

# DESIGN MANAGEMENT IN THE CERAMIC SECTOR

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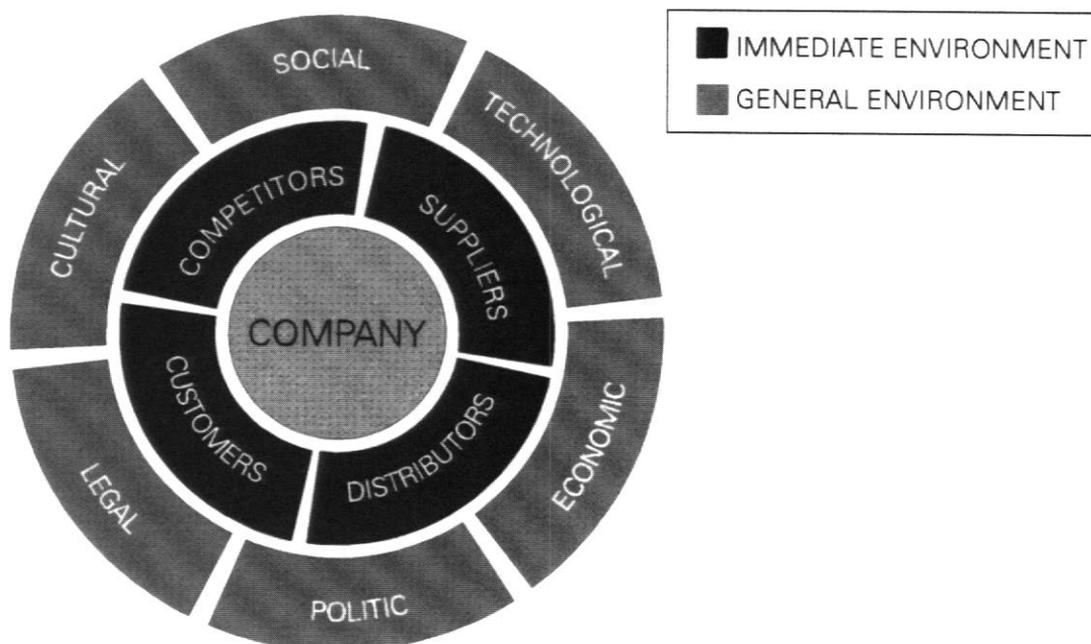
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This study addresses the incorporation of design in business management in the ceramic wall and floor tile industry. The model integrating design in company organization charts will be studied, as well as the infrastructure and human resources involved, in order to characterize its situation, studying means of optimization.

## 1.- FUNCTIONS AND ROLE OF DESIGN IN THE COMPANY.

At present, enterprise in the ceramic sector not only faces the challenge of having to respond quickly to the needs of a continually changing society that is undergoing economic, technological, political, sociological and legal transformations, but also to anticipating market demands (Fig. 1. a.).

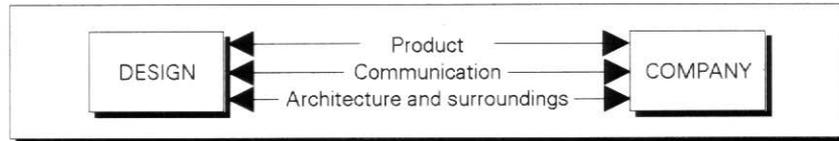


1.a.- Company environments

Wall and floor tile industries must translate these needs into new ceramic products. To do so, the company makes use of design, as well as other resources.

Design is to be understood as an analytical, interdisciplinary, technical and creative process, whose objective is: determining the characteristics of a product, whether this be an industrial ceramic product, a graphic system or an architectural infrastructure (Fig.1.b.).

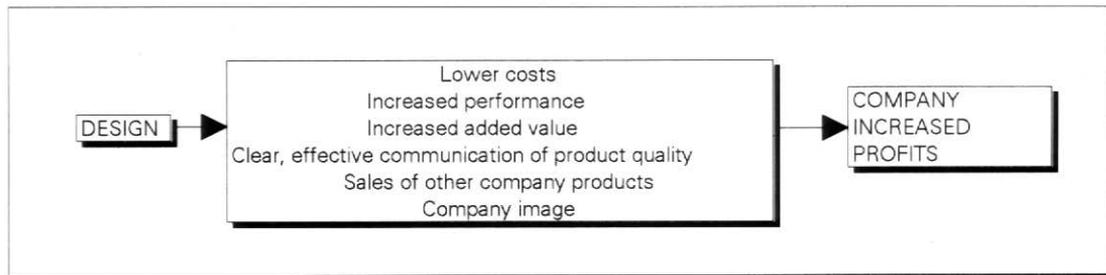
1.b.- Areas in which design acts in the company



Design relates aspects such as user, market, materials, uses, trends, communication, image, technology, quality, costs etc., which are brought together in product creation, production and marketing stages. Design must therefore be considered a dynamizing factor in the company.

Good design can add use and value to a product, decreasing costs and providing clear, effective product communication. This can, furthermore, entail sales of other company products. Thus, design decisively contributes to meeting company objectives, as well as consolidating its image, and therefore raising profits (Fig.1.c.).

1.c.- Contributions of design to the company



The industries in the ceramic sector are currently striving not just to improve their products, but also their image as innovative enterprises with regard to their competitors. In this sense, design also constitutes an innovative factor, as it can contribute new materials, new techniques and new formal solutions to products that enter the marketplace.

Design is just one of several activities companies undertake to attain their objectives, but it has a marked impact on the outcome of the whole industrial and commercial strategy. Thus, design should not be understood as a merely aesthetic, formal contribution to creating ceramic products, but as an element of strategic significance for the company, a fundamental factor in competitiveness, product quality and stability in the market, and requires being managed as such.

There is no single model, or sole solution in design management. The level of integration of design in tile manufacturing enterprise depends on company size, organizational, financial and technological capability, on previous involvement in design, on general company strategy and policy and its position in the market.

The following analyzes the incorporation of design in the ceramic industry. Data were used stemming from a study on design organization and management in the sector. The information was

obtained by personal or telephone interviews to companies in the province of Castellón, in July 1993.

**2. DESIGN MANAGEMENT IN THE CASTELLON CERAMIC SECTOR.**

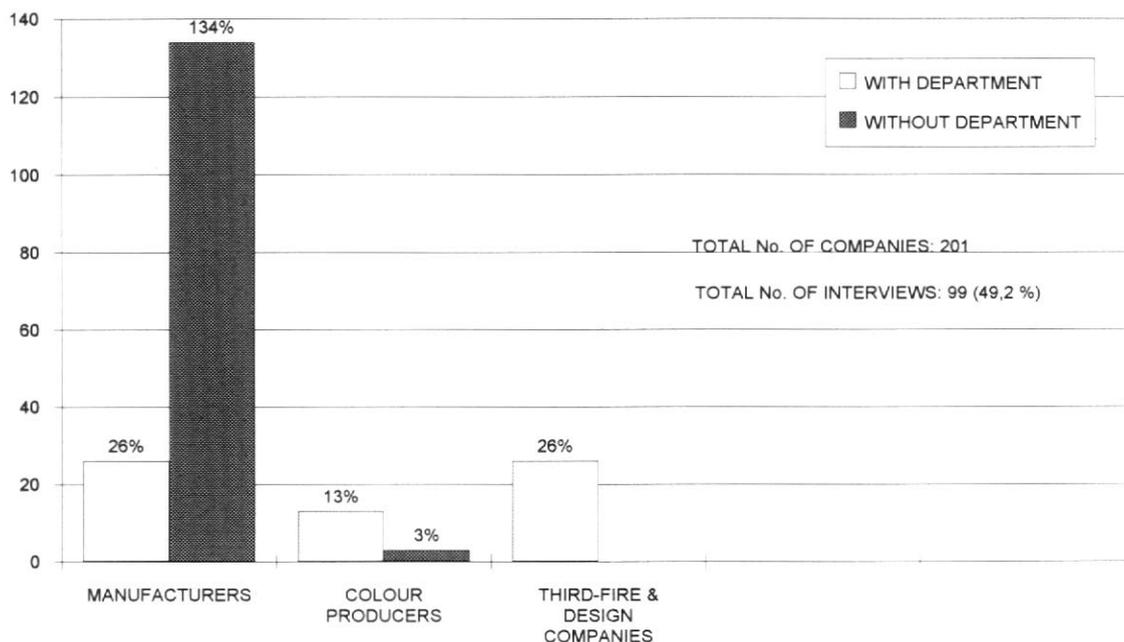
**2.1. STUDY CHARACTERISTICS.**

First of all, a telephone survey was held in which companies were asked if they had a design department and the following response was found:

- Ceramic wall and floor tile manufacturers: 26 out of 159.
- Producers of frits, glazes and colours: 13 out of 16.
- Third-fire and design consultancy companies: 26.

Three types of questionnaires were subsequently drawn up: one for ceramic wall and floor tile manufacturers and producers of frits, glazes and colours, with design departments, another for third-fire firms and design consultancy organizations, and the third kind of questionnaire went to ceramic wall and floor tile manufacturers and producers of frits, glazes and colours, without a design department. A total of 99 interviews were held: 37 personal interviews at companies with design departments (17 ceramic wall and floor tile manufacturers, 11 producers of frits, glazes and colours, and 9 third-fire and design consultancy companies), and 62 telephone interviews took place with companies that had no design department (Fig. 2.1.).

**Fig. 2.1.- OVERVIEW OF COMPANIES**



It was attempted to infer from this study what role industrial design plays in the Castellón ceramic sector, how it is managed, what its human and material resources are, what the usual work procedure is and what needs or deficiencies might be detected, which on being met or remedied, could allow optimizing the result.

**2.2. CHARACTERISTICS OF THE COMPANIES IN THE SECTOR.**

The high degree of fragmentation in the sector hinders obtaining a view of a company model that may be generalized. Small and medium-sized enterprises prevail among ceramic wall and floor tile manufacturers. The following data were supplied by the Spanish Association of Ceramic Tile Manufacturers, ASCER:

- Average turnover is assessed at round 1,000 million pesetas yearly.
- The average labour force consists of about 75 workers.
- The average export figure lies at about 50% of the turnover.

On comparing these figures with data from the study of tile manufacturing firms with design departments, significant variations become apparent (Fig. 2.2.a.)

**2.2.a.- Company characteristics**

	<b>OVERALL COMPANY SIZE</b>	<b>SIZE OF COMPANIES WITH DEPARTMENT</b>
TURNOVER	Pta 1,000 Million	Over Pta 2,000 Million
LABOUR FORCE	75 Workers	Over 75 Workers
EXPORTS	50%	Over 50 %

- Average turnover exceeds 2,000 million pesetas yearly (except in those companies with a design department, but with highly specialized production).
- The average labour force exceeds 75 workers (54% of these companies have over 200 workers).
- The average export figure lies at over 50% of the turnover.

One of the most salient characteristics of this sector is its great geographic concentration in the surroundings of Castellón, where 85% of the ceramic tile industry is found. This circumstance has fostered the growth of subsidiary companies, to which those offering design services also belong.

The ceramic industrial sector can basically be broken down into two groups of companies:

1. Ceramic wall and floor tile manufacturers.
2. Companies involved in complementary activities:

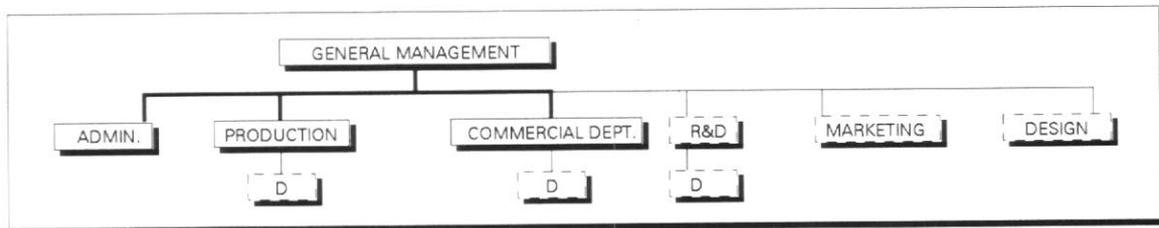
- Producers of frits, glazes and ceramic colours.
- Machinery manufacturers.
- Third-fire companies and firms making trim units.
- Design organizations and other service companies: printing screens, reproduction, CAD.

Since 1980, the ceramic sector has been involved in extensive technological upgrading, with a view to improving product quality and innovative capability, and ultimately make its products competitive in the national and international marketplace.

This striving to improve production organization also includes paying growing attention to introducing and fostering a design policy in company management. The following data will help to set out the present situation.

There is no single organization model in ceramic tile company organization charts. Generally, at the head stands the manager or managing director. Then follow the heads of administration, production, sales, marketing, and R&D (if the last two departments are actually found) (Fig. 2.2.b.).

#### 2.2.b.- Organization chart



In companies with a design department, its head usually depends on management, followed at some distance by the head of marketing or sales director, and then the head of Research and Development.

In companies with no design department, although there is a person in charge internally that manages design, this person does not have any specific training and is head of another department.

As far as sales management is concerned, the companies have developed a system organized according to traditional models: head/s of the domestic market, head/s of foreign markets.

Most firms claim to have information on the sector, but none wished to or could specify the amount or quality of the information involved. Most stated they used information stemming from their sales network: sales people, customers and distributors.

All the companies, except one, considered it to be a good moment for international expansion. It should be remembered that current export figures lie at or over 50%. The most frequently mentioned reasons are:

- Devaluation of the peseta.
- Need to open foreign markets as a result of the fall of the domestic market.
- Increase in quality and competitiveness of company products.
- Technological improvement.
- Improvement in the transport network.
- Improvement and innovation in the field of industrial design.

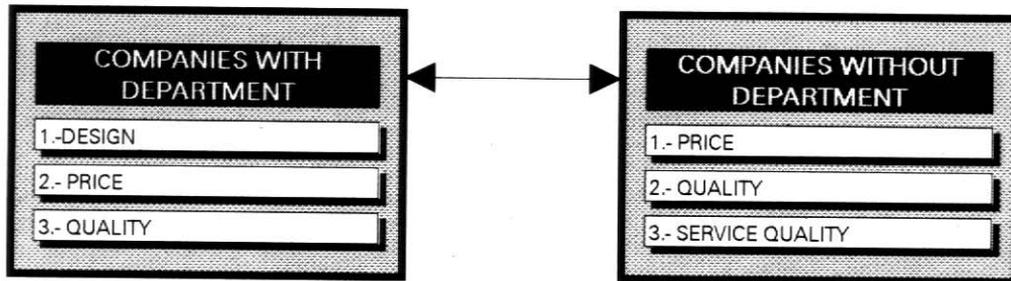
As far as market segments are concerned, this does not appear to be a policy followed by the companies. It is rather attempted to get a market share by diversifying the offer, as will become clear below when dealing with the launching of new products. However, there is a strong trend towards serving mid- and upmarket segments:

- 70% of the companies target the upmarket segment with 50% of their production, with the other 50% aimed at the mid-market segment.

- 30% of the companies target the mid-market segment with 90% of their production, with the remaining 10% aimed at the upmarket segment.

The consulted companies were asked to rate a series of factors influencing national and international competitiveness. The results were as follows (Fig. 2.2.c.):

**2.2.c - Factors impacting competitiveness**



- Companies with a design department:

1. Design
2. Price
3. Quality

- Companies without a design department:

1. Price
2. Quality
3. Service quality

That is, large companies, with a turnover of more than 2,000 million pesetas, with more professional management, with an organized design department, consider design to be the determining factor in their production.

However, for medium-sized companies (1000 million peseta turnover), design is not a determining factor in competitiveness. They lack a design department and believe the fundamental variables to be price and quality.

**2.3. DESIGN MANAGEMENT.**

Contrary to what might be expected from the above information, most companies, whatever group they belong to, consider that a sustained design policy can be highly profitable for the company, even though it is not managed as an important asset.

The situation of industrial design in enterprise is undergoing the consequences of its recent incorporation into company organization. This involves not fully using its strategic potential. Although all the companies felt ceramic design was very important for production, and even vital in some cases, most are substantially removed from the proposed definition laid down at the outset. The question was formulated in an open manner and generally, the answers did not go beyond the product's decorative, formal aspect: surface treatment, pattern, decoration, aesthetic form, way of differentiating products, of adapting fashion trends to ceramic wall and floor tiles, pluridisciplinary activity, etc. From these responses it may be inferred that if the role industrial design should play in defining products is obviated, it can hardly be managed by the company as a successful strategy.

**Design acts in the sector in the following areas:**

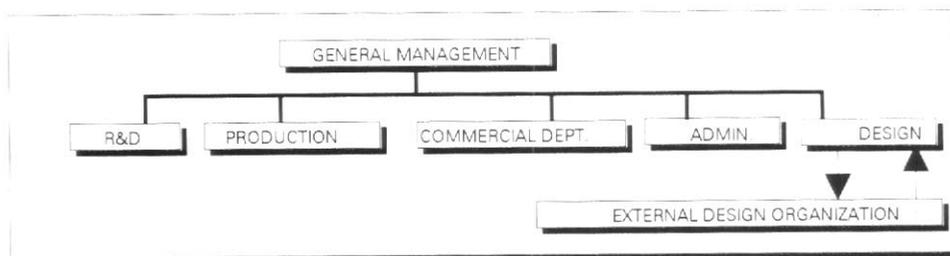
- Product design.
- Communication design. That is, the usual graphic media.
- Surroundings and architectural design. That is, the building or group of buildings in which company activity takes place (factory, expositions, stands, sales outlets).

**2.3.1.- MODELS.**

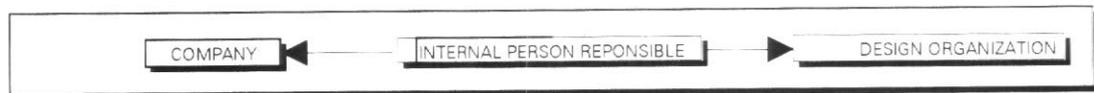
There are two models of design integration in companies: (Fig. 2.3.1.)

**2.3.1.- DESIGN INTEGRATION MODELS IN ENTERPRISE IN THE CERAMIC SECTOR**

**2.3.1.a- MIXED MODEL**



**2.3.1.b- EXTERNAL MODEL**



**1. Mixed model:** producers that have their own team make use of this model by subcontracting specific services (third-fire decorations, preparation of screens, photolithos, settings using CAD). This model is also followed by most producers of frits, glazes and colours, and third-fire firms.

Communication design and architectural and surroundings design services are mostly subcontracted.

The most common communication media are:

- advertising
- light graphics
- promotional articles
- graphics-bearing products
- vehicles
- signs

All the companies, with one exception, believe investing in promotion is profitable. The greatest outlay for the companies is involved in attending fairs, which is common practice in this sector, this mainly being at CEVISAMA, followed by CERSAIE and at some considerable distance: ITSE, CONSTRUMAT, BAU, SK, SIBEX, IBEX, etc. To do so, companies apply for support from the administration in the form of funding and joint promotional activities.

**2. External model:** this model involves subcontracting all design services and is chosen by all companies that lack a department of their own, mostly among ceramic wall and floor tile manufacturers. However, there is a person in charge inside the company, who is sometimes also the production manager or sales manager, but never a professional designer or specific head.

### 2.3.2.- COMPANIES INVOLVED IN COMPLEMENTARY ACTIVITIES.

It was stated above that most companies consider that a sustained design policy can be quite profitable. This has led to a growing demand for design services, which in such a dynamic sector as that of ceramics, has found immediate response in the market, with the appearance of quite a few companies that make subcontracting these services feasible.

There are three kinds of companies involved in complementary activities:

1. Frit, glaze and colour producers.
2. Third-fire companies.
3. National or international design consultancy organizations or free-lance consultants.

**1. Frit, glaze and colour producers** have for some years backed up their sales policy by offering their customers designs, illustrating the technical quality and formal possibilities of their products. What started as a publicity campaign by a colour manufacturer was followed by most companies, which claim they would be unable to sell their products without design support. All this has had several immediate consequences.

The first of these is the booming development of the design organizations of the companies fabricating frits, glazes and colours, in some cases leaving the R&D department where they were integrated, to become independent departments, although working closely together with the former, while one and the same person is at times in charge of both. Of the 16 producers of frits, glazes and colours in Castellón, 13 have a design department. Thus, a great step forward has been achieved in new product development, with a concurrent advance in raw materials research and product applications.

The second consequence is that some companies have become dependent on these frit, glaze and colour producers as far as new product development is concerned. This negatively impacts the policy of product innovation in the sector, since although magnificent work is being done in technical consulting and formal development, the colour manufacturer can hardly carry out an innovative, competitive design policy for each company. Developing new products can involve an innovation for the company, but it is unlikely to be a market innovation.

This situation could in the long run entail unifying the products on offer, which after being shown at the fairs, exhibit few novelties, with local competition leading to a price war, weakening the role of design management as a successful business strategy and innovative factor. This issue will be further examined below in dealing with proposals for optimizing resources.

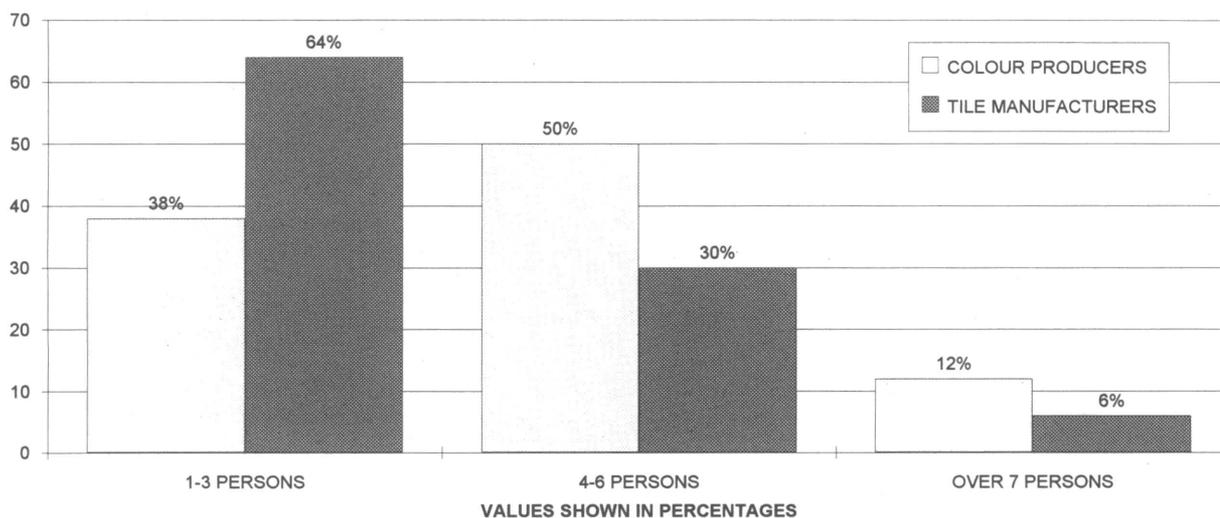
**2. Third-fire companies.** The growth of this second kind of company devoted to complementary activities, has been quite spectacular in recent years. The presence of these well-equipped organizations, capable of offering a wide range of services: designs, complex and sophisticated third-fire decorative applications (which is where the name comes from), creating special pieces, hand-painted units, reproductions, hydraulic cutting, etc., have become an effective formula for a considerable number of companies that in this fashion enrich their range of products without needing to keep a facility exclusively devoted to third-fire manufacture, which requires specialized workers and machinery, and therefore high costs that are difficult to recover.

3. Finally, the third kind of company involved in complementary activities, **national or international design organizations or free lances**, supply companies with designs, sketches of photolithos with decorations or patterns, enabling the companies to have available a wide range of models. Some of these organizations have arisen out of graphic design companies, but market demand has led them to broaden their offer, signing yearly consultancy contracts, which besides catalogues, sample collections and advertising, include industrial ceramic design and advice on setting up stands at fairs and other promotional environments at the plant or at sales outlets. Design companies are currently being set up with a specific focus on industrial ceramic design, probably as a result of the growing demand for these services, as well as the existence of specialized training, that delivers new ceramic tile design graduates each year.

### 2.3.3.- DESIGN AGENTS.

Design departments at tile manufacturers as well as at frit, glaze and colour producers, are young, rather small organizations. Only 24% of the tile manufacturers have organized departments, staffed with workers: 64% have between 1 and 3 workers, 29.5% have between 4 and 6 workers, and 6% have more than 7 workers. In the case of frit, glaze and colour producers, 37.5% have between 1 and 3 workers, 50% have between 4 and 6 workers, and 12.5% have over 7 workers. The third-fire and design consultancy companies are a different matter and have not been included in these figures owing to their specialization (Fig. 2.3.3.a).

Fig. 2.3.3.a.- Design agents



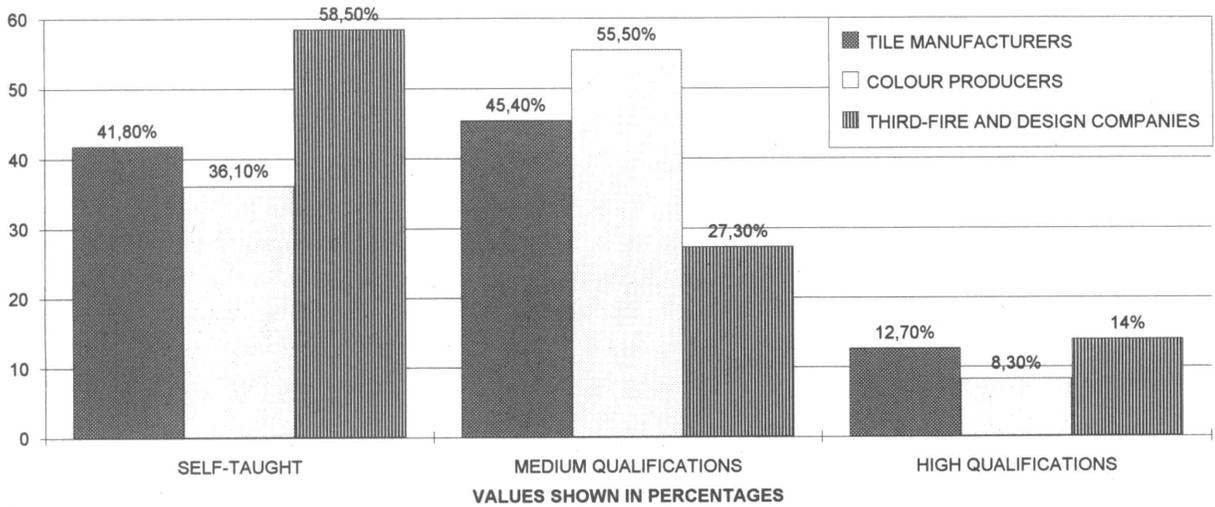
As far as **training and experience** of design department members are concerned, two groups can be distinguished: in the tile manufacturers, most design team members are self-taught, or have had medium level training but have extensive experience in the sector, while in the group involving frit, glaze and colour producers, third-fire companies and design organizations, most designers have high or medium level qualifications though less experience in the sector. The number of self-taught workers in third-fire companies is to be highlighted (Figs. 2.3.3.b, 2.3.3.c).

This situation seems justified by the sector's own history, since the creation of design departments which took place first in tile manufacturing companies, when there were as yet no specialized studies, obliged workers to specialize independently in different fields, one of which was design. Third-fire companies similarly depended on a great number of self-taught workers. However, the increasing complexity of the work process and markets have led companies to select workers with specific training qualifications and retrain their workers.

The sector's ability to react deserves mention once more. Specialized studies were fostered by entrepreneurs' organizations, ASCER and the Instituto de Tecnología Cerámica-Asociación de Investigación

de las Industrias Cerámicas, supported by State bodies, Ministries of Education and Industry, as well as Autonomous bodies, the regional Education and Industry Authorities, this last organization through the Institute for Small and Medium-Sized Enterprises of Valencia (IMPIVA), designing programmes that met the professional profile companies sought.

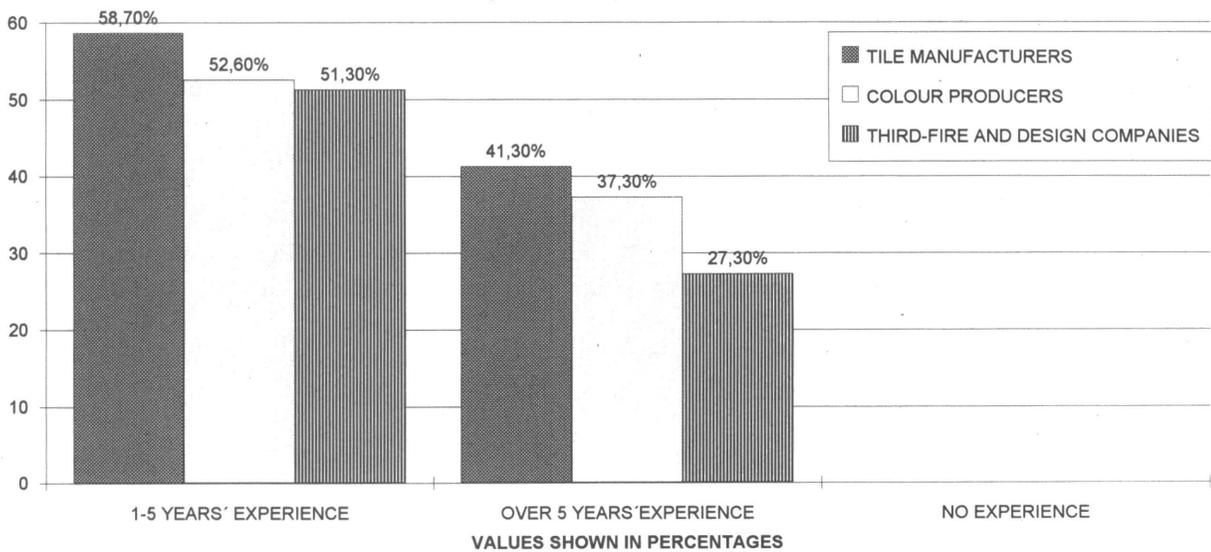
**Fig.2.3.3.b.- Training**



In 1988, a Ceramic Tile Design Speciality was started at the School of Arts and Crafts in Castellón, from which three classes have graduated, fully acquainted with the sector and the characteristics of ceramic products for architectural applications.

Similarly, from 1990 to 1992, three courses of Professional Specialization in Ceramic Tile Design were given to graduates with medium or high academic qualifications, who wished to specialize in this field.

**Fig. 2.3.3.c Experience**



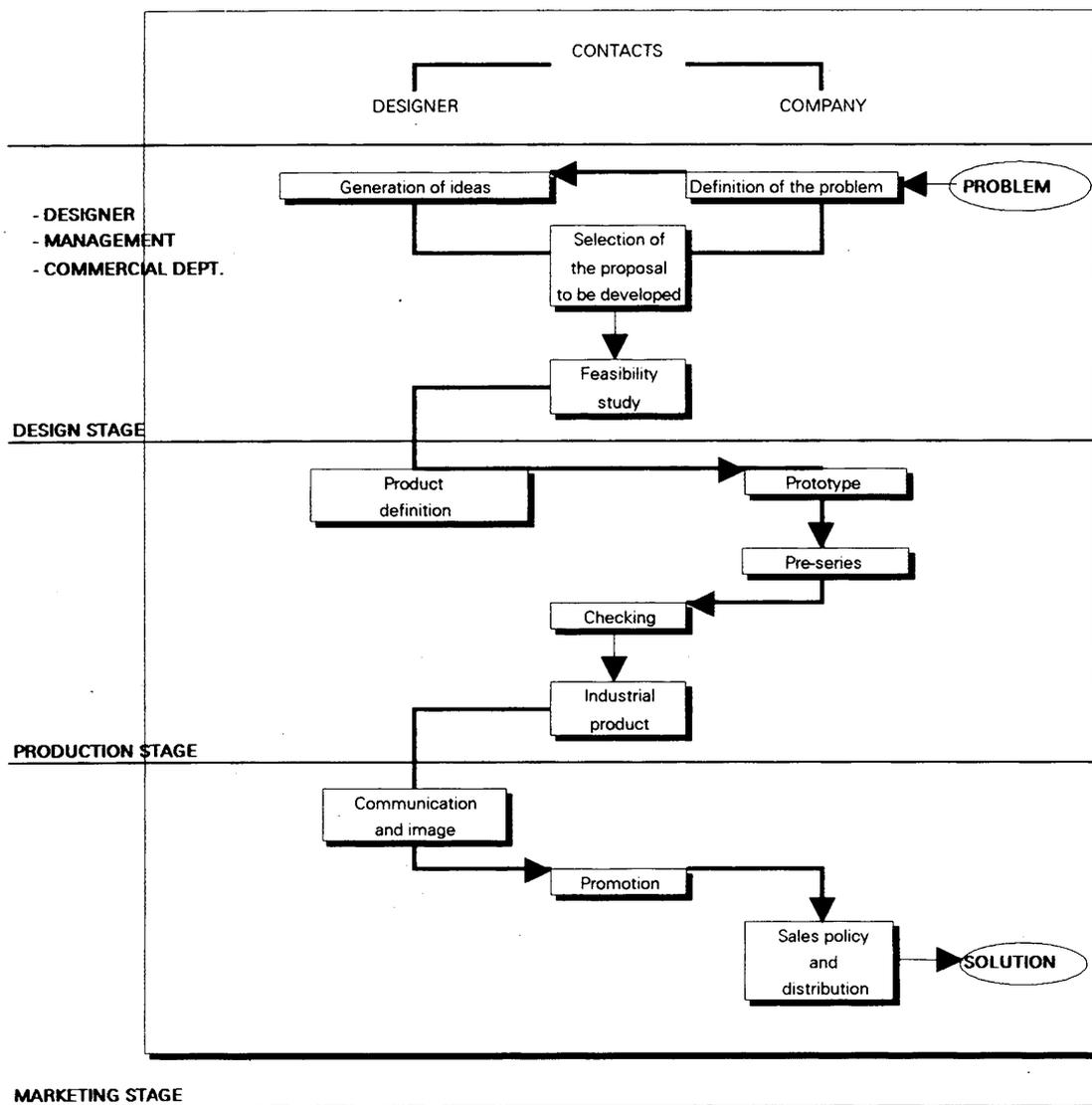
This double thrust, together with the consolidation of the Speciality at the School of Arts and Crafts, has helped meet the need for new professionals in industry. Their welcome acceptance is reflected by their fast entry into the trade.

As far as retraining professionals is concerned, specific retraining courses are being imparted by the Asociación para la Promoción del Diseño Industrial Cerámico (ALICER), for workers in industrial design organizations.

**2.3.4.- THE DESIGN PROCESS**

The work process adopted by the three kinds of company with a department of their own is the traditional one. The specialist basically intervenes in the definition and development stages of the concept, which are arrived at by consensus, or even according to the proposals from the heads of sales and production, without any support in the production stages or communication regarding the product itself. The total design model states that efficiency increases if the designer actively cooperates in all the stages of product creation and launching (Fig.2.3.4.).

**2.3.4- DESIGN PROCESS IN COMPANIES IN THE CERAMIC SECTOR**



Among the companies without a design department, the person in charge inside the company participates in the definition and development stages together with sales and/or management, and/or production. However, although they intervene by consensus with management and sales or marketing, they do not usually take the initiative in formulating new creative proposals, arising from formal internal investigation. Only one single company works like this: design wholly develops a product and presents it to management and sales for acceptance.

With regard to the production process, this is basically the competence of the production department, and the sales department and management make the decisions in launching the product.

In respect of the **launching of new collections**, the first conclusion is that companies launch many more collections than they withdraw, reaching astonishing figures (200), especially if note is taken of the scarce human resources these departments possess. Collections are launched according to a reactive strategy, which is defensive and not offensive, a dangerous policy if the conclusions are to be heeded of a study on the American market, which claims that about a third of all new products fail.

This situation could lead to not fulfilling the objectives of design management, as a result of:

- hindering the working procedure of designers
- giving rise to saturation by indiscriminate supply
- complicating stock management and production in the companies
- not letting design fulfil its role as an innovating factor

These are the reasons why it is so important that new products should be the result of a whole work process requiring time and involving professionals. At this very moment a proper language is being consolidated, known as 'Tiles from Spain', identifying Spanish manufacturers as manufacturers of products of great technical and formal quality.

This situation is the fruit of the magnificent work carried out year after year by the sector. However, further improvement is still required. There is an important advantage at the outset: an impressive historical heritage, undoubted creative capacity and the on-going development of the available infrastructure. To achieve this, the consulted companies suggested:

- Creating a centre for the promotion of industrial ceramic design.
- Fostering the in-works design department
- Improving the services of companies involved in complementary activities

**2.3.5.- DESIGN DEPARTMENT INFRASTRUCTURE.**

Some differences are to be observed amongst the different kinds of companies with regard to equipment and facilities (Fig. 2.3.5.):

**2.3.5.- Infrastructures**

	MANUFACTURERS	COLOUR PROD.	THIRD-FIRE COMP.
PROJECTION	100%	88.8%	88.8%
CAD	15.7%	75%	55.5%
PHOTO LAB	78.9%	100%	66.6%
SURFACE PROT. LAB	89.4%	77.7%	33.3%
VOLUME PROT. LAB	42.1%	0%	44.4%
TECHNOLOGICAL LAB	84.2%	100%	22.2%

- **tile manufacturers:** these are older and more mature departments. These all have a well-equipped projection department as regards graphic and design materials, though information systems are

noticeably lacking (15.7%). Although almost all have bibliographic material, visual information is scarce. Most (78.9%) have a photo lab and are generally well-outfitted with quite modern facilities, acquired in the last five years. There is often a laboratory of surface treatment prototypes (89.4%) and less frequently those of volume (42.1%). In 84.2% a technological laboratory was found, although this was shared with the technical department.

Generally, as mentioned above, companies subcontract CAD services, reproduction and printing screen preparation services, in product design.

- **producers of frits, glazes and colours:** these are quite well-equipped companies as far as their infrastructure is concerned, although they almost all complain that their available surface area has become too small owing to the dizzy growth they have undergone; several companies have recently been extending or remodelling their available space. In 89% of the companies there is a well-equipped design department as far as graphic and design materials are concerned. Information systems are available in 75% of the companies, which may be explained by the need to facilitate the numerous 'design' services offered to the companies, turning the computer into an image manipulating instrument, rather than a creative resource. All the consulted producers of frits, glazes, and colours have a photo lab, 78% have a laboratory of surface treatment prototypes, both with recently acquired equipment; 89% of the companies have a technological laboratory, usually shared with the R&D department. These companies also point out the need to subcontract some CAD services.
- **Third-fire companies and design organizations:** the third-fire companies exhibit figures that quite resemble those of frit, glaze and colour producers, although it deserves mention that the surface area devoted to design is much greater, being twice and sometimes three times as much. This seems justified by the differences in services offered. More than half (56%) have information systems, and although all claim to have bibliographic material, only 67% possess visual information. Furthermore, 67% have a photo lab, 44% a laboratory of volume prototypes, and 33.3% a laboratory of surface treatment prototypes. Only 22% have a technological laboratory. The equipment has been recently acquired, although the prototype laboratories are older.

As far as the design consultancy organizations are concerned, although all have information systems, they exhibit deficiencies in photographic equipment, technological and prototype laboratories. These shortcomings are made up for by subcontracting these services. This situation is due to the companies being very small, with 2 to 6 workers, so that infrastructure costs become quite high, as well as the fact that most of these organizations also offer graphic design services.

The role and management of industrial design in the ceramic sector have thus been analyzed: integration models, design agents, work procedure, and available infrastructure. Some of its achievements and needs have been highlighted. In the following, this last point will be dealt with more extensively, in order to put forward some proposals for further optimization.

### 3. -CONCLUSIONS.

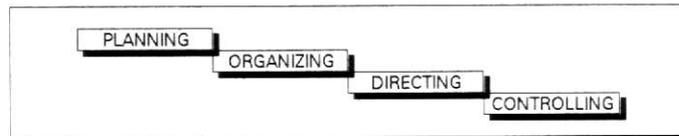
In concluding this analysis of design management in the ceramic sector of Castellón, this last part will bring together those aspects that have been remarked on throughout the study, examining some proposals for optimizing design management.

The first part of this study pointed out the importance of design in business management as a strategy for success. Companies use design to define the product characteristics that will meet user demands, actual or potential customers, or their own design needs. However, it was observed that the role of product design is mostly reduced to the specific intervention involved in decorating the product, and is not a total process that collaborates in achieving company objectives.

It may thus be inferred that the ceramic tile industry has at its disposal a highly efficient resource that can collaborate in attaining its objectives and consolidate its image as an innovative enterprise. This means that companies must **define the role of design in daily management, as well as developing, as far as possible, a specific design strategy.**

To successfully carry out design management, companies need to have available tangible and intangible assets that enable them to: (Fig.3.1)

3.1 - Functions of the heads of design management



- **PLAN** the general strategy of their actions in design, concrete policies and programmes of actions.
- **ORGANIZE** resources
- **DIRECT** projects
- **CONTROL** results

In the *planning* stage, the company must define the objectives to be attained, and the ways and means to do so. With a view to keeping the planning of actions in design from becoming risky, often sterile and therefore unprofitable, the company must **make use of all available resources to gather the fullest and most objective possible information.**

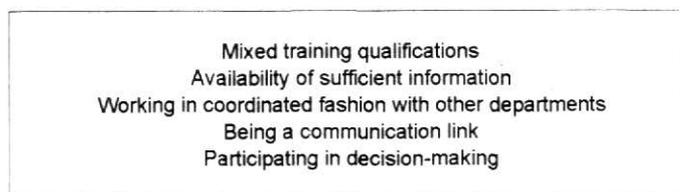
Moreover, the company must **organize human and material resources to create a formal design organization inside the company hierarchy** whose leaders assume responsibility for the different design tasks; determining what its functions are, who they resort under, how they relate to other departments, etc. If the head of design management lacks the necessary authority, an efficient system cannot be assured. It is important there should be a direct, personal relationship between general management and design.

**Directing** a design project means informing, motivating, coordinating design functions and those that do not relate to it such as: marketing, production, purely technical aspects, etc., in order to obtain an efficient process.

Finally, it is vital **to verify results** and confirm if the project approved by the different members is compatible with the company's production system, if product quality, the term involved in carrying out the project, costs, etc., correspond to initial assessments. The company must therefore **CONTROL** the outcome and assure its coherence with the objectives set in all the project stages: design, production and marketing.

It is therefore of the greatest importance that the company, with or without a design department, **should have a person in charge of design** who must (Fig.3.2.):

3.2.- CHARACTERISTICS OF THE HEAD OF DESIGN

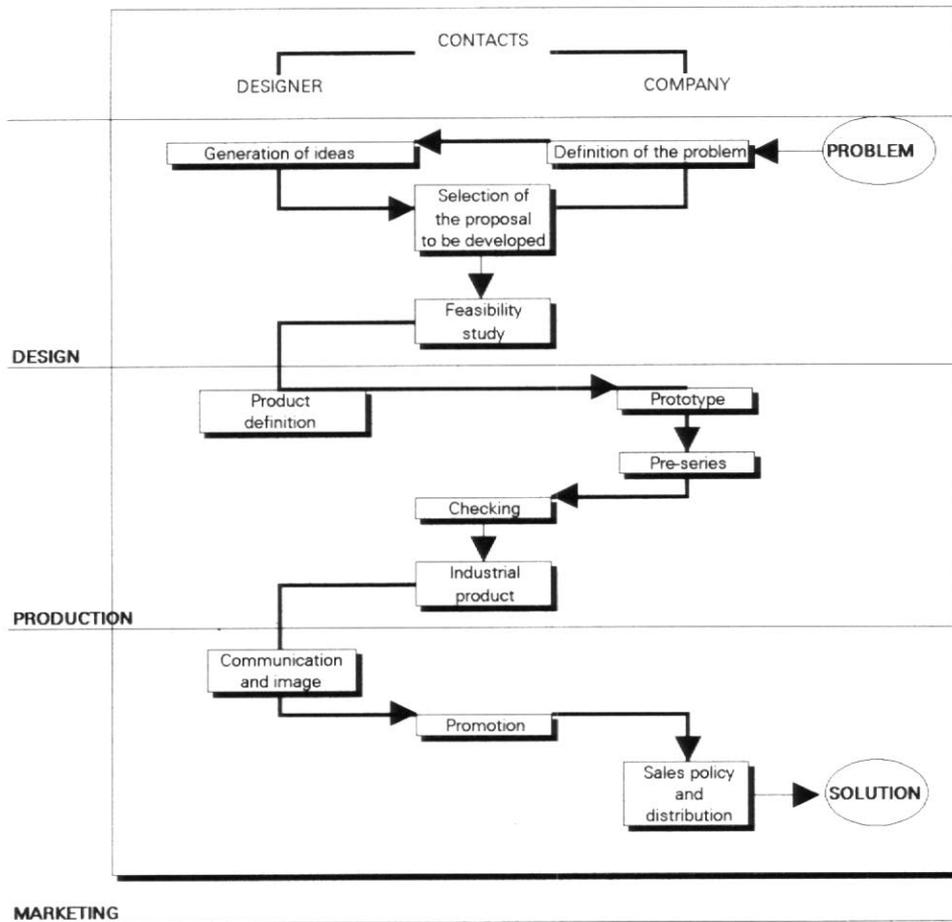


- participate in decision-making.
- work in a coordinated manner with other departments and act as a communication link.
- have a mixed training background, halfway technical, halfway creative.
- have enough information to be able to implement the whole design process in its different stages: Design, Production, and Marketing.

This process involves the areas in which design acts as mentioned above, and not just that of creating new products. However, this is probably the area of most concern in daily manufacture; frequently, the new product failure rate is high, too many product lines are launched onto the market, most of which do not even allow the investment involved in production and advertising to be paid back.

To avoid useless risks and costs, **the design process must be managed step by step.** Therefore, after concreting all the aspects relative to design integration and management in the company, the work plan to be followed, and after establishing contacts between designer-company, whether integrated in the company or not, implementation of the design process itself starts, comprising the following stages (Fig. 3.3.):

**Fig. 3.3.- The design process is a creative process that aims to SOLVE a previously set PROBLEM**



1.- The first is the actual **DESIGN stage** or conceptual stage, involving a series of steps:

Definition/identification of the factors giving rise to the need for a new product: the firm provides the necessary information allowing the problem to be resolved to be defined, indicating the bounds and constraints the product must comply with.

Generation of ideas: the design team works out the first design alternatives and proposals.

Selection of proposals: the design team together with all the other company areas involved, assess all the given alternatives and analyze the possibilities of both the company (financial, technological resources etc.) and the market (segment, competition, consumer habits, etc.), in order to select the most suitable proposal, which will allow a commercially successful product to be developed.

Feasibility study of the product to be developed: terms and production costs, launching costs, sales forecasts and product life cycle, price, profitability, etc.

2.- The second is the **PRODUCTION stage** or development stage:

Product definition: designers provide the necessary documentation and material - sketches, designs, etc. - which determine the aesthetic, formal, functional and technical characteristics of the product.

Pre-production: appropriate tests are run in the laboratory on colour, surface finish, etc. to obtain the prototype that can lead to the first pre-series.

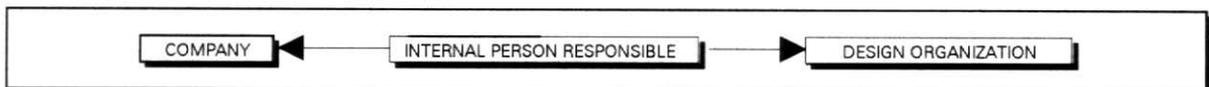
Checking: product testing is performed to check if the results obtained coincide with the sought aesthetic, technical, quality characteristics etc. If this is so, industrial production is started and the product can be launched.

3.- Third is the **MARKETING stage** or launching of the product. Highly differing aspects are involved, such as sales, distribution, communication, and product image issues. This is a very important stage as far as product promotion is concerned, so that the three areas in which design acts converge here: product, communication, architecture-surroundings.

It was stated at the outset that there is no single way of integrating design in company organization charts, but that **each company must adopt the integration model that best suits its organization, needs and capabilities**. Besides the mixed and the external model, adopted by the companies in this study, an internally organized model can also be adopted, where all the company's design activity takes place. However the internal team, whichever model is involved, can equally be a part of other departments (marketing, production, R&D), or function as a department with its own organization. Whatever model is chosen, the important thing is for it to be efficiently integrated, effectively contributing to company objectives. (Figs. 3.4.a., 3.4.b. and 3.4.c.).

### 3.4.- MODELS OF DESIGN INTEGRATION IN COMPANIES

#### 3.4.a.- EXTERNAL CONTRACTING

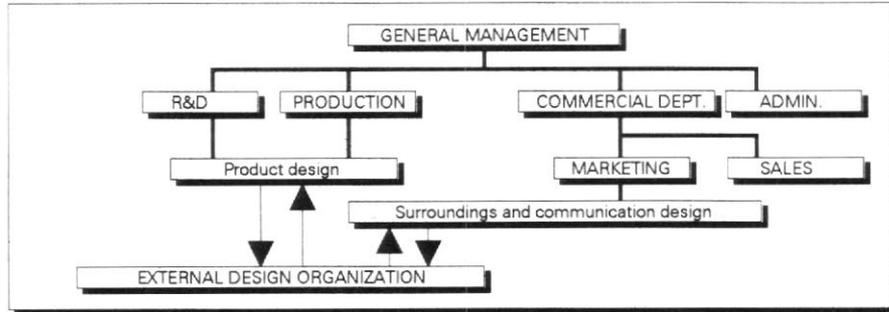


The ceramic tile industry is made up of workers whose professional training and qualifications are steadily improving, and has training and retraining resources that allow raising these qualifications. Similarly, in industry's striving to improve infrastructures, design departments have been well-equipped and are being continuously upgraded. This, together with the fact that the companies consider a design policy to be highly profitable, allows the conclusion to be drawn that industrial design has extremely good prospects in the ceramic sector of optimizing its management and thus contributing to growth in the sector.

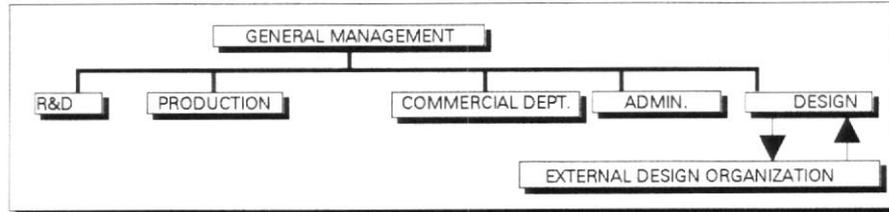
MODELS OF DESIGN INTEGRATION IN COMPANIES

3.4.b.- MIXED ORGANIZATION

1- Mixed model with design dept. depending on other dept.



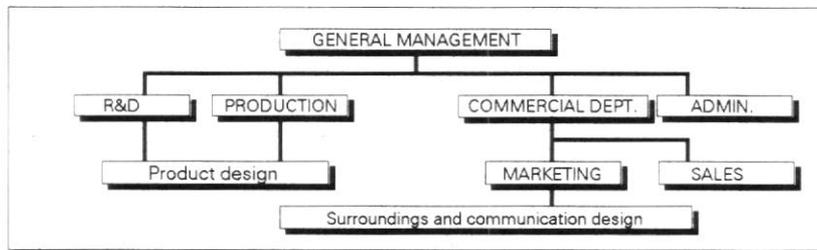
2- Mixed model with independent design department



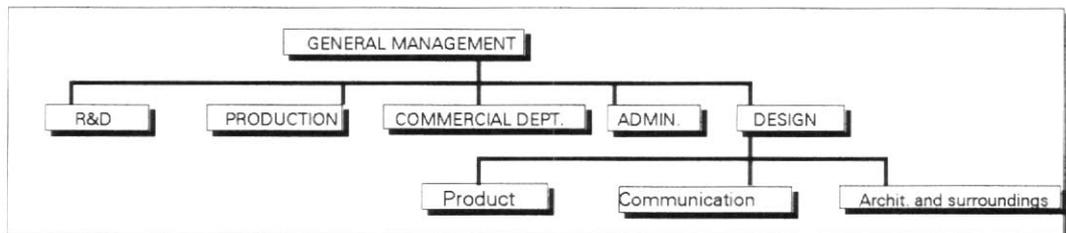
MODELS OF DESIGN INTEGRATION IN COMPANIES

3.4.c - INTERNAL ORGANIZATION

1- Design department depends on other department



2- Independent design department



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