest, all of when were seeking a common purpose.

3. A well designed *marketing strategy* that convinced the customer that to innovate and change his or her home surroundings meant to be in the *avant garde.*

The Italian example has to be viewed in this highly particular perspective because the above set of conditions is difficult to reproduce. Their style and focus originated alongside important shifts within the textile and fashion sector. The concept of an *Italian way of life* has had a deep pull for other Italian sectors, helping to open new markets for them.

The furniture sector has sprouted, in other parts of Europe, other phenomena that bear similarity in some aspects to this. However most of these have not experienced such a high degree of success. The interesting factor that they all seem to have in common is that they have overcome risk aversion.

In our view, in order to overcome risk aversion and confront the risks of innovating head on, three factors are essential:

- *Information*, to reduce structural uncertainty as much as possible[6]

- *Personal reinforcement*, to overcome that residual risk that cannot be factored away by the information process.

- *Leadership* with skills and knowledge: to be able to overcome the many subsidiary barriers to innovation which result from the interplay of the main innovation thrust and the structure of the firm

The furniture sector, thus, provided us with a splendid example of how innovation occurs in a mature sector that had to develop new strategies in order to survive. It is a tremendously

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[5] See previous reference.

[6] See Riverola, J & Muñoz-Seca, B. Implementing Innovation Projects A paradigm and its implications, IESE research paper # 154.

vigorous sector that is trying to provide for the three factors outlined above, but without having defined them in a structured or systemized fashion.

Furniture has developed from being a basic necessity into representing an important distinguishing factor of one's life style. It has become one of the differentiating elements in today's society. Furniture companies have met this demand in different ways, but most of them have striven to maintain their own identity. They are trying to compete on the basis of a personal and unique style.

These are the reasons why we chose the furniture sector as the main subject of our study. We analyzed the existing patterns, which provided us with a concrete basis on which to develop a range of measures to help overcome them.

Research objectives

We have already stated that information is a key factor in reducing uncertainty. An SME usually faces two crucial problems when dealing with information issues:

1. It doesn't know what *type of information* it needs.

2. Once step one is clarified, it does not know where and how to obtain the information

Moreover, the information should be provided in such a way that it can be understood by the SME.

The objectives of this research will be to:

1. Determine some of the main barriers to the innovation process

2. Determine some of the main information needs in order to innovate

3. Initiate a survey to enable the classification and clarification of existing European data bases.

Methodology: The questionnaire

As a first step, we developed a three part questionnaire[7]based on the information needs for the business activity sequence explained in chapter I. The three different sections are as follows:

Part One: Company background information and understanding of the innovation process:

–   general information on the company

–   respective stage of the company in the life cycle

–   company's way of competing: on either price, specialization, flexibility, client or customer loyalty, innovation or a mixture of the above

–   the state of the company's growth and innovation strategies over the last three years

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[7] See Annex 1.

- the difference between innovation and diversification
- areas of difficulty encountered when trying to innovate
- sources of information
- general comments

Part Two: Operations structure

- organization
- personnel
- workers' task structure
- types of machinery
- structure of product range
- production capacity and subcontracting
- relationships with suppliers
- material management, response time and handling of urgent orders
- production control system

Part Three: Information needs and sources in:

- research
- design
- quality assurance
- production process design
- purchasing
- input logistics
- production
- output logistics
- installation
- support
- maintaining customer satisfaction

Once the questionnaire had been finished we tested it with two companies in order to know:

a. if it was easily understood

b. if it took a reasonable length of time to fill out(we calculated for less than half an hour)

With both objectives accomplished, we began with a dry run of 350 Spanish furniture SMEs.

At the same time, we sent a mailing to 1,022 Chambers of Commerce throughout the European member states, requesting the names and addresses of between three and five furniture companies affiliated to them. The responses to the request were extremely varied and the average success rate was about 40%. There was a great disparity in the responses from each

member state. For example, France and the United Kingdom had almost a 70% response rate whilst Italy, Denmark and Greece had less than 3%. In the end, this process provided us with 2,300 addresses of furniture companies in the EEC, all of which are featured in the support documentation (excluding the 350 from Spain which were previously used as a dry run)

The Spanish dry run produced reasonable results, with an average response[8] rate of 7.4 %. This was then followed by the mailing of the 2,300 questionnaires, which had been translated into French, German and English in order to encourage a positive response from the different companies.

Data bases

In order to gain a better understanding of how the information could be effectively delivered to SMEs, we did a preliminary search of the following databases:

- ECHO (European Commission Host Organization)

- ESA (European Space Agency)

- Official Spanish Registry of Patents

Statistical analysis of the data

The questionnaire was answered by 71 companies in Europe. In order to work efficiently with these 71 companies we created a data base that contained all of the questionnaire's possible variables. We feel that the sample is very small, especially considering the amount of effort that went into the development of the mailing.

However, as will be shown later on, we did receive a response from a broad spectrum of companies. This raised some concerns about the suitability of some statistical procedures. The bulk of the analysis was therefore done more from the data analysis point of view than that of a statistical one. We used a variety of data analysis techniques to try to identify significant patterns in the data. These included, among others, cluster analysis, factor analysis, analysis of the variance and regression. We used computer packages like Statwiev, Data Desk and Systat.

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[8] Expected response rate of 5-10%.

Chapter III

Results of the research

Summary

General structure

We produced a sample with a total of 71 companies[9], most of whom have fewer than 35 employees. Sales per employee figures are less than 0.219 MECU. The average gross margin lies somewhere between 43.2% and 22.2%. Most of the companies involved are furniture *manufacturers*. We encountered a wide range of company ages, from 8 months to 150 years old, although almost half of them are less than 14 years old. Some 75.6% have fewer than 11 products and almost half of them introduce fewer than 3 new products a year.

Their market is generally restricted to the domestic variety, and more than half have a management structure with well defined functions. Looking at their life cycle, most seem to be at stage III, which is the crucial stage in terms of defining their future strategy. Most of the companies state that they compete on flexibility and customer identification, although companies from the F.D.R. and Spain were notable exceptions. The companies surveyed in these countries said that they competed more often than not on innovation.

The companies surveyed generally prefer to innovate independently, and when they do innovate it is usually aimed at making changes to the product line. Half of them have diversified in the same period. A third have not experienced any impediments to innovation and of the rest, 25% have come up against only one important barrier. For these, the most common factor is lack of qualified personnel or a shortage of finances (31% reported this as the most important factor). The countries that seem to have greatest difficulties in innovating are France and Spain whilst the country with the fewest problems appears to be the F.D.R. The data shows that company life cycle, innovation and nationality are independent variables.

The SMEs in the sample generally prefer to search for information than use their intuition. They usually seek such information at trade fairs and exhibitions. An alternative is to try to obtain useful information from either suppliers or customers, and there is a significant difference in preference between the F.D.R. (where suppliers are preferred) and the U.K. (where there is a preference for customers). It is clear that in our sample neither the government bodies nor universities play an important role as information providers, and the EEC Euroguichets are not very well-known in either France or Spain.

Operations Structure

In order to have a better understanding of the workers' characteristics in the sample, we have divided personnel qualities into two categories – following McGregor's [11] model – calling

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[9] France: 20   Italy: 3
    F.D.R. : 7   Spain: 26
    U.K.:   15

them X or Y.[10] X can be defined as those characteristics found in traditional settings, where discipline and efficiency are the most highly valued, whilst Y is a more participative model in which initiative and responsibility are champions. In the results of the survey 75% of the companies valued Y more highly than X and there is little difference in the factor between high- or low-profitability companies[11].

In their task structure, the workers perform a limited number of, few, or several broad tasks and two thirds of them perform their own quality control. They cannot choose the tasks they perform, which seems to reveal an inconsistency, as they also often report a certain amount of team work alongside individual incentives. The companies say they need more information on the work force training schemes available. We can therefore assume that there is room for improvement in their technical skills or knowledge.

Looking at the BAS, we can see that the companies seem to devote a high proportion of their investment to production and purchasing and a much lower proportion to R&D. The most significant differences arise in process design and purchasing and production, thus hinting at a diversity of commercial and manufacturing firms.

Almost half of the companies have computerized production control systems and they work at an average of 80% of full capacity. They do not have very new machinery and they seem to have plans to renew it. However there is no evidence to suggest that they are actually doing this. They have traditional bonds with their suppliers and half of them are considering subcontracting more.

Information needs

A first glance at the information needs shows us that the companies seem to have similar interests and motivations, with the difference being that those in Spain and the U.K. find it much harder to access information. In the overall results on information needs, we find a high degree of interest in general market information, quality attainment and production process design. This could mean that there is a certain difficulty encountered in gaining more specific and detailed information. The greatest degree of difficulty lies in obtaining information on new machinery, new and more efficient production processes and the benefits or risks of replacing present components with one of the various substitutes available.

They also report a significant difficulty in obtaining information on European standards and regulations, the costs involved in alternative methods of furniture production and the true nature of substitutes for present components and general production items.

In the following sections we provide detailed information on the results. We explore the various sections of the Infosmes questionnaire one by one. We show averages and standard deviations, and also comment on significant issues. We also include histograms for the more important variables.

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[10] X characteristics: discipline, efficiency, successful completion of tasks, docility, obedience.
     Y characteristics: initiative, responsibility, creativity and imagination.
[11] X: 25%
   Y: 75%

Part One: Company's general information

1. General

In order to gain a brief overview of your company, please fill in the following data:

|				
Number of employees:			m:94/s:79	
Sales in 1989:			m:8/s:20	
Company's business activity:				
Company's age:			m:26/s:25	
Contribution margin in 1989:			m:2/s:4	
Total assets at the end of 1989:			m:2/s:4	
Company's market:	16	43	17	22

The data above shows a mean in the number of employees of 94 with a standard deviation of 79. This is the result of having two significantly different types of companies. One type is highly clustered while there are three outliers with 600, 650 and 1,200 employees which distort the sample. In discounting these samples we see the following results:
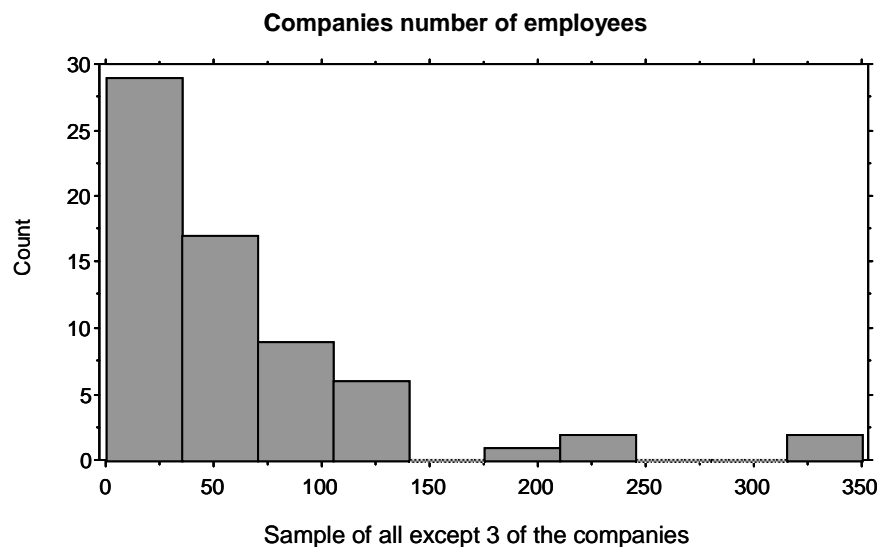
The graph shows that 44% of the companies have from between 1 and 35 employees whilst another 26% have between 35 and 70. An analysis of the variance shows a significant difference between the F.D.R. and France, and between France and Spain, with France having a higher percentage of companies with fewer than 25 employees. The sales in 1989 produced a mean of eight million ECUs, with a standard deviation of 20. With such a standard deviation, we performed an analysis of the sales per employee figures in order to gain a clearer understanding.
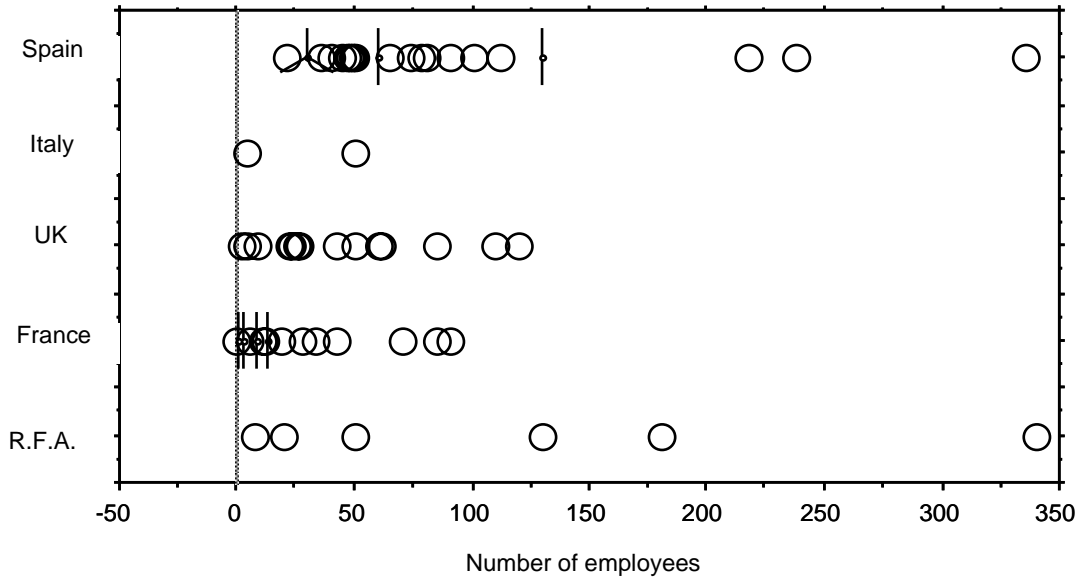
An analysis of the sales per employee factor reveals that 48.3% of the companies have sales which amount to less than 580.000 ECUs, whilst another 37.5% have sales worth less than 1.160.000 ECUs. If we consider .036 MECU to be the minimum level of profitability, we can conclude that 13% of the companies are below it.
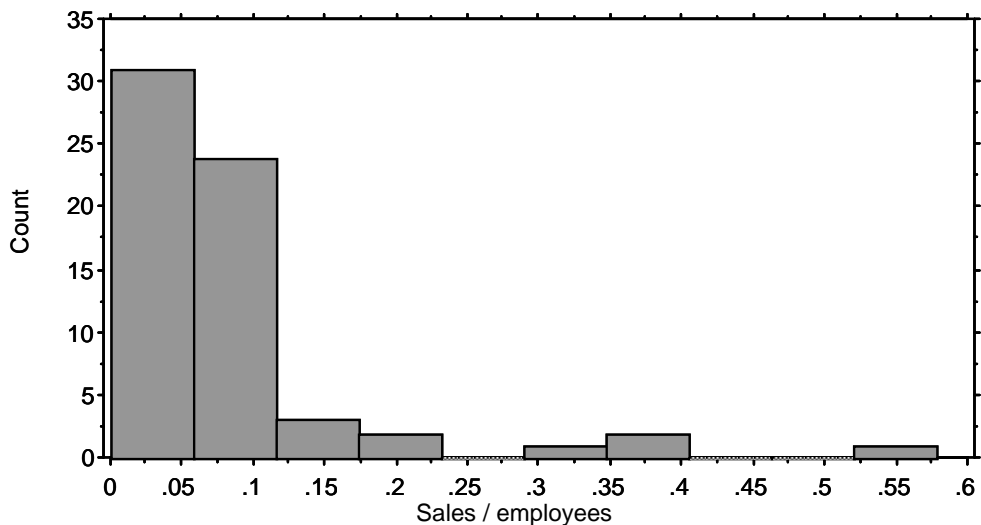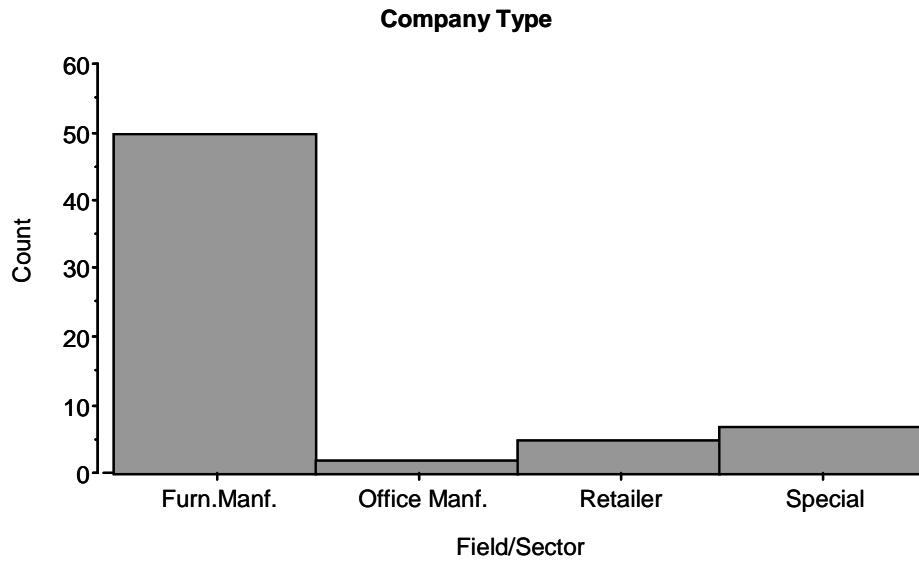

For the purpose of distinguishing the different types of businesses involved, we have divided the companies into four types, showing the following percentages:

Co.Type

Field/Sector	Count:	Percent:	
Furn.Manf.	50	78.125	Mode
Office Manf.	2	3.125	
Retailer	5	7.812	
Special	7	10.938	

Performing an ANOVA reveals no significant differences among member states

Company Type

Looking at the age factor, 41.1% of the companies are less than 14 years old and 23% have been established for between 14 and 27 years. Of those which have been operating for less than 14 years, almost half of them are less than 5 years old and 16% are between 5 to 9 years old.

Company's Age
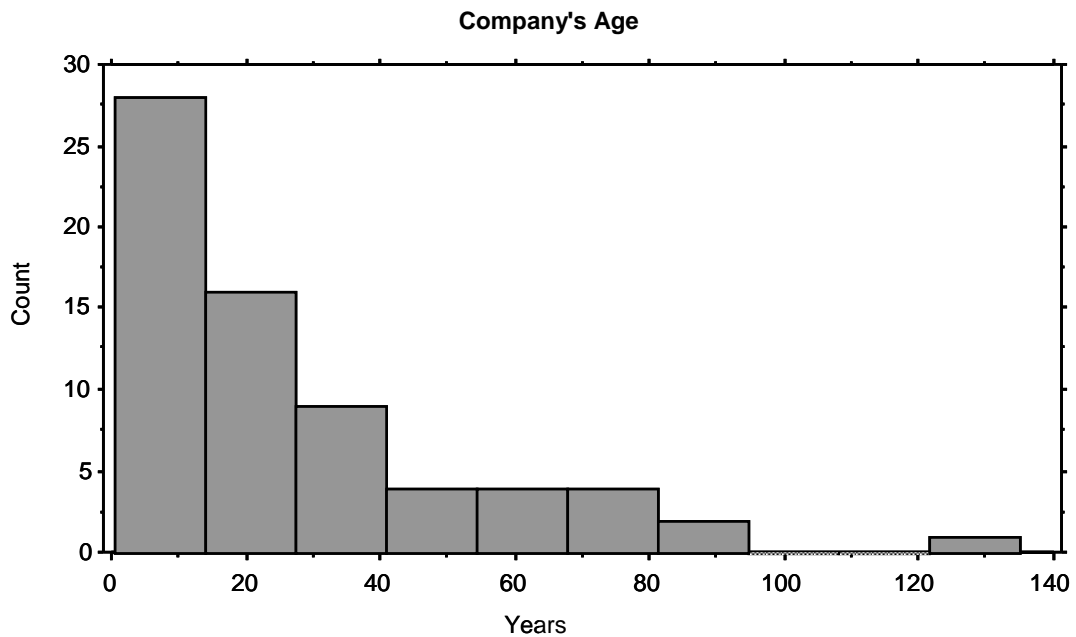
Hence, we have a sample of small companies with low sales and a wide range of ages (from the newly created to a 125 year-old company) although there is a slight predominance among companies with less than 6 years of age.

The markets for these companies are generally local or national, with the U.K. and Spain showing the highest weighting of cases. The F.D.R has the highest proportion of companies (33%) whose sales within local or national markets take second stage to those achieved in overseas markets

2. Company's life cycle

The company's life cycle data shows us that 57% of the companies have a management structure with well defined functions. Following the model of Churchill and Lewis [5], it can be seen that these companies are at a crucial stage of their life cycle because they can live in the fallacy that they can stay at that stage indefinitely. It is a crucial stage at which, unless there is a clear target for growth, the company might start suffering a period of slow but steady languishing.

Please state which of the following sentences best describes your company's organization:	N	Y
The company's owners work in production	61	39
The owner spends most of his time managing the company	47	53
There is a management structure with well-defined functions	43	57
There is more than one management level and formal management systems are being developed	76	24
There is a divisional structure with a considerable degree of delegation	73	28

The data also shows, with a high degree of significance, that company life cycle, innovation and nationality are independent variables.

3. Way of competing

	N	Y
Your company is different because it has a unique product, which is different from the rest	70	30
Your company is different because you are cheaper than your competitors	91	9
Your company is different because you are more flexible than others	59	41
Your company is different because your customer identifies with you	53	47
Your company is different because you are up-to-date with your industry's innovations	54	46

The data shows that almost half of the companies state that they compete on customer identification. There is no significant differentiation among member states. Only those in Spain and the F.D.R. suggest that they might be competing on innovation.

Company competing on innovations

	No	Yes	Totals:
F.D.R.	28.57%	71.43%	100%
France	66.67%	33.33%	100%
U.K.	75%	25%	100%
Italy	100%	0%	100%
Spain	33.33%	66.67%	100%
Totals:	53.73%	46.27%	100%

The above table suggests that there may be some differences between the member states. To confirm these differences we have conducted a single factor ANOVA, taking each respective country as the factor. The ANOVA reports a significant divergence with a 98.2 % significance level. Pair-wise comparisons of the groups show a difference between the means of the F.D.R and Spain and the rest of the countries. Thus, there is a marked and significant difference among the 5 countries in relation to this type of competition.

A comparison between the rest of the member states shows no significant differences.

Company competing on product differentation

	No	Yes	Totals:
F.D.R.	71.43%	28.57%	100%
France	73.68%	26.32%	100%
U.K.	68.75%	31.25%	100%
Italy	100%	0%	100%
Spain	64%	36%	100%
Totals:	69.57%	30.43%	100%

Company competing on price

	No	Yes	Totals:
F.D.R.	71.43%	28.57%	100%
France	73.68%	26.32%	100%
U.K.	68.75%	31.25%	100%
Italy	100%	0%	100%
Spain	64%	36%	100%
Totals:	69.57%	30.43%	100%

Company competing on flexibility

	No	Yes	Totals:
F.D.R.	100%	0%	100%
France	84.21%	15.79%	100%
U.K.	93.75%	6.25%	100%
Italy	100%	0%	100%
Spain	92%	8%	100%
Totals:	91.3%	8.7%	100%

Company competing on customer identification

	No	Yes	Totals:
F.D.R.	42.86%	57.14%	100%
France	52.63%	47.37%	100%
U.K.	62.5%	37.5%	100%
Italy	100%	0%	100%
Spain	45.83%	54.17%	100%
Totals:	52.94%	47.06%	100%

4. Innovation

What is your company's average growth rate in the last two years? m:19/s:14

A growth range mean of 19% alongside a standard deviation of 14 might seem to suggest a very high growth rate. In order to clarify this data we have calculated the growth rate by converting it into the equivalent growth in employees per year.
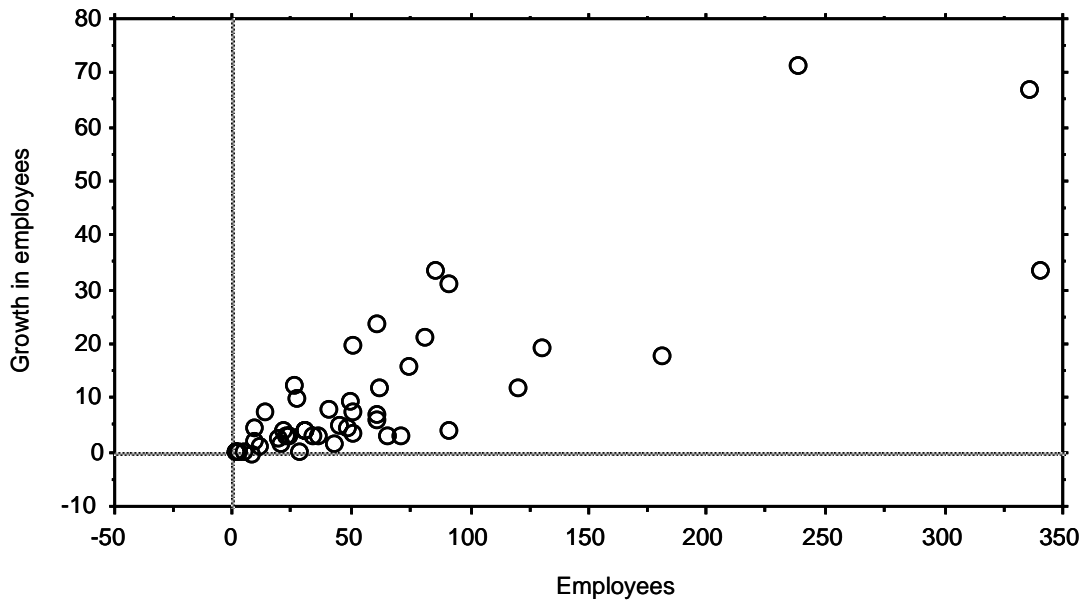
This table shows that some of the larger companies keep disproportionately increasing their size in relation to the rest of the sample. At the same time, however, some of the small companies are closing the gap between them. Nevertheless, we can see that in general most of the small companies grow at a far slower rate than the larger ones. In the long run this will result in a dichotomy among some large firms, as they secure the majority of the market share. Small companies will therefore have to specialize more if they want to survive.

Do you feel safer working with other companies or do you prefer to innovate alone?

Alone	Others	Both
71	21	8

71% of the companies responded that they prefer to innovate alone. We can see – with the help of an ANOVA analysis - some significant differences in this respect between the companies in the F.D.R./ France and the companies in the F.D.R./Spain. This might suggest that companies in the F.D.R. have a similar inclination to operate alone than to work together with other companies[12]. Performing an analysis according to company size[13] shows that there is no significant difference between small and medium size companies.

Has the company diversified into new fields of activity in the last three years?

52	48

In response to the question about whether they had accomplished some innovations in the last three years, 67% of the companies responded in the positive, with product innovation forming the most common area. For the same period of time, 52% claim to have diversified.

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[12] In an analysis of a contingency table the F.D.R. shows a 42.8% inclination to work alone, a 28.57% inclination to work with others and a 28.52% inclination to do both.

[13] Small :companies with less than 50 employees
Medium: with more than 50 employees
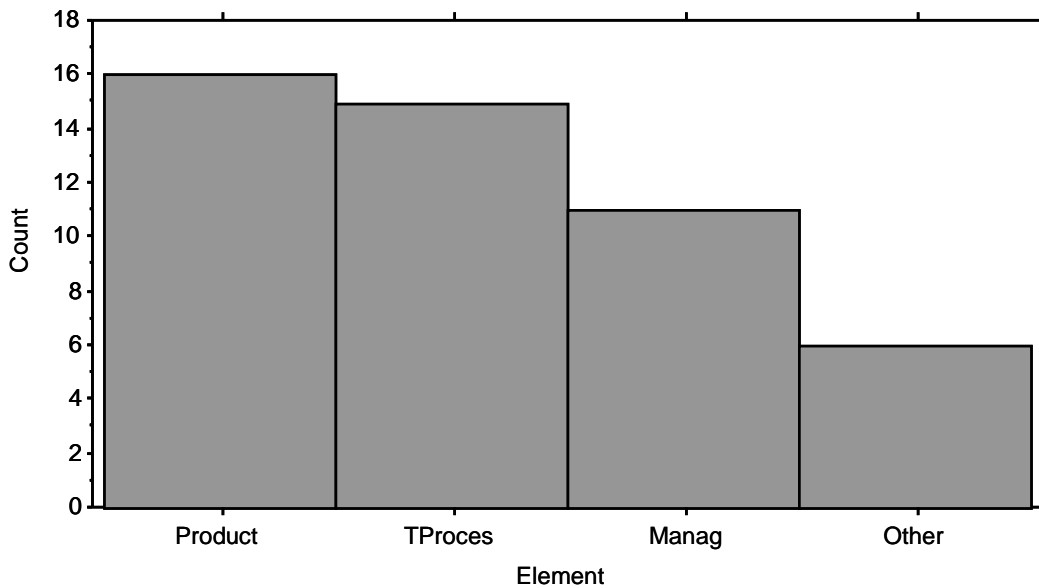
When did the last innovations occur? What were the most important barriers to implementating the innovation?

Lack of money	31	40	29
Lack of worker skill	25	51	24
Lack of qualified professional personnel	34	34	32
Lack of middle management ability	13	47	39
Lack of senior management skills	11	33	56
Rejection by the rest of the company	3	25	71
Lack of technical knowlegde	10	55	34
Lack of market response and support	23	39	37
Change too risky	12	46	41

As regards the barriers encountered by those companies seeking innovation, 38 % of the respondents claim that they do not suffer any impediments to innovation[14] whilst 25% reportedly have one blocking factor. Looking at the percentage of total answers, we can assume that one of these factors is the lack of qualified personnel (34% of the sample said they had a lot of difficulty with this issue[15]) whilst the other significant factor is lack of money (31% put it as their highest concern[16]). The countries that seem to have greatest difficulties in all the different areas are France and Spain. Companies in the F.D.R. seem to have the least difficulty as a whole.

5. Information sources

When you want to do something innovative, do you act on intuition or do you systematically seek more information?

71	23

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[14] A blocking factor is apparent when one of the variables is seen to cause great difficulty for the company.
[15] In this area France has a 50% difficulty rate and Spain a 44% rate.
[16] In this area France has a 53.3% difficulty and Spain a 32%.

The sample shows that 71% of the companies prefer to search for information – rather than use their intuition – as a means of innovating. The F.D.R.. has the highest incidence of this tendency. Their sources of information are listed below:

If you seek more information,who do you direct your enquiries towards?

Public or private research centres	9	45	45
Universities and Polytechnics	5	30	64
Chambers of Commerce	11	67	22
Autonomous Community bodies	6	40	55
Eurowindows	0	8	92
Your suppliers	42	56	2
Your customers	43	49	8
Your friends or acquaintances	16	72	11
Your trade association	22	47	32
Other companies	22	70	8
Trade fairs and exhibitions	64	33	7
Consultants	7	69	24
There is nowhere I can go	2	26	71

A high proportion of the companies (64%) go to trade fairs and exhibitions to search for information. The second preference is either that of suppliers or customers, with an 83% preference in the F.D.R. for suppliers and a 53% preference for customers in the U.K. The companies in the F.D.R seek more information from friends and acquaintances than from customers and the Euroguichets are relatively unknown in both France and Spain. The following bar chart provides a graphic display of the results. We have removed the data from Italy because there was not enough for it to be truly relevant or representative.
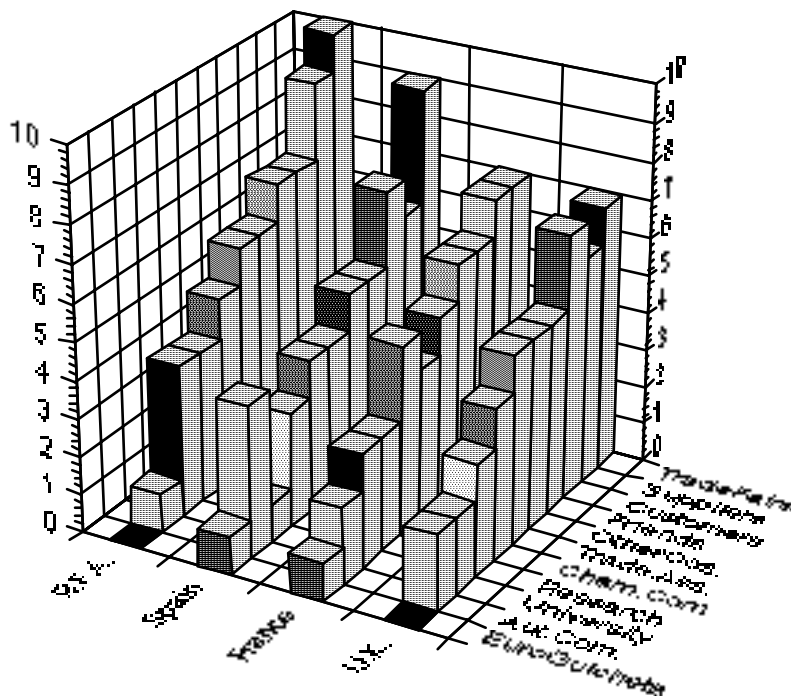
Part Two: Operations structure

1. Organization in operations

How are your operations organized?			Both
Do you produce by stock or by job	29	59	13
Do you have functional production centres specialized in certain operations?	49	51	Number
Do you have dedicated production lines specialized in certain products?	49	51	
Do you have flexible production centres consisting of several machines able to carry out various sequences of operations?	25	58	17
Do you use balanced assembly lines for high efficiency, and are they relatively inflexible?	20	80	Number

This section looks at information about the types of processes the sample companies are using in their operations. However, the internal structure is not discernible from the statistical data. Looking at this structure we find that most of the companies that have functional centers are migrating to flexible production centers or assembly lines as they expand. Nonetheless, the relatively low number of firms using assembly processes leads us to conclude that most of the companies place less importance on cost than on flexibility. It is well known that manual processes are adequate for early stages of a product life, whilst automatic processes are better for mature products. From this point of view, it looks like most of the companies are producing less mature products than we expected.

2. Value of personnel qualities

The personnel qualities that are stated in the above list are divided into categories. In one category we have selected *discipline, efficiency, a job well done, docility, obedience* and in the other *initiative, responsibility, creativity and imagination.*

Relating it to the theory of Douglas McGregor[17], we can call the former categories "the X factors" and the latter ones "the Y factors" [1]

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[17] Theory X is the traditional view of management: i.e. direction and control. It is based on the following postulates:
 1. The average human being has an inherent dislike of work and will avoid it if he can.
 2. Because of this dislike for work, most people must be coerced, controlled, directed or threatened with punishment to get them to contribute sufficient effort towards the achievement of organizational objectives.
 3. The average human being prefers to be directed, wishes to avoid responsibility, has relatively little ambition and wants security above all.

  Theory Y relates to what today is called participative management and is based on the following principles:
 1. The average human being does not inherently dislike work. Depending upon controllable conditions, work might be a source of satisfaction.
 2. External control and the threat of punishment are not the only means to encouraging workers to achieve organizational objectives.
 3. A commitment to objectives is a function of the rewards associated with their achievement.
 4. The average human being learns, under proper conditions, not only to accept but to seek responsibility.
 5. The ability to exercise a relatively high degree of imagination, ingenuity, and creativity in the solution of organizational problems is widely, not narrowly, distributed in the population.

Thus, theory Y could be summed up in the following way(Warren Bennis [1]): advocating for an active participation in the enterprise by all involved, a transcending concern with individual dignity, worth and growth and a belief that human growth is self generated and furthered by an environment of trust, feedback and authentic human relationships.

Discipline	6	Mode
Initiative	1	
Responsibility	1	
Efficiency	1	
A job well done	1	
Docility	8	
Obedience	7	
Creativity and imagination	4	

Performing an ANOVA analysis has not revealed any evidence of correlation between the quality of personnel and the nationality of the company. No evidence in the sample is found to disprove the hypothesis that the quality of personnel is statistically independent of

– the size of a company

– the company life cycle

– the innovation phase

– diversification

The ranks given in the sample are the following:

A – X Factors

Discipline

Efficiency

A job well done

Docility
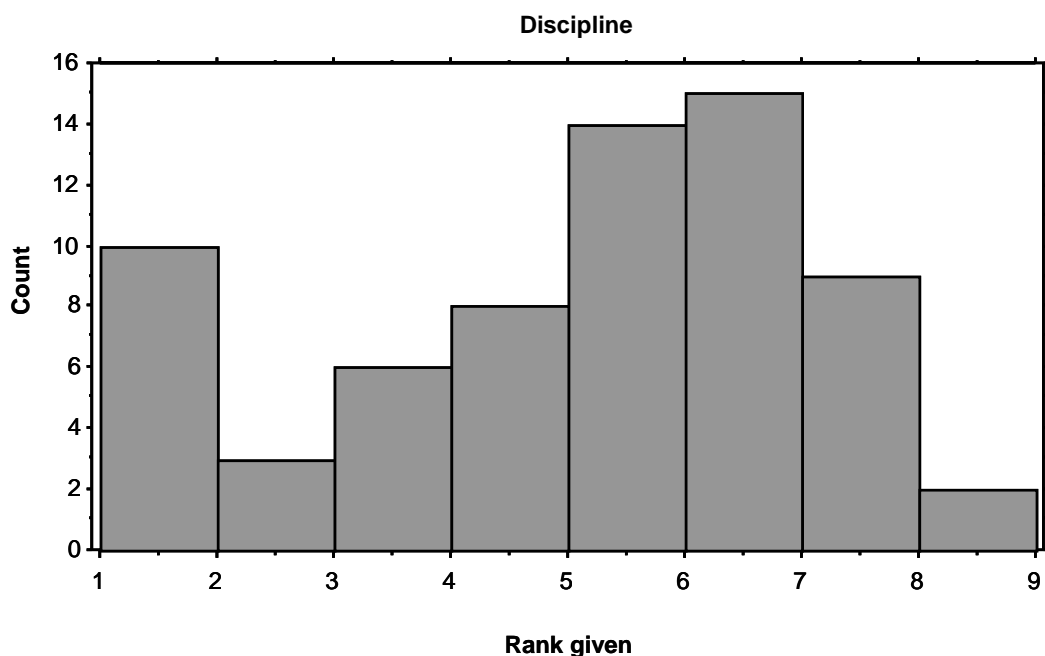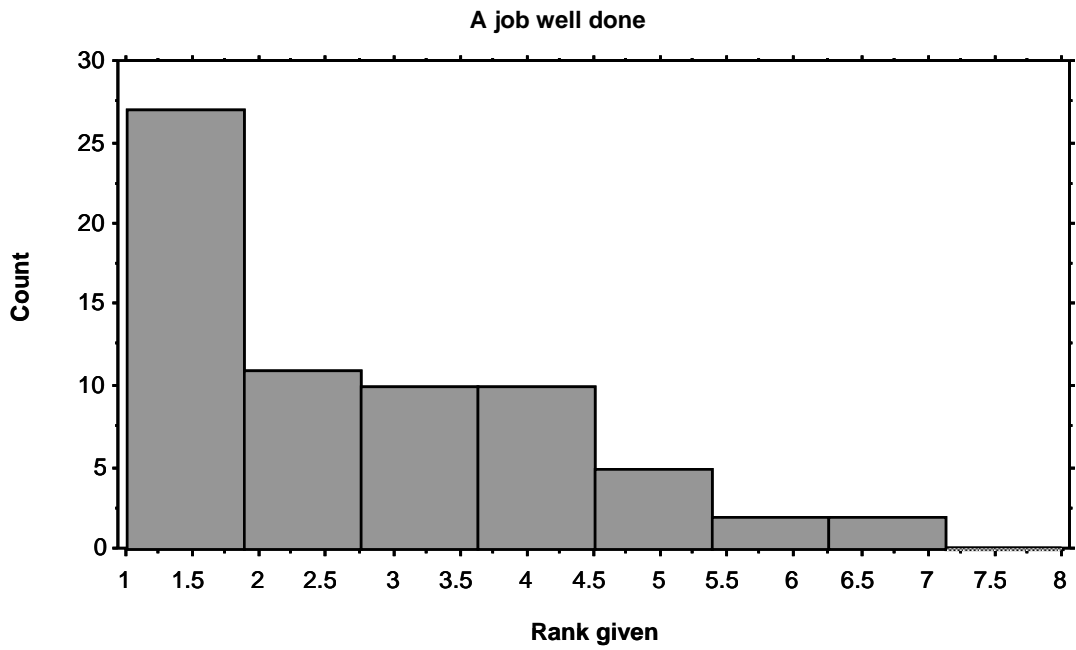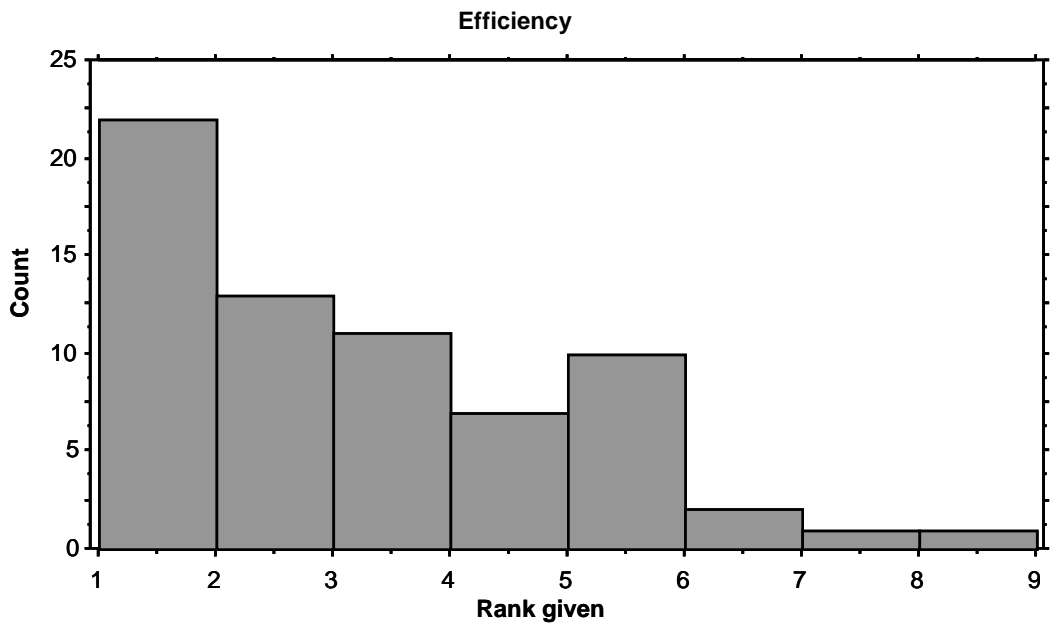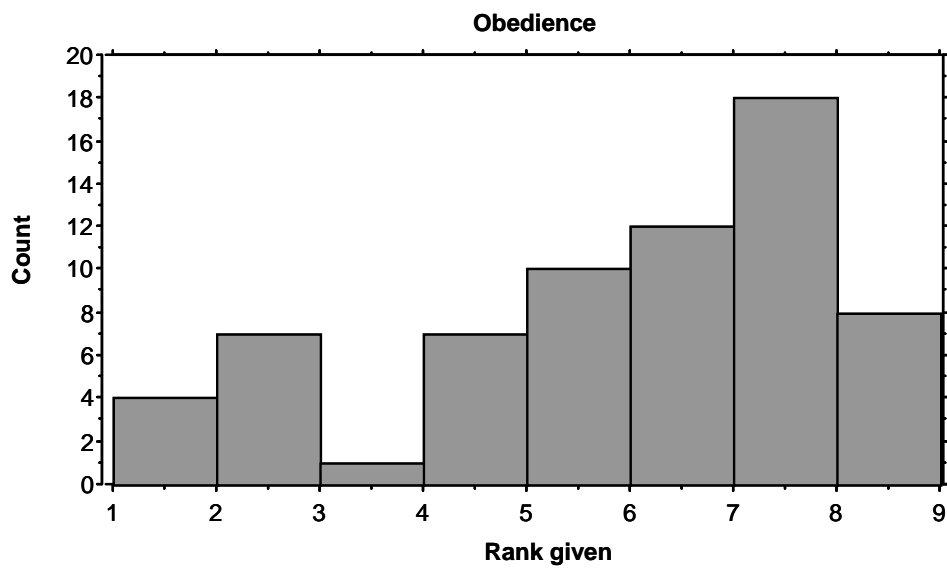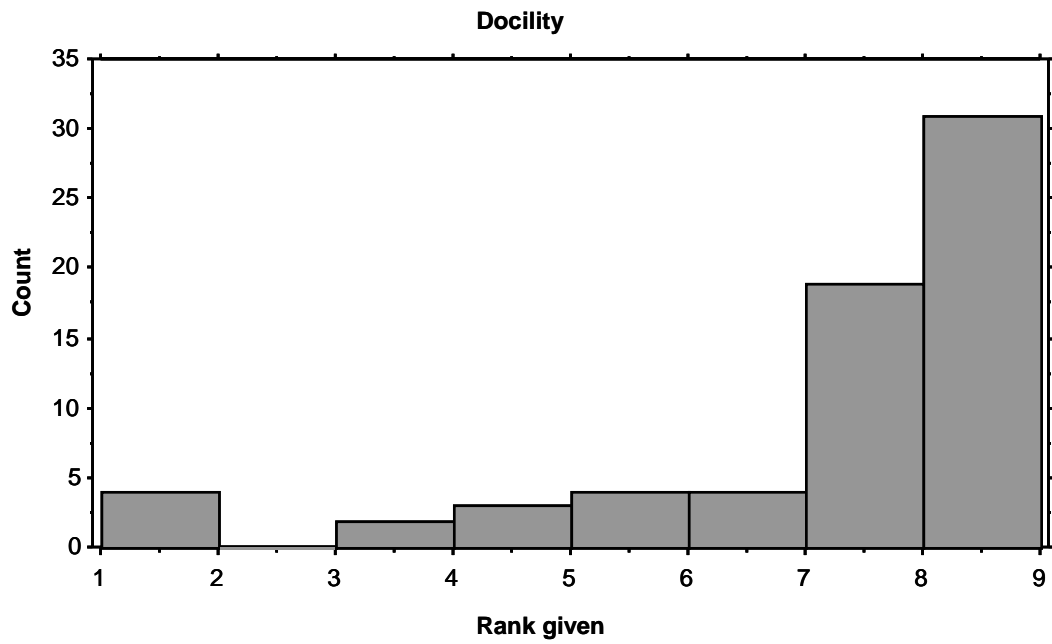
Obedience

Looking at the mode, we can see that *efficiency* and *a job well* done have the highest score and *discipline* and *obedience* the lowest.

B – Y Factors

Initiative

Responsibility

Creativity and imagination
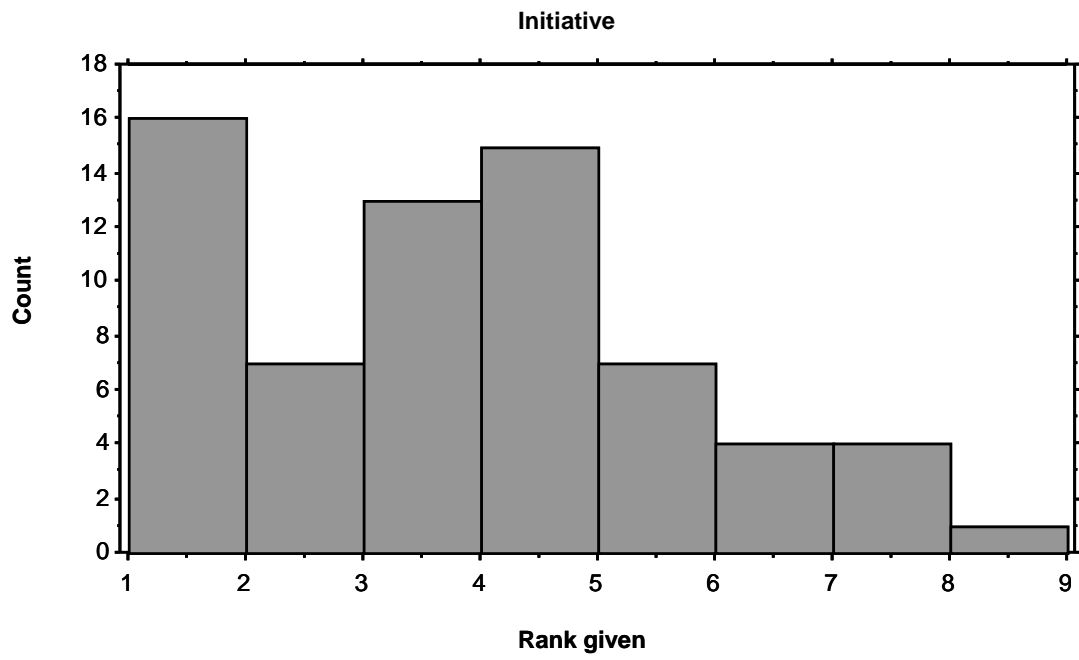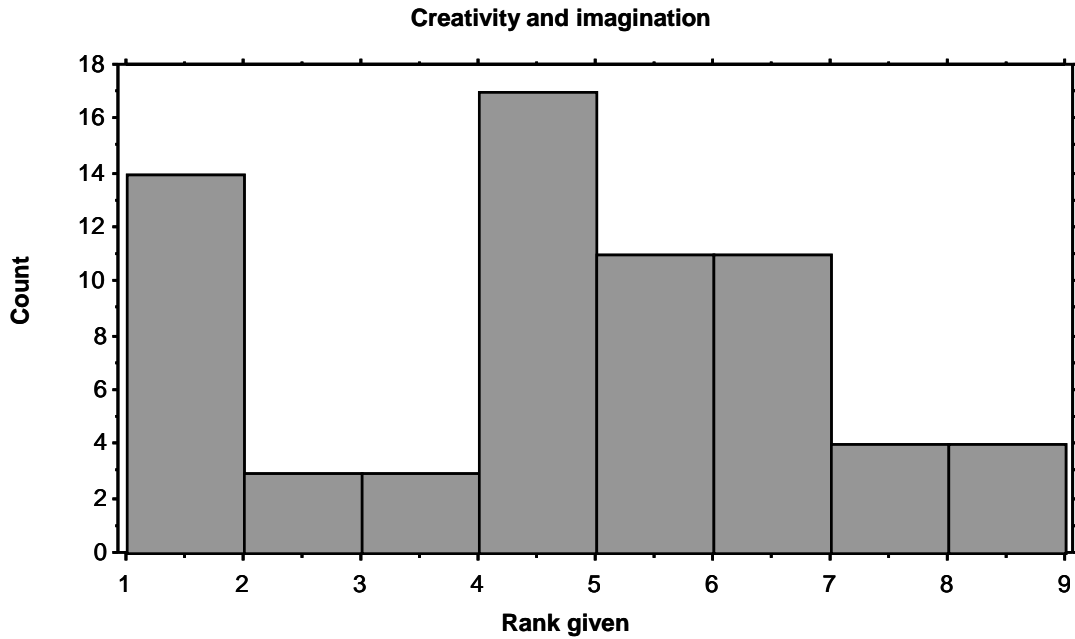
We can see that initiative and responsibility have the highest ranks, followed by creativity and imagination.

3. Task structure

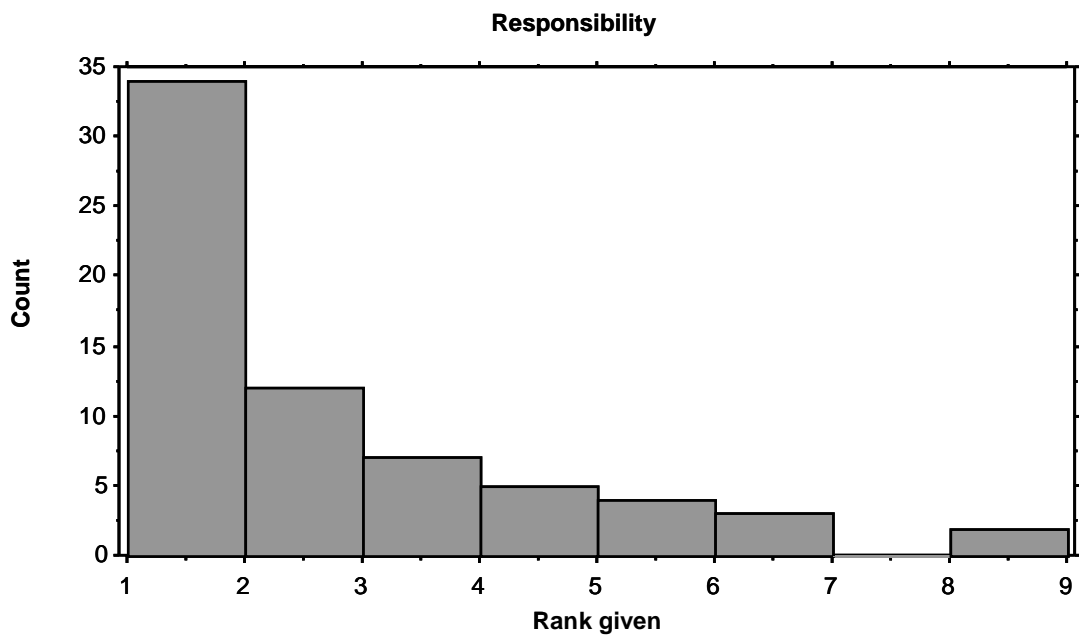| Is an average worker highly skilled in a few tasks or does he have to do a lot of things, according to the kind of work needed?	55	45	
Does the worker carry out his or her own quality control?	60	35	

Can he or she choose the task he or she should do at any particular time	3	50	47
Does he or she work alone or in a team?	30	56	
Is the incentive individual or group?	66	28	

The task structure shows that there is a similar number of workers performing a few tasks as there are those performing various tasks and that 2/3 of them carry out their own quality control. Performing an ANOVA allowed us to see that the only significant difference based on nationality is that which results from a comparison of France and the U.K. compared to Spain[18].

The ANOVA of the quality control shows no significant difference among member states.

The ANOVA of the responses to the question of whether or not they *can choose the task to do at any particular time* revealed a significant level of difference between the F,D.R. [19] on the one hand and Spain and the U.K. on the other.

---

[18] Spain shows the highest *proportion of negative responses* (48%).

[19] The F.D.R. has a 100% response of "*sometimes*" to the question.

4. Kind of machinery

Average age of machinery	m: 7.7	s: 6
Number of machines less than 5 years old	m: 14.8	s: 29
Number of conventional production machines	m: 30.5	s: 79
	m: 5	s: 8.6
Number of NC Centres	m:1.7	s: 4.4
Are they easy to reconfigure?	m: 1.7	s: 0.4
And to set up?	m: 1.8	s: 0.3

The data on machine age allow us to analyze the rate of renewal of the companies in the sample. We have constructed a renewal index by computing the value of the expression:

$$\frac{\text{Num. Machines of age} \leq 5 \text{ years old} - \dfrac{\text{Total num. of machines}}{\text{Average Age}} \quad \text{Min (Average Age of 5)}}{\text{Average Age}}$$

Assuming a steady state, the average age should be roughly equal to the historical average renewal period. Thus, the second term in the numerator measures the number of machines that, on average, should have been renewed to maintain the average age. If the number is less than the actual number, the index gives an indication that the firm is efficiently exploiting its facilities and renewing them as much and as often as is needed. Obviously this has the drawback that the firm may be substituting machines of high performance for machines of low performance, thus decreasing the number of machines. To correct for this we have used the index as a mere indication of what to look for in the questionnaires.

We have also used the results of this section to construct an index of automation by looking at the percentage of production done with automatic machines at each firm. This has been done by first estimating, using regression analysis, the average production of an automatic machine against that of a standard one. The result has been a factor of roughly 5. Thus the index has been constructed by using this factor and the expression:

$$1 - \frac{\text{Normal Machines}}{5 \text{ (robotized Centers + Automatic Machines) + Normal Machines}}$$

5. Structure of product range

How many product lines does your company have?	Median: 5	
Are a large proportion of components common?	61	39
How many new products do you introduce each year?	Median: 4	
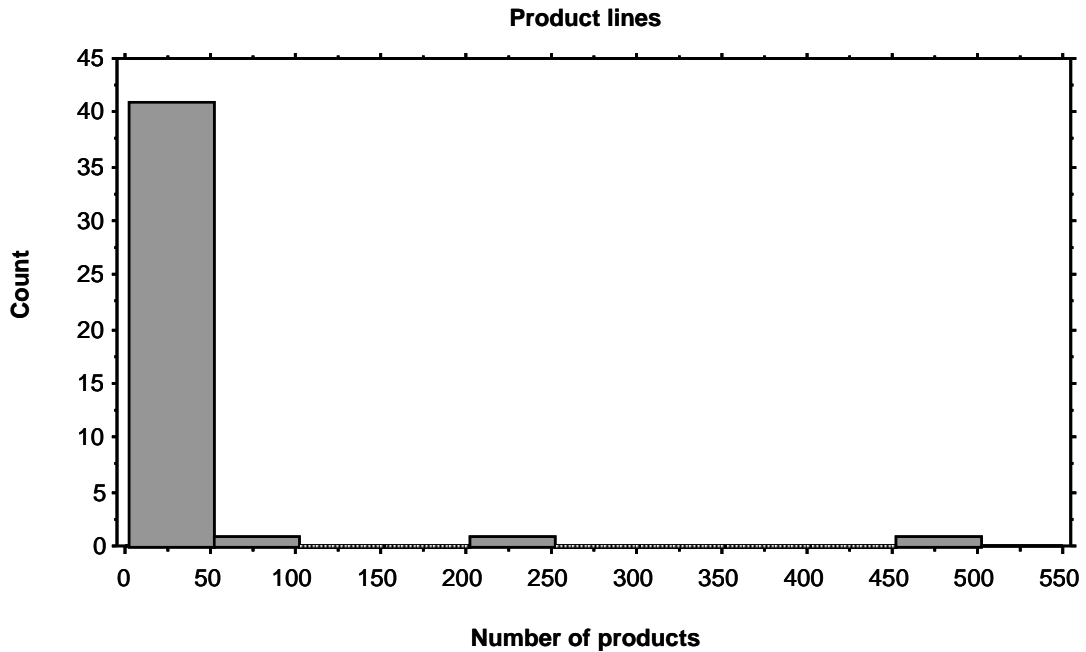
Product lines

In analyzing the number of product lines, we see that 3 companies distort the sample. If we discount the results for these three companies we can see that 75.6 % (mode) of all the companies have fewer than 11 products.

Product lines
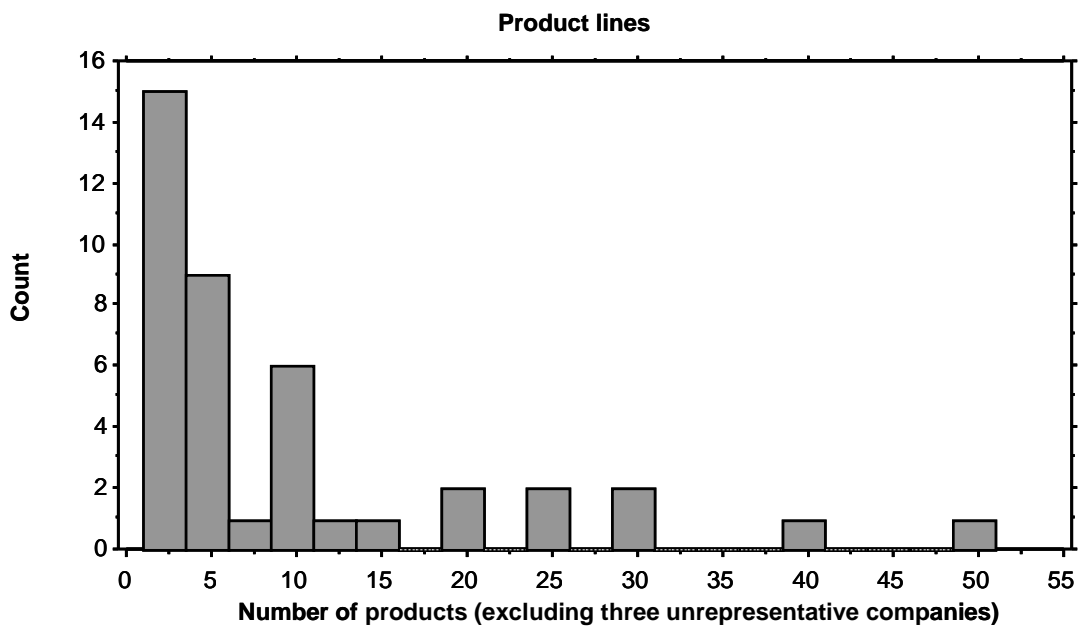
Analyzing the number of common components and relating it to the type of company under consideration, we find that even though an ANOVA analysis does not give a significance level, we might infer from the data that office furniture manufacturers have a higher degree of common components than standard furniture manufacturers.

	No	Yes
Furn. Manf.	36.17%	63.83%
Office Manf.	0%	100%
Retailer	100%	0%
Special	42.86%	57.14%

Performing a smiliar analysis of the introduction of new products as that which was carried out on the number of product lines[20], we can see that 43.5% (mode) introduce fewer than 3 products a year and that 23% introduce from 3 to 6 new products a year.

Introduction of new products
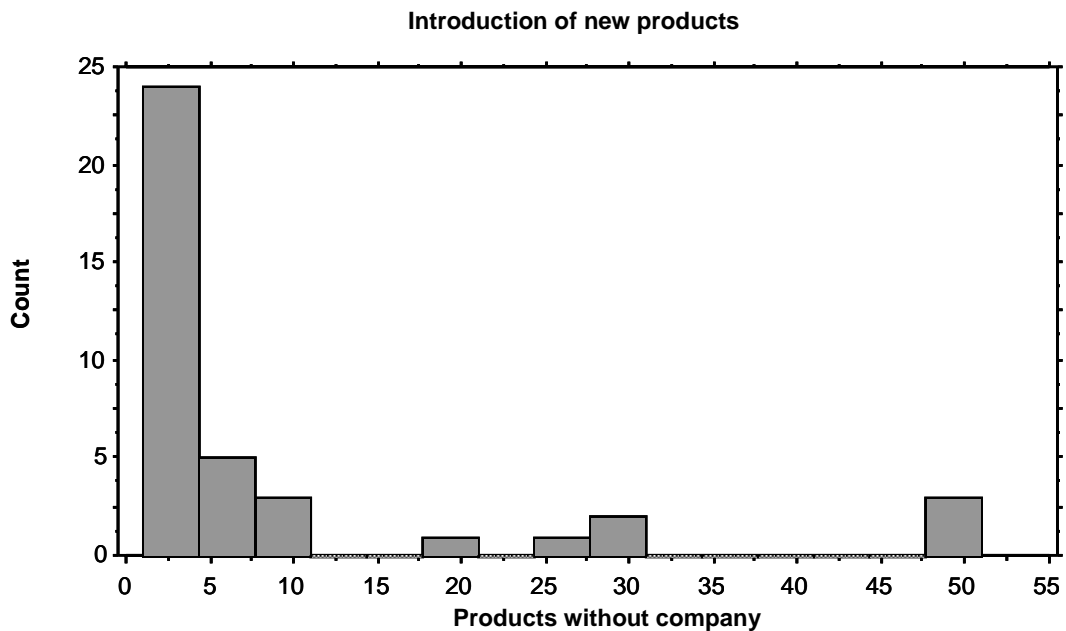
6. Production capacity

What is the occupation of production capacity in your factory?	Median:80	
Do you subcontract work outside?How much(%)?	61	39
Is overtime used?What is the percentage over total hours?	64	36
Do you accumulate stocks at certain times of the year?What percentage of annual production do you accumulate?	60	40
What is your bottleneck? Please be explicit		
Do you plan to increase in-house production capacity	86	14
And to subcontract more?	42	58

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[20] We removed from the sample a company that introduced 6.000 new products a year.

Once more, the raw averages are not overly relevant; in this case the responses allow us a general overview of the capacity management policies being used. There are several ways of providing capacity: one is spare capacity-gaining flexibility; another is to have a constant production capacity and cut the oscillations in demand; or alternatively a provision of increased capacity can be obtained through several other means, such as subcontracting, or working extra time. We see that in general there is a certain amount of spare capacity. This corresponds to the fact that most of the firms in the sample are trying to be flexible. Demand fluctuates in 60% of the cases. Two types of subcontracting seem to be in use in the sample. A large number of firms - some 35 % - are at less than full capacity but are still subcontracting. This seems to come in the form of technical subcontracting, which is typical in innovation-oriented firms, obtaining some outside specialized knowledge which is too expensive, too specialized or too transient to be provided in-house. The rest of the subcontracting seems to be pure capacity subcontracting, since the contractor is usually near full capacity, and often combines it with over time.

Finally, most of the firms are thinking of increasing their in-house capacity whilst at the same time expanding their subcontracting, as can be seen from the following table. As much as 44% of the sample, which is equivalent to 50% of the respondents, are considering *both* alternatives. This is probably a symptom of the increasing importance of technical subcontracting in these companies. Some 28% of the sample, equivalent to 31% of the respondents, are doing what at first sight might seem more logical, i.e. increasing in-house capacity but not encouraging more subcontracting, a clear indication of capacity providing subcontracting.

Table contents: count, percent of table

Columns: Plans to increase in-house capacity

Rows: Plans to subcontract more.

	No	Yes	Missing	Total
No	5	20	0	25
	7	28	0	35
Yes	4	31	0	35
	6	44	0	4
Missing	0	3	8	11
	0	4	11	15
Total	9	54	8	71
	13	76	11	100

7. Supplier management

Is it your policy to have one or several suppliers for each product you purchase?	18	82	
Do you just buy from your suppliers?	70	30	
Or do you obtain information and technical support from them?	83	17	
Do you influence the actions of your suppliers?	40	60	Both
Do the suppliers dominate supply and the conditions?	25	72	3

National differences are not statistically significant. Therefore we can consider this section as representative of the whole sample.

It is interesting to note the high percentage of firms obtaining information from suppliers, although, in a somewhat contradictory fashion most of them assert that they only *buy* from suppliers. The power of suppliers in this industry seems to be rather weak. 72% of the firms assert that the suppliers do not set the rules of the game. This is consistent with the previous answer if we assume that suppliers are mainly raw material suppliers operating within support industries. For instance, a supplier of paints and varnishes can supply important technical information to the firm without having any direct influence on the furniture industry. Another factor, which probably rings true for suppliers of wood, is their small size and geographical dispersion within certain countries. Multiple-supplier policy seems to be the rule, hinting at traditional buying practices. We believe most of the firms have not started a serious program of supplier "exploitation", i.e. trying to develop close cooperative links with them.

8. Material management

Question			
How many months of stock do you have on hand?	m:3 s:4.2		
Do you make forecasts and how?	12	22	66
Do you calculate production loads and component requeriments? How?	12	44	44
Do you work by batches?What is the average batch size?	55	45	Size
How long does it take to change batch in your machines?	In days: m1.8 s:3.6		
What is your minimun order quantity?	m:71 s:200		
Do you use Just-in-Time?	41	59	

Materials management here provides information about the lot structure of the sample. The main conclusion is that traditional production practices are being followed in the sample.

Minimum order quantity
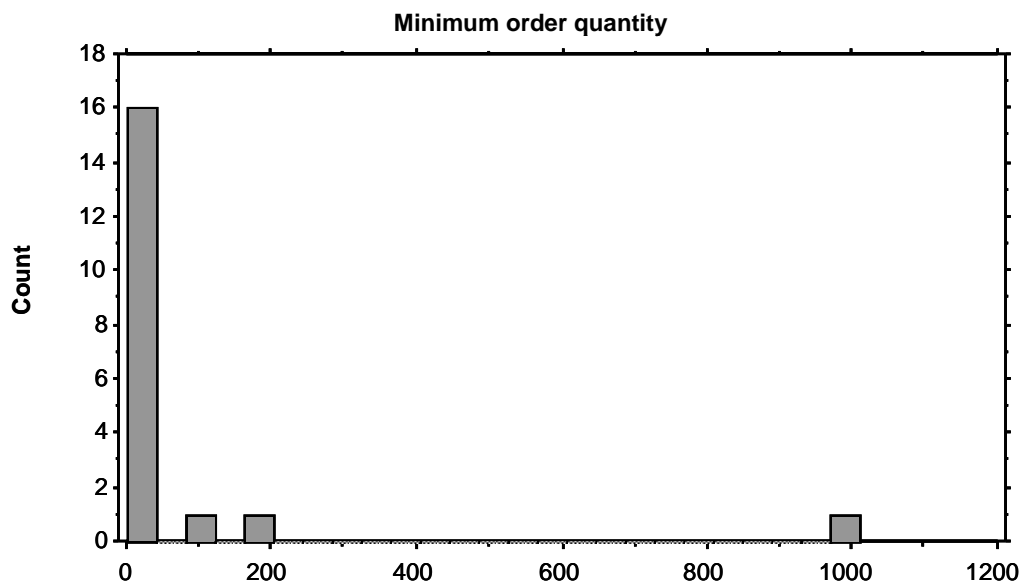
The introduction of procedures to increase flexibility and reduce inventories is not a high prioirity for most of the companies observed. We can deduce that it does not point to a clear understanding of the competitive capabilities of the company, as will be seen when analyzing the production structure of each one taken independently.

9. Response times

Response Times	Measured in days	
What is your normal delivery lag?	m:30 s:20	
What is your delivery lag for urgent orders?	m:12 s:12	
How far in advance do you order supplies?	m:35.7 s:31.7	
How much margin do you allow between production operations?	m:12.3 s:19.8	
What is the average work backlog, in number of machine days?	m:51 s:77	
Is there any operation that takes much longer than the others?	41	59

In line with the other findings, response times are inordinately long. It can be seen that urgent orders are processed 2.5 times faster than normal orders. That means that only 40% of the time is used in processing. The rest is waiting time. This is consistent both with the safety approach being taken in purchasing and between operations, and with the lot approach evident in the materials management section.

A great area for improvement for all the companies concerned seems to be that of production time, regardless of the grounds on which they are competing. Thus, when we talk later about short delivery times, we will be using "short" as a synonym for "less than the average". There seems to be a great need for more use of production technology in the furniture industry in order to reduce production times to reasonable levels. This need will become increasingly important as European companies are called upon to compete more and more with their counterparts in the Far East.

Decreasing the production time uniformly throughout the industry is one of the main causes of the increases in productivity detected over the course of this research.

10. Percentages of value added

In the analysis of the percentages of added value, a question arises concerning the meaning of the missing observations. When a firm filling out some of the cost figures leaves a cost blank, there are two possible interpretations. Either it does not want to report on the value of said cost, or it does not perform the related activity, in which case the cost is zero. The following table shows the summary statistics obtained when treating unanswered questions as missing values. The figures represent the percentage spent in the given cost category among the firms that reported their spending.

Research and Development	m:2 s: 2.2
Design	m:3.6 s:5.2
Quality	m:4.4 s:9.4
Process design	m:6.1 s:12.6
Purchasing	m:22 s:19
Input logistics	m:3.2 s:5.9
Production	m:26.8 s:19
Output logistics	m:3.7 s:3.7
Installation	m:3.1 s:3.8
Onsite support	m:3.9 s:7.7

The next table reports the statistics that arise when a missing observation is taken to represent zero. These figures represent the values averaged over the whole industry, having pooled together businesses that perform different functions of the BAS[21]. These percentages can be added to compute the gross margin. This is not the case for the percentages in the preceding table. However, they do provide an upper boundary of the gross margin.

After studying both tables we can assert that the average gross margin in the industry lies somewhere between 43.2%, from the previous table, and the 22.2% obtained from the one preceeding it. The most significant differences arise in process design, purchasing and production, suggesting that there is an important difference in the firms' commercial and manufacturing processes.

Research and Development	m:2.1 s: 2.82
Design	m:3.2 s:5
Quality	m:4.2 s:11
Process design	m:3 s:9.4
Purchasing	m:18.4 s:20
Input logistics	m:1.3 s:4
Production	m:18.9 s:19.9
Output logistics	m:2 s:3.4
Installation	m:2.3 s:4.4
Onsite support	m:1.4 s:4.6

Research and Development

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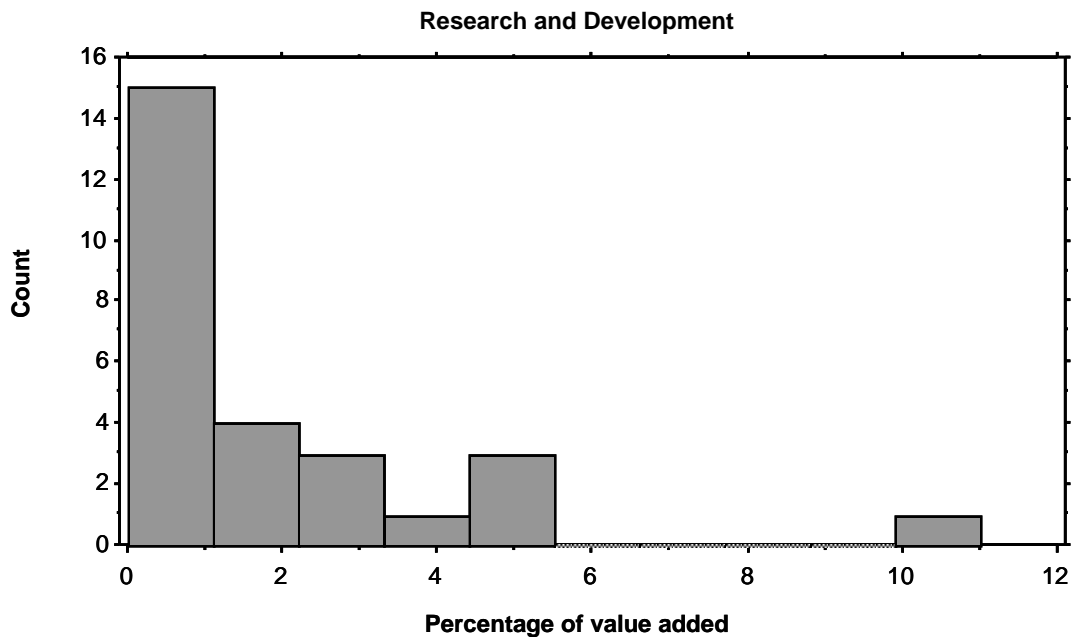
[21] BAS: Business Activity Sequence; see chapter 2.

Design

Quality

Process Design

Purchasing

Input Logistics

Production

Output logistics

Installation

Onsite support
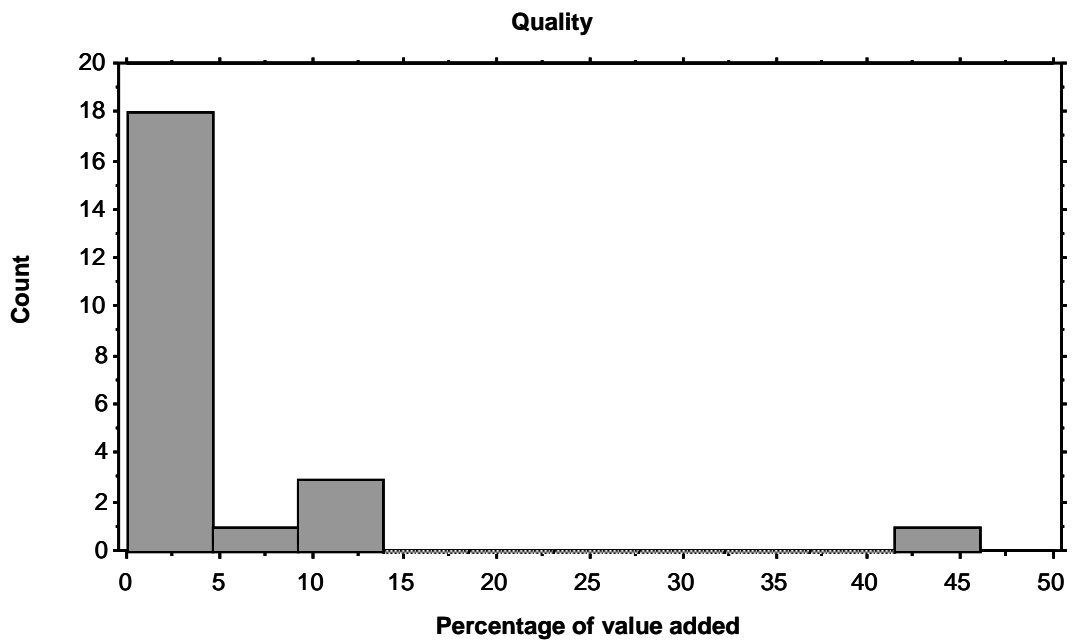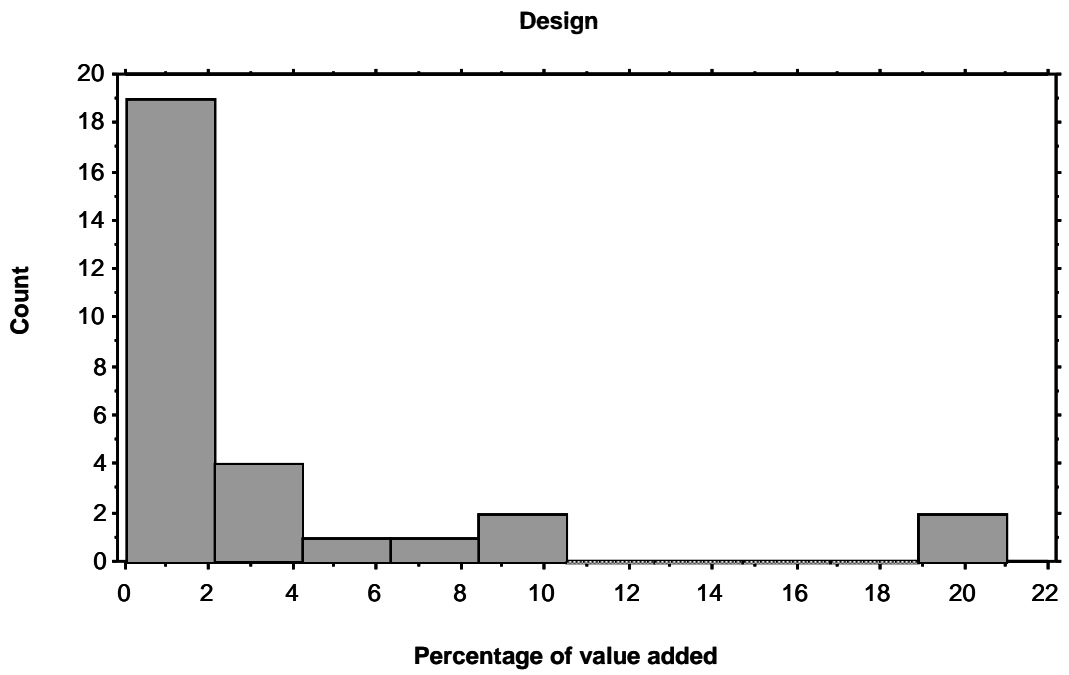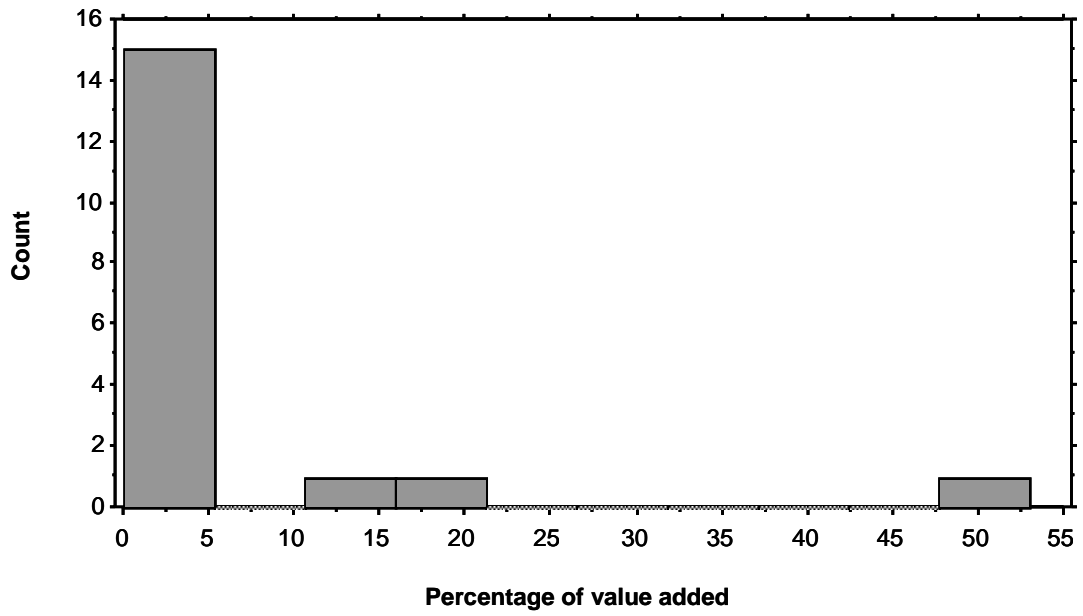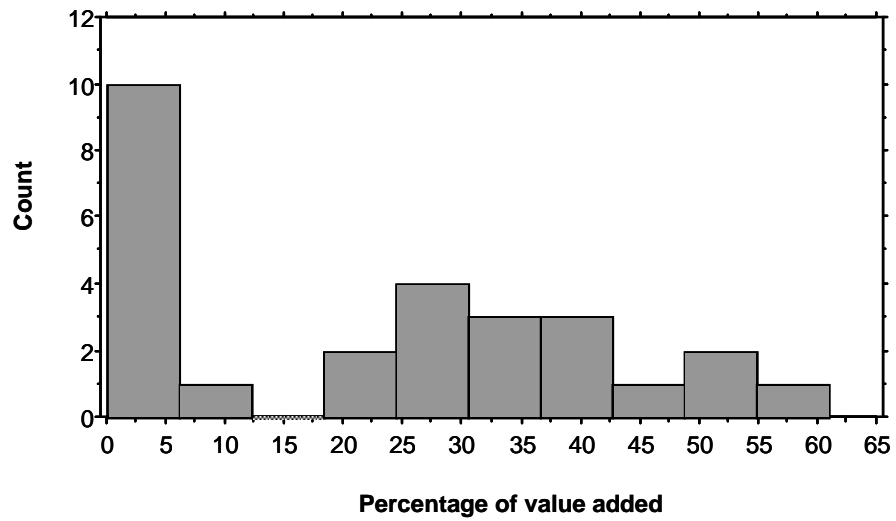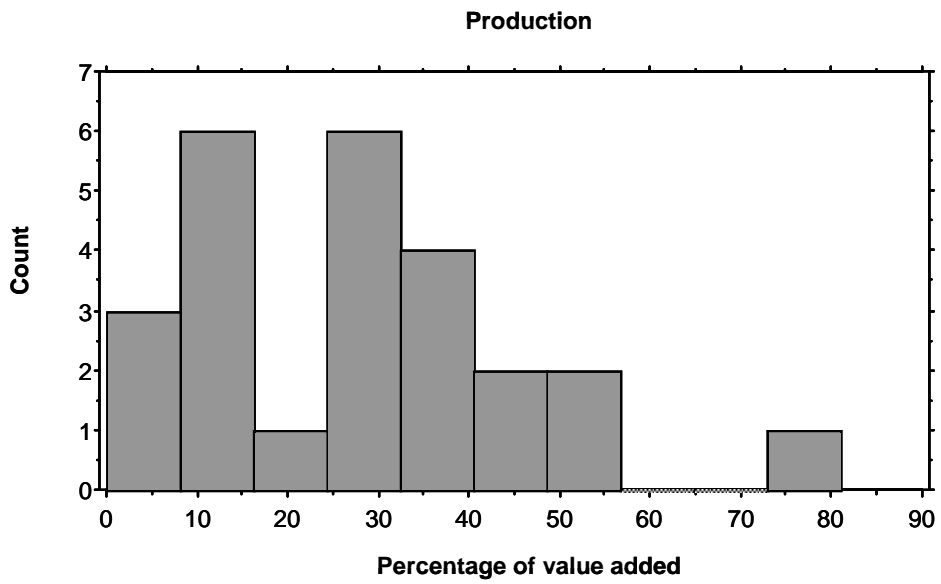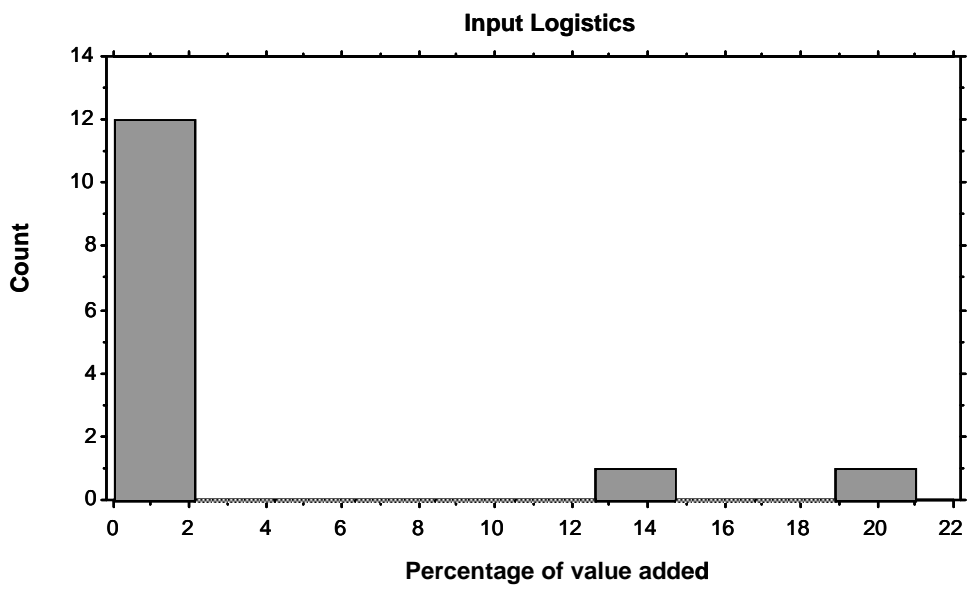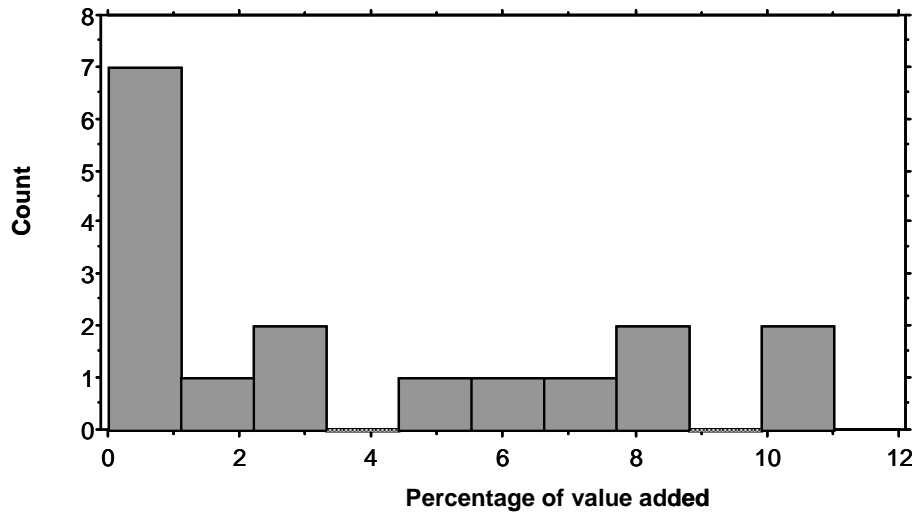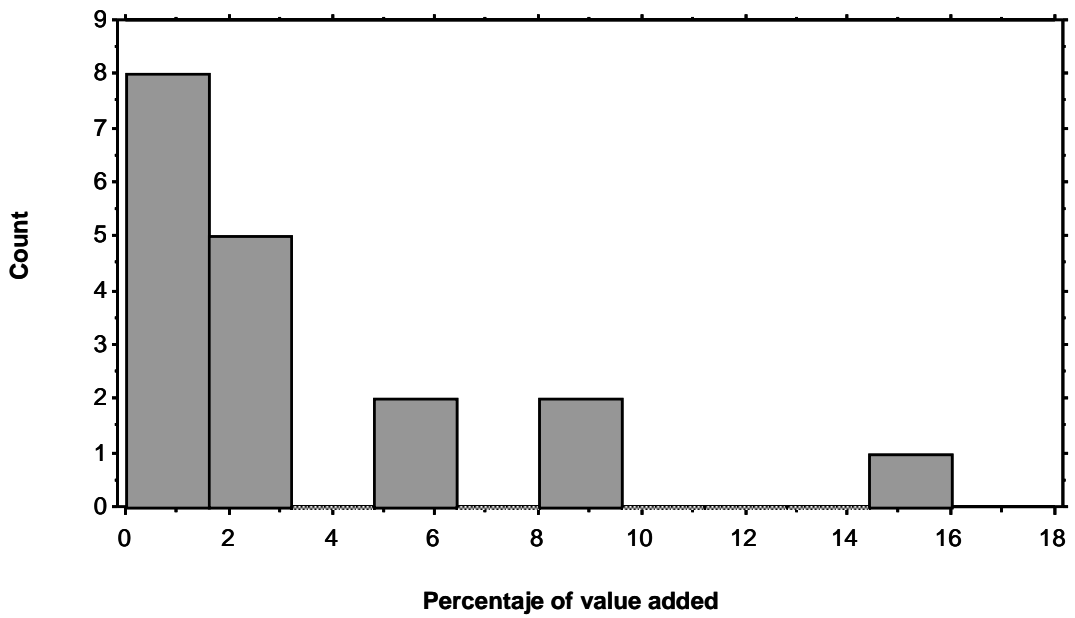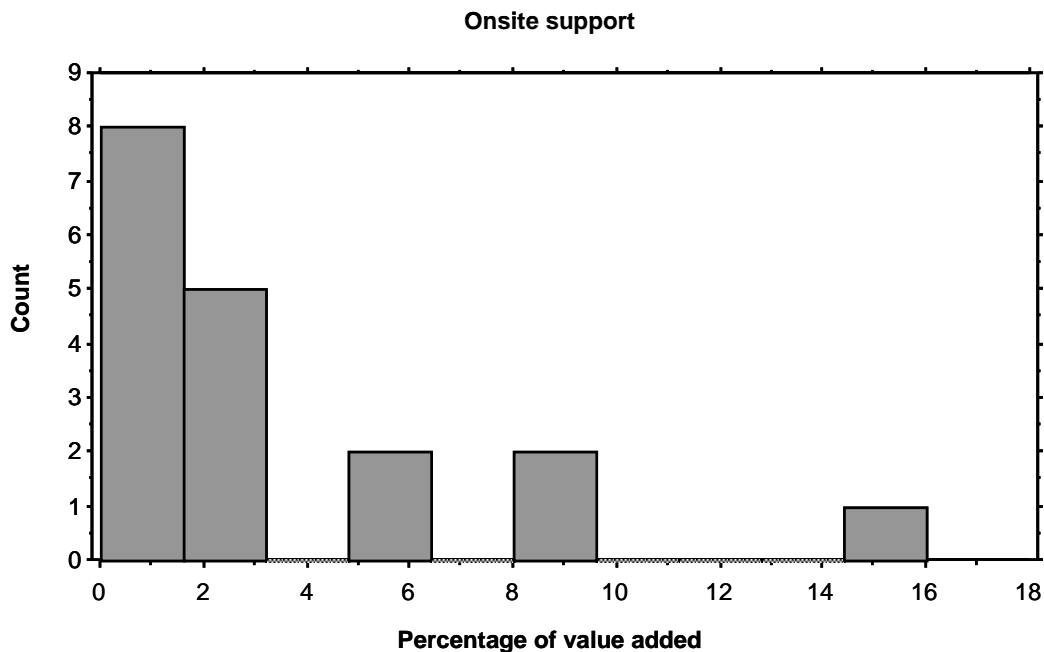
11. Production control system

Is there a computerized production control system?	41	59	
What type of computer do you use?	42	33	24
Was the system developed in-house or did you buy a package?	33	33	33

In the production control system area, 41% of the sample claims that they have a computerized production control system. An ANOVA analysis between this factor and the type of company does not show any significant difference.

It seems that computers are present in roughly 50% of the companies and that of these roughly 50% developed the system in-house, which is rather surprising in these type of companies. It suggests that the systems are of a very elementary nature, and that there is probably a lot of room for improvement in the EDP area.

12. Handling of urgent orders

Following pre-established rules	Mode:	6
By delivery date		6
According to the foreman's criterion		
According to the worker's criterion		1
Decided by one person (always the same)		2
Decided by the highest ranking person present		6

Observing the highest ranking criteria, we can see the correlation between formal priority rules, due dates or some other fixed rules and the criterion of the highest ranking person present (which is of a fairly inconsistent nature). To develop an understanding of this co-existence we need more knowledge of the operations profile of each company.

Part III: Information needs and availability

Total results

In the analysis of the total results, we find a high degree of interest[22] in the following items:

Research

- characteristics of products currently on market

- the general nature of the furniture market

Characteristics of products currently on market	87	11	2	39	54	7
Nature of furniture market	78	17	5	39	54	7
Behavior of competitors	55	39	6	44	44	12
Different ways of designing furniture	67	22	10	48	38	14

Quality assurance

- European standards and regulations

- inspection and quality control systems

European standards and regulations	68	23	10	50	33	17
Quality offered by competitors	77	18	5	27	56	16
Dimensional stability and tolerances	70	24	7	36	55	9
Inspection and quality control systems	79	14	7	33	57	10
Types and causes of defects	86	12	2	42	46	12

Production process design

- new machines available

- new, more efficient production processes

- new, more flexible production processes

New machines available	84	9	7	34	51	15
Cost of alternative ways of making furniture	73	21	6	60	31	10
Competitors'production processes	56	34	10	57	35	8
New,more efficient production processes	88	10	2	61	29	10
New, more flexible production processes	88	11	2	58	31	10
Speed with which workers learn new processes	67	31	2	43	41	16

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[22] The degree of interest is measured by a 75%, or higher, level of interest in the total results.

Purchasing

Characteristics of substitutes for present components	77	18	5	53	37	10
Characteristics of possible suppliers	62	33	5	36	54	10
Suppliers'new product plans	67	23	11	41	37	22
Competitors'purchasing practices	49	36	15	49	32	19
Purchase prices in alternative markets(West,East,etc.)	46	23	30	52	23	25

Of those only

- – new machines available

- – new, more efficient production processes

- – characteristics of substitutes for present components

Many companies appeared to experience great difficulty in obtaining solid information regarding the nature of available substitutes for the components that they are presently using[23]. Information on other elements (such as the characteristics of possible suppliers, suppliers' new product plans, competitors' purchasing practives, etc) seems to be more readily available[24]. The results are as follows[25]:

Design

Professional design services	41	31	28	40	38	23
Design resources, such as CAD	38	31	31	24	43	33
Ergonomic product qualities	49	35	16	30	41	30
Calculation of physical properties before making the product	47	36	17	32	52	16
Availability of standard furniture components	55	36	9	24	61	15
Special components(electronic, fireproofing, etc)	38	34	28	45	29	26

Input Logistics

Transport options available	55	34	11	20	63	17
Lead-times, prices and associated costs	67	26	7	22	64	13
Means of supply,purchase plans, batches, etc.	46	44	9	25	61	14

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[23] The degree of difficulty is measured by a 50%, or higher, response level to the question*: was getting the information difficult?*

[24] The degree of availability was measured by a 59%, or higher, response level to the question: *was getting the information easy?*

[25] The percentages in the left hand column express the amount of interest in the item (a lot/ a little/ not at all) and the percentages in the right hand column refer to the difficulty in getting the information (difficult/ easy/ very easy).

Production

Cost and time standards used in other companies	49	41	10		61	25	14
Methods,tools and fixtures available and/or used by others	62	33	4		51	41	8
Types of labour available and evolution forecasts	50	37	11		50	34	16
Problems associated with quality and process improvement	73	22	4		51	38	11
Plant layout and normal in process inventory	47	44	8		24	59	18
Other companies'productivity and performance	52	37	11		65	21	15
Most common organization structure for operations	37	58	5		30	58	12
Other companies' production and delivery lead-times	49	47	4		22	62	16
Production Control Systems available on the market	41	57	2		34	53	13
Main productivity improvement programs implemented in industry	64	33	2		57	29	14
Availability of middle management training	49	37	14		43	40	17
Worforce training schemes available and their features	60	30	9		56	31	14

Output logistics

Distribution channels used in the market	68	25	7		24	50	26
Packaging and safety conditions during transport	69	24	7		24	49	27
Current distribution used in the industry	62	28	10		33	39	28
Local regulations and standards	46	39	15		27	44	29
Storage methods, times and prices	53	35	13		23	45	32

Installation

Local practices in product installation	45	31	24		16	58	26
Possible local installers	41	27	31		24	44	32
Expected operating standards and in-use specifications	43	32	26		34	37	29
Competitors' habits in furniture installation	43	33	24		40	33	28

Support

Types of problems expected in product use	57	32	11		29	57	14
Guaranteed practices expected(or demanded) by customer	64	30	6		30	50	20
Legal maintenence requirements	57	28	15		33	42	26
Customer knowledge and requirements	67	24	9		31	47	22
Possible evolution of users'habits	70	23	7		53	31	16
Special conditions required by local market	46	37	16		35	37	28
Spare parts logistics	44	35	21		18	53	30

Maintaining customer satisfaction

Characteristics of local customers	67	24	9		33	48	19
Ways of reaching the user and communicating with him or her	74	18	9		44	33	22
Local organizations which can help in this	57	25	18		43	36	21
Legal requirements and customers' rights	68	25	7		36	49	16

In an analysis of the data, the items - besides those mentioned above - which involved the greatest difficulty in obtaining information about were:

Quality assurance

   – European standards and regulations

Production process design

   – costs of alternative ways of making furniture

   – competitors' production processes

Purchasing

   – characteristics of substitutes for present components

Production

   – cost and time standards usual in other companies

   – methods, tools and fixtures available and/or used by others

   – types of labour available and evolution forecasts

   – problems in achieving quality and production process improvements

   – other companies' productivity performance

   – main productivity improvement programs implemented within the industry

   – available work force training schemes and their features

Analysis of EEC member states

In an analysis comparing member states, the statistics show the following results:

Research

   – *Characteristics of products currently on market*
    Companies in the Federal Republic of Germany and Italy have a 100% interest and a 0% level of difficulty in obtaining this information.

   – *Nature of the furniture market*
    German companies have a 100% interest with a 0% difficulty range in obtaining this information, French companies have an 87% level of interest with a 31% level of difficulty.

   – *Behavior of competitors*
    Spanish companies have a 75% level of interest and a 48% level of difficulty in obtaining this information. The rest show a 40-50 interest range with low difficulty levels.

    – *Different ways of designing furniture*
German and French companies both have an 80% level of interest and a difficulty level of 40%. Spanish and UK companies have a 50% level of interest and a similar level of difficulty in obtaining this information (50-59).

Design

    – *Professional design services*
Spanish companies have the highest interest level with a difficulty rate of 50%.

    – *Design resources such as CAD*
Companies from the Federal Republic of Germany have the highest interest level together with the least difficulty in obtaining the information (80 % said it was very easy to find).

    – *Ergonomic quality products*
Companies from the Federal Republic of Germany and Italy have a very high level of interest (100%) with the lowest difficulty level (Italian companies say that it is exceptionally easy (100%) to find whereas companies from the Federal Republic of Germany state that it is fairly easy (75%)).

    – *Calculation of physical properties before making product*
Companies in the five member states showed a similar interest level (50%) with a similar level of difficulty (30%), with the exception of the companies from the United Kingdom, which reported a somewhat lower difficulty level (17%).

    – *Ergonomic quality products*
Companies from the Federal Republic of Germany showed the highest level of interest and the lowest difficulty level in relation to obtaining relevant information.

    – *Special components*
Companies from the Federal Republic of Germany and Italy had a 50% level of interest with a 40% level of difficulty in obtaining such information.

Quality assurance

    – *European standards and regulations*
Companies from the Federal Republic of Germany, Italy and France have the highest interest level, with a 45% level of difficulty in the Federal Republic of Germany, 9% in France and 0% in Italy.

    – *Quality offered by competitors*
Companies from the United Kingdom and Spain have an 80% level of interest with a difficulty level of 80%.

    – *Dimensional stability and tolerances*
Companies from the Federal Republic of Germany have a 100% interest level with a difficulty level of 25%.

    – *Inspection and quality control systems*
Companies from the Federal Republic of Germany have a 100% level of interest with a 25% difficulty level. Spanish companies have a significantly higher level of difficulty in obtaining such information.

– *types and causes of defects*
Companies from all the member states show a high level of interest, with Spanish companies showing the greatest. All member states revealed levels of difficulty of between 40 and 50%, with the exception of the F.D.R, which had a somewhat lower level.

Production design process

– *Availability of new machinery*
Companies from Spain and Italy show a 100% interest level. Those from Spain have a 36% difficulty level in obtaining such information. Companies from The Federal Republic of Germany show an 83% level of interest with a 40% difficulty level.

– *Costs of alternative methods of furniture production*
Companies from the Federal Republic of Germany and Italy show a 100% interest level with a 25% level of difficulty reported in the Federal Republic of Germany. Spanish companies show a 90% level of interest but also have the highest level of difficulty (83%).

– *Competitors' production costs*
There is a higher level of interest (64-66%) among companies from the Federal Republic of Germany and the United Kingdom, with a corresponding 12% level of difficulty in the companies from the Federal Republic of Germany and a 70% level of difficulty among those in the United Kingdom.

– *New, more efficient production processes*
There is a very high level of interest in companies from the United Kingdom, Italy, the Federal Republic of Germany and Spain, with the highest difficulty levels among companies in Spain and the lowest among those in the Federal Republic of Germany.

– *New more flexible production processes*
We discovered a very high level of interest in companies from the Federal Republic of Germany, Italy, Spain and France. The highest level of difficulty was found among companies in Spain and Italy and the lowest in companies in the Federal Republic of Germany.

– *Speed with which workers learn new processes*
The highest level of interest is among companies in the Federal Republic of Germany (83%) with a corresponding low difficulty level (20%). The rest of the member states have a similar interest level (70%), with the highest difficulty level found in Spain.

Purchasing

– *Characteristics of substitutes for present components*
Companies from Spain and Italy have a very high interest level and a very high corresponding level of difficulty in finding the information. A significantly lower level of difficulty was found in the Federal Republic of Germany.

– *Characteristics of potential suppliers*
There is a high level of interest among companies in France but they also face a lot of difficulty in obtaining the information. Significantly lower levels of difficulty in the Federal Republic of Germany.

- *Suppliers of new product plans*
  Highest interest level in companies in the Federal Republic of Germany and France with a 20% difficulty level for companies in the Federal Republic of Germany and a level of 33% among their French counterparts.

- *Competitors' purchasing practices*
  Companies from the Federal Republic of Germany and France show a 60% level of interest, with a high level of difficulty among the companies in France (69%) and a low level of difficulty among their counterparts in the Federal Republic of Germany (60% said it was very easy to find relevant information.)

- *Purchase prices in alternative markets*
  The highest level of interest is found among companies in France with a corresponding difficulty level of 73%. The rest of the member states show similar interest levels (30-40%), with companies in Spain admitting to far greater difficulty in obtaining relevant information, whilst companies in the Federal Republic of Germany find it much easier.

Input logistics

- *Transport options available*
  Companies from the Federal Republic of Germany and the United Kingdom have similar interest levels with a level of difficulty of 33% in the United Kingdom and 0% in the Federal Republic of Germany.

- *Lead-times, prices and associated costs*
  Companies from the Federal Republic of Germany and France have a high interest level (84), together with a low difficulty level, in obtaining information.

- *Means of supply and purchase plans*
  Similar interest levels in all member states (50%) with a high level of difficulty in obtaining relevant information in the United Kingdom and a relatively low one in the Federal Republic of Germany.

Production

- *Usual cost and time standards in other companies*
  Similar levels of interest among companies in the Federal Republic of Germany and Spain, with a corresponding low level of difficulty in obtaining information in the Federal Republic of Germany and a high level in Spain.

- *Methods, tools and fixtures available and/or used by others*
  Companies from the Federal Republic of Germany and Spain show a high level of interest, with the Federal Republic of Germany boasting low, and Spain comparatively high, difficulty levels in obtaining relevant information.

- *Types of labour available and evolution forecasts*
  Companies from the Federal Republic of Germany boast the highest levels of interest (100%) with a low level of difficulty (20%). There is a significantly higher level of difficulty in Spain.

– *Quality and production process improvements problems*
Companies from the Federal Republic of Germany and Spain show the highest levels of interest, with a 0% difficulty level in the Federal Republic of Germany and a 74% difficulty level in Spain.

– *Plant lay out and normal inventory processes*
Companies from the Federal Republic of Germany show the highest level of interest, with very little difficulty in obtaining relevant information. Companies from the United Kingdom show the highest level of difficulty in obtaining such information (43%) with a corresponding level of interest of 30%.

– *Other companies' productivity and performance*
Companies from the Federal Republic of Germany show the highest interest level with a low difficulty level in obtaining relevant data. The Highest difficulty levels are reported among companies in Spain and the United Kingdom.

– *The most common organizations structure for operations*
Companies from the Federal Republic of Germany boast the highest level of interest alongside a difficulty level of 20%.

– *Other companies production and delivery lead times*
Companies from the Federal Republic of Germany show the highest level of interest with a corresponding level of difficulty of 0%.

– *Production control systems available on the market*
Companies from the Federal Republic of Germany have the highest level of interest together with a 0% difficulty level in obtaining relevant information.

– *The most important productivity improvement programs implemented in the industry*
Companies from the Federal Republic of Germany show the highest level of interest (83%) alongside a 0% difficulty level in obtaining relevant information. Spanish companies have a similar interest level (71%) together with a difficulty level of 76%.

– *Availability of middle management training*
Companies from the Federal Republic of Germany and Spain show an interest level of 60% with a corresponding level of difficulty of 0% among companies in the F.D.R and 67% among their Spanish counterparts.

– *Workforce training schemes available*
Companies in the Federal Republic of Germany and Spain show an interest level of 80% with a corresponding level of difficulty of 20% in the companies from the Federal Republic of Germany and 72% among their Spanish counterparts. A similar difficulty level is shown in companies from the United Kingdom (62%).

Output logistics

– *Distribution channels available in the market*
Companies from France, Spain, and the Federal Republic of Germany show similar interest levels, with a difficulty level of 10% among French companies and 20-25% among companies in the Federal Republic of Germany and Spain. The highest level of difficulty in obtaining information is recorded in the United Kingdom.

– *Packaging and safety conditions during transportation*
Companies in France and Spain show similar interest levels with a difficulty level of 0%
for those in France and 33% for their counterparts in Spain.

– *Currents of distribution in force within the industry*
The greatest interest was recorded among companies in Spain, with a corresponding
difficulty level of 45%, similar to that of the United Kingdom.

– *Local regulations and standards*
Companies in the Federal Republic of Germany and Italy reported the highest interest
levels, with a difficulty level in both countries of 0%.

– *Storage methods, times and prices*
Companies from the United Kingdom have the highest interest level (64%) with a
corresponding difficulty level of 46%.

Installation

– *Local practices in product installation*
Companies from the Federal Republic of Germany reported the highest level of interest
with a 0% difficulty level in obtaining relevant information.

– *Possible local installers*
Companies from the Federal Republic of Germany showed the highest level of interest
with a corresponding 0% difficulty level in obtaining the relevant information.

– *Expected operating standards and in use specifications*
Companies from the Federal Republic of Germany showed the highest interest level with
a corresponding difficulty level of 20%.

– *Competitors' habit in furniture installation*
Companies from the Federal Republic of Germany and Italy demonstrate the highest
levels of interest, with the German companies reporting a low difficulty level in contrast
to the Italian companies' very high level of difficulty.

Support

– *Types of problems expected in product use*
All member states show a similar interest level (50%) in these areas whilst the highest
difficulty levels were reported by companies in Spain and the United Kingdom.

– *Guarantee practices expected (or demanded) by the customer*
Companies in all the member states show similar interest levels (50%) with the highest
difficulty level reported by companies in Spain and United Kingdom.

– *Legal maintenance requirements*
The highest level of interest was shown by companies in the United Kingdom, with a
corresponding difficulty level of 31%. The greatest difficulties in obtaining information
were reported by West German companies.

– *Customer knowledge and requirements*
Spanish companies show the highest level of interest and the highest level of difficulty.

- *Potential evolution of user's habits*
  Spanish firms show the highest level of interest and the highest level of difficulty.

- *Special conditions required by the local market*
  Companies in Spain, Italy and the United Kingdom show similar levels of interest (50%) and similar difficulty levels (39%).

- *Spare parts logistics*
  The greatest interest was shown by companies in the United Kingdom, with a corresponding difficulty level of 25%.

Maintaining customer satisfaction

- *characteristics of local customers*
  Companies in France and the Federal Republic of Germany show a similar interest and difficulty level. Highest difficulty levels are reported in Spain and the United Kingdom.

- *Methods of reaching the end user and communicating with him or her*
  Companies in Spain and Italy show similar levels of interest in this field and similar levels of difficulty in obtaining relevant information.

- *Local organization*
  Companies from the Federal Republic of Germany, Spain and the United Kingdom show similar levels of interest with a greater difficulty being experienced by companies in Spain and the United Kingdom. A 0% difficulty level was reported by companies in the Federal Republic of Germany.

- *Legal requirements and customer's rights*
  Companies from the Federal Republic of Germany and Spain show similar levels of interest and difficulty.

Summary of results:

All Member States show similar (moderate) interest levels in the following areas:

- calculation of physical properties before making products
- types and causes of defects
- means of supply, purchase plans, batches
- types of problems expected in the product use
- guarantee practices expected (or demanded) by customer

There are some member states that show similarly high levels of interest in the following areas:

- new, more efficient production processes (United Kingdom, Italy, Federal Republic of Germany and Spain)
- new more flexible production processes (The Federal Republic of Germany, Italy, Spain and France)
- European standards and regulations (The Federal Republic of Germany, Italy and France)

- distribution channels used in the market (France, Spain and the Federal Republic of Germany)
- local organizations which can help with this (Federal Republic of Germany, Spain and the United Kingdom)
- special conditions required by local market (Spain, Italy and the United Kingdom)

The Federal Republic of Germany and Italy share similar levels of interest in:

- the characteristics of products currently on market
- ergonomic product qualities
- special components
- costs of alternative ways of making furniture
- local regulations and standards
- competitors' methods of furniture installation

The Federal Republic of Germany and France share similar levels of interest in:

- different ways of designing furniture
- characteristics of local customers
- tendency of furniture market
- suppliers' new product plans
- competitors' purchasing practices
- lead-times, prices and associated costs

The Federal Republic of Germany and the United Kingdom share similar levels of interest in:

- competitors' production costs
- transport options available

France and Spain share similar levels of interest in:

- packaging and safety conditions during transport

Spain and Italy share similar levels of interest in:

- availability of new machinery
- characteristics of substitutes for present components
- methods of reaching the end user and communicating with him or her

United Kingdom and Spain share similar levels of interest in:

- quality offered by competitors

Federal Republic of Germany and Spain share similar levels of interest in:

- legal requirements and customer's rights
- cost and time standards in other companies
- methods, tools and fixtures available and/or used by others
- the problems associated with quality and production process improvements
- the main productivity improvement programs implemented in the industry

- availability of middle management training
- workforce training schemes and their features

There are two countries that show significant differences in some of their most important information needs

Spain

- behavior of competitors
- professionals design services
- current distribution in force in the industry
- customer knowledge and requirements
- possible evolution of users' habits

United Kingdom

- storage methods, times and costs
- legal maintenance requirement
- spare parts logistics

We find that the highest degree of interest among companies in the G.D.R. is in the following areas and items[26]:

Research

- characteristics of products currently on market*
- nature of the furniture market*

Quality assurance

- dimensional stability and tolerances*
- inspection and quality control systems*

Production

- methods, tools and fixtures available and / or used by others**
- types of labour available and evolution forecasts**
- problems associated with quality and production process improvements**

Output logistics

- local regulations and standards**

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[26] *: relevant

   **: very relevant

Final Comment

After this careful and thorough analysis of the responses to the Infosmes questionnaire, it is difficult to see a general pattern emerging in the data. In addition, the vague patterns that do emerge suggest a mixture of varying degrees of inconsistent behaviour which, if taken to be true, means that there is an extremely broad range of rather erratic strategies in the furniture sector. There are several reasons for this, among which we can include:

- – The broad mix of companies
- – Noise in the sample.
- – Evidence of dynamic behavior in the sample.

Even if we try to eliminate the first two reasons, which is far from easy considering the limited number of observations, the third cause still remains. It should represent a fundamental area of interest in future work. For one, the sector we have been studying is in a far from steady or stable state. We will need to be careful in defining the meaning of "steady state", since in business anything steady is almost dead. In any case, to be able to discount this third factor we desperately need to form a dynamic model of the evolution of the SME. In a previous study, we presented such a model, a synthesis of some previous models presented by other authors. Using the light thrown by the Infosmes sample, we intend to extend the model and convert it into an operational tool in further research.

Conclusions

The research up to now has been exploratory in nature. The aim was not so much to test the hypothesis as to develop a general understanding of the situation. Saying that, the research has supported some of the main points advanced in Chapter I. We have seen that SMEs in the furniture sector show evidence of companies encountering the following problems relating to information and innovation:

1. While a fairly large number of companies do not seem to encounter any barriers to innovation, when they do exist they tend to be a result of:

   - – A lack of qualified personnel
   - – A lack of money

   France and Spain are the countries with the greatest difficulties whilst the F.D.R has the fewest problems.

2. A significantly high number of firms seem to agree on the same needs for information. Some of these are nothing more than general themes, such as a manifestation of ignorance or insecurity. But some of the information needed is of a very specific nature and should be provided by the governing or institutional bodies of each member state.

   Companies require information on:

   - – European standards and regulations
   - – Inspection and quality control systems
   - – Production Process Design
   - – New Machines available

- New and more efficient production processes
- New and more flexible production processes

The above areas should form part of all countries' information-providing services. We feel this is true for all mature sectors, and not just the furniture sector.

3. In general, the companies do not use university or administrative bodies. The first place to turn, it seems, for obtaining information is the trade fairs whilst the second preferred choice is that of customers (as in the U.K.) or suppliers (as in the G.D.R).

4. In some countries, companies do not know *where or how* to acquire relevant and useful information. Although we do not have enough statistical evidence to prove this, we can tentatively conclude that in the G.D.R. there seems to be adequate provision of the type of information services that SMEs require. Moreover, the information seems to be provided in such a way that it can be understood by the SME. We can also deduce that Spain and the U.K. are probably the member states whose SMEs have the greatest difficulty in obtaining relevant information.

The research has also shown that it is necessary to systematize the handling of the databases, providing mechanized indexes and thesauruses. The access procedures of many data bases are highly technical and need special expertise. Sometimes a lot of time and effort is wasted on trying to pinpoint something that does not actually exist.

Thus, from all the previous data analysis we can summarize the results by stating that SMEs seem to have real and concrete information needs in order to innovate. Such information is provided, at least to a certain extent, in some member states whilst in others there appears to be a desperate need for clearer and more accessible information services. The greatest impediment to innovation is almost always a shortage of qualified personnel. Thus, member states and the European Commission should put in place measures to help provide SMEs with better qualified personnel and at the same time improve their training programs.

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Annex 1
INFOSMES Project
(Sponsored by the DGXXIII - Economic European Community)
Questionnaire on information needs for innovation in the small and medium-sized business

Furniture Industry

The Instituto de Estudios Superiores de la Empresa is carrying out a research project sponsored by the General Directorate XXIII of the European Communities to ascertain how the EEC can help small and medium-sized businesses to overcome the information barriers that arise in the course of innovation projects.

Many ideas are often not put into practice in small and medium-sized businesses due to a lack of information or knowledge. On the other hand, many information professionals maintain vast and costly data bases that never get used by small and medium-sized businesses.

In this project, the word innovation is used to denote a *substantial change in the company's way of doing things.* This definition covers products, processes and management alike. It implies *new ways of doing things* which were not habitual before the change occurred and which most of the company members were largely ignorant of.

This questionnaire will **help the EEC** (*which will be the direct recipient of these results*) to decide what kind of assistance, whether monetary or otherwise, can be given to promote the dissemination of and access to the information available.

Your cooperation in this project is therefore extremely important. As this cooperation will be *completely secret and anonymous*, we ask you to omit all those data in the questionnaire that could be used to unequivocally identify your company.

The results of this project will be published at a future date but only in the form of statistical tabulations and general conclusions; not even the authors will be able to say which companies have answered the survey.

We thank you sincerely for your cooperation and the 30 minutes of your time that we estimate you will need to answer the questionnaire. When you have completed the questionnaire, please send it in the enclosed envelope to

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Aravaca - Madrid 28023
SPAIN

Instructions for filling in the questionnaire

The questionnaire consists of three parts. The first part is aimed at ascertaining your company's basic features in order to give us an idea of the kind of small or medium sized business it is. The second part seeks to ascertain how the company's management conceives the company's role in the market and the third part focuses on the company's information needs.

The third part is the part that is most important to us. If you feel that you do not have enough time to fill in all three parts, please give priority to the third part.

If any question is unclear to you, skip it and go onto the next question. The questions are fairly self-contained and you should be able to answer the questionnaire without any great difficulty. If you consider that answering any question would reveal classified information about your company and if you are not prepared to answer it, even anonymously, please ignore it. We have made all possible efforts to prevent this situation from arising but there is no way of guaranteeing it.

1. The usual procedure will be to mark a cross in the corresponding box after each question. As you will sometimes have to mark boxes containing text, we suggest you use a felt-tip pen.

   In Part One, **you will see that the boxes not containing text normally have to be filled in with numerical data.** Please do not worry if you cannot give us the exact figure; an estimate is good enough for us.

2. Question 2 in Part Two asks you to write a number from 1 to 8 in each box.

3. In **Part Three, each line expresses an information need; on the right-hand side, there are two columns for the answer**, each with three boxes per line.

   The first column is for indicating how much the type of information referred to interested (interests) you (A LOT, A LITTLE or NOT AT ALL). The second column is for stating how difficult it is for you to obtain such information (DIFFICULT, EASY or VERY EASY). Please **cross one box in each column** for each line of the questionnaire.

MANY THANKS FOR YOUR COOPERATION!

Annex 1 (continued)
INFOSMES Questionnaire – Part One

1 General

11 *In order to gain a brief overview of your company, please fill in the following data:*

Number of employees:

Sales in 1989:

Company's business activity:

Company's age:

Contribution margin in 1989:

	LOCAL	HOME COUNTRY	EEC	WORLD

Total assets at the end of 1989:

Company's market:

12 *Please state which of the following sentences best describes your company's organization*

1 The company's owners work in production

2 The owner spends most of his time managing the company

3 There is a management structure with well-defined functions

4 There is more than one management level and formal management systems are being developed

5 There is a divisional structure with a considerable degree of delegation

1 Your company is different because it has a unique product, which is different from the rest

2 Ditto above - because you are cheaper than your competitors

3 Ditto above - because you are more flexible than others

4 Ditto above - because your customer identifies with you

5 Ditto above - because you keep up-to-date with your industry's innovations

14 *What do you think you do better than your competitors?*

2 Innovation

21 *What is your Company's average growth rate over the last two years?*

22 *What are the most important innovations(s) that have taken place in your company over the last three years?*

23 *Has it diversified into new fields of activity in the last three years? Which?*

YES	NO

24 *When did the last innovation occur? What were the areas of greatest difficulty in implementing it?*

1 Lack of money	A LOT	LITTLE	NOTHING
2 Lack of worker skill	A LOT	LITTLE	NOTHING
3 Lack of qualified professional personnel	A LOT	LITTLE	NOTHING
4 Lack of middle management ability	A LOT	LITTLE	NOTHING
5 Lack of senior management ability	A LOT	LITTLE	NOTHING
6 Rejection by the rest of the company	A LOT	LITTLE	NOTHING
7 Lack of technical knowledge	A LOT	LITTLE	NOTHING
8 Lack of market response and support	A LOT	LITTLE	NOTHING
9 Change was too risky	A LOT	LITTLE	NOTHING

25 *When you want to do something innovative, do you act on intuition or do you systematically seek more information?*

SEARCH	INTUITION

26 *If you seek more information, who do you direct your enquiries towards?*

Public or private research centers	Always	Sometimes	Never
Universities and polytechnics	Always	Sometimes	Never
Chambers of Commerce	Always	Sometimes	Never
Autonomous community bodies	Always	Sometimes	Never
Eurowindows	Always	Sometimes	Never
Your suppliers	Always	Sometimes	Never
Your customers	Always	Sometimes	Never
Your friends or acquaintances	Always	Sometimes	Never
Your trade association	Always	Sometimes	Never
Other companies	Always	Sometimes	Never
Trade fairs and exhibitions	Always	Sometimes	Never
Consultants	Always	Sometimes	Never
There is nowhere I can go	Always	Sometimes	Never

27 *Do you feel safer working with other companies or do you prefer to innovate alone?*

ALONE	OTHERS

Do you have any comments that would help us to better understand the difficulties your company has encountered when innovating and how the Government could help you solve your information problems?

Annex 1 (continued)

INFOSMES Questionnaire – Part Two

1 How are your operations organized?

11 Do you produce by stock or by Job?	STOCK	JOB	
12 Do you have functional production centers specialized in certain operations?	YES	NO	**Number** ☐
13 Do you have dedicated production lines specialized in certain product lines?	YES	NO	
14 Do you have flexible production centers consisting of several machines which can carry out various sequences of operations?	MANY	SOME	NO
15 Do you use balanced assembly lines for high efficiency but which are relatively inflexible?	YES	NO	**Number** ☐

2 What personnel qualities are valued in your company?

Please rate each item from 1 to 8 — **RATING**

21 Discipline	☐
22 Initiative	☐
23 Responsibility	☐
24 Efficiency	☐
25 A job well done	☐
26 Docility	☐
27 Obedience	☐
28 Creativity and imagination	☐

3 How are your workers' tasks structured?

31 Is an average worker highly skilled in a few tasks or does he have to do a lot of things, according to the kind of work needed?	A FEW	A LOT	
32 Does the worker carry out his own quality control?	YES	NO	NO QC
33 Can he choose the task to do at any particular time?	ALWAYS	SOMETIMES	NEVER
34 Does he work alone or in a team?	ALONE	TEAM	
35 Is the incentive individual or group?	INDIV.	GROUP	

4 What kind of machinery does your company use?

41 Average age of machinery	☐
42 Number of machines less than 5 years old	☐
43 Number of conventional production machines	☐
44 Number of automatic machines	☐
45 Number of NC Centers	☐
46 Are they easy to reconfigure?	☐
47 And to set up?	☐

5 Structure of your product range

51 How many product lines does your company have?			I WORK TO ORDER
52 Are a large proportion of components common?	YES	NO	
53 How many new products do you introduce each year?			

6 Production capacity

61 What is the mean occupation of production capacity in your factory			
62 Do you subcontract work outside? How much (%)?	YES	NO	**%** ☐
63 Is overtime used? What is the percentage over total hours?	YES	NO	
64 Do you accumulate stock at certain times of the year? What percentage of annual production do you accumulate?	YES	NO	**%** ☐
65 What is your bottleneck? Please be explicit			
66 Do you plan to increase in-house production capacity?	YES	NO	
67 And to subcontract more?	YES	NO	

Annex 1 (continued)

INFOSMES Questionnaire – Part Two

7 Supplier management

71 What products do your major suppliers supply you with?

72 Is it your policy to have one or several suppliers for each product you purchase?

ONE	SEVERAL

73 Do you just buy from your suppliers?

74 Or do you obtain information and technical support from them?

75 Do you influence the actions of your suppliers?

76 Do the suppliers dominate supply and set the conditions?

YES	NO
YES	NO
YES	NO
YES	NO

8 Material management

How many months of stock do you have on hand?

82 Do you make forecasts and how?

NO	BY SIGHT	STAT

83 Do you calculate production loads and component requirements? How?

NO	MRP	BY HAND

84 Do you work by batches? What is the average batch sine?

YES	NO	Size

85 How long does it take to change a batch in your machines?

86 What is your minimum order quantity?

87 Do you use Just-in-Time practices?

YES	NO

9 Response times

91 What is your normal delivery lag?

92 What is your delivery lag for urgent orders?

93 How far in advance do you order supplies?

94 How much margin do you allow between production operations?

95 What is the average work backlog, in the number of machine days?

96 Is there any operation that is much longer than the others?

YES	NO

A Value added percentages

What is the percentage value of sales corresponding to each of the following operations:

A1 Research and Development

A2 Design

A3 Quality

A4 Process design

A5 Purchasing

A6 Input logistics

A7 Production

A8 Output logistics

A9 Installation

AA Onsite support

B Production control system

B1 Is there a computerized production control system?

YES	NO

B2 ¡What type of computer do you use?

MICRO	MINI	BIG

B3 Was the system developed in-house or did you buy a package?

INHOUSE	BOUGHT	MIXED

B4 What is the package's name?

C Handling of urgent orders

How are priorities allocated in the factory? (please number from 1 to 6, with 6 being the most frequent)

C1 Following pre-established rules

C2 By delivery date

C3 According to the foreman's criterion

C4 According to the worker's criterion

C5 Decided by one person (always the same)

C6 Decided by the highest ranking person present

Annex 1 (continued)

Part Three

The last time you started to develop a new way of doing something in your company, perhaps you felt the need to obtain relevant information about the action you were going to undertake. In this part, we would like you to tell us

a) *First column.* What kind of information you needed in that particular case and what might also be useful to you in other similar situations in the future.

b) *Second column.* The amount of difficulty you had in obtaining this information (if you managed to obtain any).

INFOSMES Questionnaire – Part Three

Code number	INTEREST			GETTING INFO		
	Interested			Was		
	A lot	A little	Not at all	Difficult	Easy	Very easy
1 Research						
11 Characteristics of products currently on market						
12 Nature of furniture market						
13 Behavior of competitors						
14 Different ways of designing furniture						
2 Design						
21 Services of professional designers						
22 Design resources, such as CAD						
23 Ergonomic qualities of products						
24 Calculation of physical properties before making the product						
25 Availability of standard furniture components						
26 Special components (electronic, fireproofed, etc.)						
3 Quality Assurance						
31 European standards and regulations						
32 Quality offered by competitors						
33 Dimensional stability and tolerances						
34 Inspection and quality control systems						
35 Types and causes of defects						
4 Production Process Design						
41 New machines available						
42 Costs of alternative methods of furniture production						
43 Competitors' production processes						
44 New, more efficient production processes						
45 New, more flexible production processes						
46 Speed with which workers learn new process(es)						
5 Purchasing						
51 Characteristics of substitutes for present components						
52 Characteristics of possible suppliers						
53 Suppliers' new product plans						
54 Competitors' purchasing practices						
55 Purchase prices in alternative markets (West, East, etc.)						
6 Input Logistics						
61 Transport options available						
62 Lead-times, prices and associated costs						
63 Means of supply, purchase plans, batches, etc.						
7 Production						
71 Cost and time standards used by other companies						
72 Methods, tools and fixtures available and/or used by others						
73 Types of labor available and evolution forecasts						
74 Problems associated with quality and production process improvements						
75 Plant lay out in process inventory						
76 Other companies' productivity and performance						
77 Most common organizational structure for operations						
78 Other companies' production and delivery lead-times						
79 Production Control Systems available on the market						
7A Main productivity improvement programs implemented in the industry						
7B Availability of middle management training						
7C Workforce training schemes available and their features						

Annex 1 (continued)

INFOSMES Questionnaire – Part Three

8 Output Logistics

81 Distribution channels used in the market

82 Packaging and safety conditions during transport

83 Current methods of distribution used in the industry

84 Local regulations and standards

85 Storage methods, times and prices

9 Installation

91 Local practices in product installation

92 Possible local installers

93 Expected operating standards and in-use specifications

94 Competitors' habits in furniture installation

A Support

A1 Types of problems expected in product use

A2 Guarantee practices expected (or demanded) by customer

A3 Legal maintenance requirements

A4 Customer knowledge and requirements

A5 Possible evolution of users' habits

A6 Special conditions required by local market

A7 Spare parts logistics

B Maintenance of satisfaction

B1 Characteristics of local customers

B2 Ways of reaching the end user and communicating with him or her

B3 Local organizations which can help in this

B4 Legal requirements and customers' rights