

INNOVATION AND CREATIVITY IN THE INDUSTRIAL SECTOR CERAMIC

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1. INTRODUCTION

Currently, in the business world there are several forces that provoke in the market a serie of competitive fluctuations, which force companies to require research and development in order to obtain benefits from their corporate functions. Such decisions are essential for the continuation of firms in the market, inasmuch as the environment is constantly changing and they are forced to adapt. The entities must focus on related aspects to the DAFO analysis, and establish a specific strategy to follow. All these decisions are substantial in all types of businesses, from the youngest to the most mature.

This final degree project will develop the resources used in the ceramic sector to reach out to be able to differentiate themselves in the market. In the ceramic group, the strategy chosen by most companies, it is the differentiation strategy, since there are many innovative methods for creation of tiles.

In the province of Castellón (especially in the localities of Alcora, Borriol Onda, Nules) this activity is developed, from which comes 94% of the Spanish production comes.

2. CONCEPTUAL FRAMEWORK

Within any company, the innovation is one of the most important concepts in order to continue growing and living within the competitive market. In this chapter we will develop the concept of innovation and many other concepts related to each other in order to be able to understand this importance within the business sector, specifically, the ceramic sector.

2.1 Importance of Creativity

One of the first skills that developed by the human being is creativity. This is generated and gets stronger during childhood, with the features to observe, imitate, improve, adapt, develop, etc. Creativity is the most important tool to develop innovation, so that a company it requires of personnel with these skills at high levels. Then we will deepen in this concept applied to the business world.

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2.1.1. Creativity concept

Creativity is defined as the ability or facility that people have to invent, create or develop any concept. Much of studies that have been carried out about creativity belong to the artistic and mathematical areas, but this work will focus on creativity in a business project as well as promote, coordinate, organize and project certain thoughts to create a competitive advantage.

Organizational creativity, is able to establish a business strategy, study it, develop and improve it against the competitive market. In addition, it is a feature that requires knowing all kinds of factors while providing the necessary information from it. Therefore, it can be consider that creativity goes hand in hand with knowledge since in order to promote it, we must know about all the factors that affect the environment, in this case, the company. It should be note that authors such as Teece, Spender, Nonaka, Pisano and Shuen (n.d.) consider knowledge of many factors can be the secret for a company to respond to problems and changes quickly and accurately.

In short, creativity is based on finding relationship between all the elements that coexist within and outside the company in order to enhance their resources and be able to overcome the difficulties that may arise as well as to develop new competitive opportunities within the company.

2.1.2. Factors affecting creativity

Organizational creativity is influenced by various factors that may benefit or harm the business project. They are factors such as the knowledge of the staff, the motivation given to work, the way of being, the lifestyle, the way of working, the way of communicating, etc. They tend to be factors that reside within the person in charge of extending the creativity within the company, since it is the basis of any creative work.

There are also external factors such as financing available to the company, social influences, the circle of friends surrounding the company and the fall in standards.

In order to understand the internal factors to oneself, one must define in which field we are in the company. To do this, we must treat the person as an employee and creativity how your work. The companies try to boost the activity of the workers through the analysis and development of their motivation.

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There are sundry authors who focus all their studies in the creativity of the person and how to treat them to get a more motivated and efficient employee. Teresa M. Amabile trained as a psychologist at Stanford University in 1997 and its main attention to social influences on a person's brain and verbal creativity. His thesis Principle Intrinsic motivation comes to defending that motivation comes from satisfaction own merits rather than merit arising from external pressures.

On the other hand, Albert Bandura (1977), defends that the social environment has a high percentage of learning about the person, so the motivation can be born this point. A. Bandura says that the human being does not act independently and isolated way, so all their answers are driven by knowledge and learning of others. In this case, the motivation would come from the hand of a series of consequences developed by the social and alien environment.

Creativity, like many human capacities, is a term that is constantly studying due to the evolution that people experiences with society and the environment. One of the most current claims about creativity comes from the hand of Bono, when in 1993 he devoted himself to the study of creativity within an organization. In his writings he mentions the importance of the search for a connection between the traditional analytical approach and the human creative approach. This new approach to business creativity is formed of two parts, one covering the features that enhance or hinder creativity, and another consisting of the processes necessary to find creative ideas.

We can determine that everything and nothing involving creativity, because each person experiencing this phenomenon has a deep-rooted personality, in addition to going through various situations in his life. This leads to the fact that all the factors that affect creativity depend on the degree to which they can intervene within the creative person. Companies must use these factors to move towards their goal, whether choosing the right staff development courses or work motivation plans.

2.1.3. How to develop individual and group creativity

Creativity is a value that can be exploited and developed in various stages of human life. In order to enhance creativity at the group level, we must first bet on the development of individual creativity.

A creative being must be curious by nature. That curiosity will lead to the desire to want to increase their knowledge related to a certain topic. To enhance human creativity

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must have certain characteristics that lie inside the person. Below we will explain the bases to help the growth of personal creativity.

Should be encouraged observation skills, find sense of everything that is being observed. In order to find a creative sense within the framework of observation, we must carefully analyze everything that appears in our perspective and be able to determine how important is what we see for our knowledge. Study all the images that you get our view will be able to choose more quickly and more clearly the most important factors to end our investigation. In addition, to carry out the observation, it is necessary that there is a birth of interest and curiosity that leads the human to want to know and develop a specific topic.

In order to achieve high creativity, we must introduce norms and rules, not very strict, in order to follow protocols and routines to achieve certain knowledge. This routine will lead a person to live similar situations where they will find solution following their instincts. The fact that there are rules and routines can have a point against, since a person may experience a situation of chaos, constantly repeated, and not be able to control it. In this case, it must restructure the rules and find the key to continue with the investigation.

As previously mentioned, in order to reach exploit collective creativity, we must go through the development of individual and personal creativity. The human being is born to adapt and to communicate, therefore, the collective creativity is achieved through the compartment of knowledge. Through the information given by other people, you can get to understand, experiment, adapt and develop that idea from a different point of view to the author. When there are different opinions, people know more and get rid of resistances and fear of the unknown, so they can still extend their knowledge and creativity.

In the business area, the creative type can be considered suitable depending on the sector to which they are oriented. In a company dedicated to the fashion design, possibly, there is only one designer dedicated to the making of an exclusive model, despite being able to receive opinions from different aspects, the designer is the artist. In the case of companies engaged in the creation and innovation of ceramic materials, a collective creativity is guaranteed success. They can interfere with different opinions due to their experience, collected by external sources or accounting opinions.

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In order to develop all these creative skills within a company, it must orient themselves and follow the objective of the company, that is, the mission and vision. The creative or the creatives must know the culture and business policy to begin their analysis. The pioneering companies in creativity, such as Google, create and promote group meetings where there is a feedback, and employees have the opportunity to show their views. Edward Bono created the Technique of the 6 hats, a meeting in which his guests, employees have 6 hats differentiated by color, and each color represents a feeling. Successively, the staff puts each hat and exposes their feelings oriented and reflected according to the color-feeling of the hat. With this method, you get to know the feelings and experiences of all the participants.

The companies of the 21st century companies know the value that creativity bring in their business, therefore, they invest in training, communication and feedback in this sector. Creative differentiation is the basis of the new company.

2.2. The innovation

As stated earlier, creativity is a term that has a human skill, it is difficult to learn (it can developed or enhanced), is intangible and is influenced by various personal aspects. On the other hand, innovation is about inventing or creating everything that creativity has been able to foster. In the business world, creativity and innovation are two areas that can be confused.

2.2.1. Concept of innovation

The innovation consists of a group of changes that consists of introducing new features or improving certain elements that already existed previously. Unlike creativity, innovation appears in order to find an answer, a result, to evaluate that decision.

Innovation is the last process R & D + i (Research + Development + innovation), although often confuses innovation as a whole. This concept has evolved over time, adapting to its definition to the most current times. Currently, innovation can occur in any area and the sales process, as well as in the creation, organization or method of sale.

The development of innovation can be affected by various factors, both internal and external to the company. The factors that arise from within the organization are consequences of previously taken decisions. Unexpected events appear, that is, events that arise once already created an innovative action plan appear. These events

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can be an advantage or disadvantage for the life of the company, and thanks to a fact which was not expected, it can have a more successful than the one main decision. Inconsistencies may also appear, and a completely incoherent conclusion may be reached, that there are necessary required to carry out innovation and the changes in the domestic sector of the company.

On the other hand, there are factors outside the company, which intervene due to the interaction of the same with the environment. Examples of external factors that affect innovation are demographics, changes in perception of society and the new knowledge of citizens. Must be addressed or enhance these factors to develop the innovation process in order to achieve project success.

2.2.2. Importance of innovation in the business sector

In the environment of business organizations, innovation always pursued under the objective of making a profit, either by introducing a new product or improving one, adapting to demand.

As previously mentioned, the innovation is affected by several factors and their evolution has suffered a series of fluctuations due to the obstacles found. Some companies that have know to react to the problems and have succeeded in creating something new because of a difficulty, however, there are companies that, without seeing their innovative processaffected , have not achieved the goal of the desired of innovation.

If we refer to innovation within the time frame of the past 50 years, we are facing technological innovations appearance. Thus, since 1967, all the tehcnological inventions best cataloged, by people, that is, which they represent a change in the world, are registered in the Consumer Electric Shows (CES). Within this list the TV, mobile phone and computer is, among others. The latter being the basis of many inventions that emerged later.

Currently, companies are facing a more competitive environment as new technologies provide greater information exchange years ago. For this, many organizations are investing in more skilled creative teams, which obtain a greater competitive advantage than other companies. Furhermore to knowing what news is suing people, businesses with their innovative team should study, analyze and know the tastes of society to implement attributes to your product or service that previously did not exist. In this part, influenced tastes, ideologies, family income, lifestyle, the average age by region, etc.

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For companies with highest turnover in various countries, they must create a product and then adapt it to its inhabitants, for example,

Within the financial objective, companies also invest in innovations for the construction or transformation. The fact of making an innovation inside the manufacturing process can suppose a perfection of the product or service, while to achieving an improvement in the efficiency and effectiveness of the sale. This may involve a greater contribution of capital, but may reflect a cheapening of production costs and an increase in profits on the part of consumers.

2.2.3. Techniques for the development of innovation

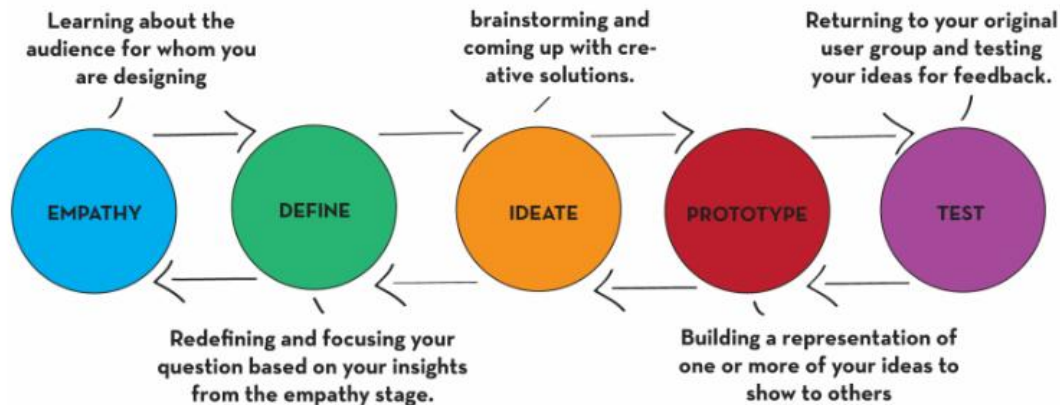
The technical innovation arise from various studies studies that were conducted from the 60s. The company prototype was different and the demanding public became increasingly complicated. Technology and environment are two key factors in modern entities, and their adaptation to them depends on the organization, itself.

It is observed that organizations with a more fluid business life, are able to adapt and react more easily and quickly to external factors. In addition, their level of innovation is more accurate and effective. Each sector gathers a set of innovative techniques to be able to develop its final product or service in order to obtain a good response from the consumer. But when it comes to most important innovation techniques developed by companies it refers to the methods that entities use to achieve that an innovative idea can be carried out in the form of innovation about their business.

Technical and organizational methodologies used by organizations rely primarily on transmission and reception of knowledge and information. A company will be more competitive if its innovative team works together with the same goals.

The most important methodology that has been done over the years is called Desing Thinking in which aims to promote the creativity of workers and thus to develop new ideas aimed at solving real problems.

Figure 1; Desing Methodology Thinking



Source: *Futurizable*

This method to enhance creativity is based on empathy, teamwork and prototyping, to provide meet customer understand the attitude of a designer, reaching a playful mental state and develop the visual content. To carry out this innovative technique it must to perform various routine activities that make up the methodology.

Knowledge does not arise, and neither always remain within the company, it can be extended with knowledge exterior from abroad, for example, the customer. To meet all participants involved in a purchase-sale can be made color maps, that is graphically define all users interested in the operation, along with a brief description of its characteristics. Another activity that can carry out to perform desing Thinking is cognitive immersion, that is, imagine that it is consuming the product or service and explain analytically as a consumer viewpoint.

To carry out teamwork in which seeks to understand the experiences, feelings and opinions of other employees, there are activities such as interviews, in which it is empathic listening and getting to establish a friendly relationship between interviewer and interviewed. With shared experiences, it is easier to get empathy among workers.

All this aims to strengthen relationships while maximizing the value of knowledge of its employees. Innovate is an action that must be developed, work and share so that organizations can capture the best in your decision making.

2.2.4. Types of innovation

When we talk about types of innovation, we refer to innovative processes arising in the commercial sector. Over the years there have been various types of innovations within

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companies, but we will focus on the types of innovation that develop within the Oslo Manual (OECD, 2005).

- Innovation in product / service: introduction of new goods and / or services in the market. Are products or services that consumers perceive as new and unique. Its characteristics can be attributed both to the function of the product or service itself as its manufacturing material.
- Process innovation: introduction of new manufacturing processes or services. Focus on the modus operandi of personnel responsible for providing the final product. In case the products are innovations that occur within the production process, ie in the form of innovations production or transformation of. As for services, process innovation refers to the way in which the seller offers the service makes getting to the final consumer.
- Organizational innovation: this type of innovation covers the whole company, inasmuch as is the application of new methods within each department. This innovation can be used, among other situations, to direct employees to a common goal, to establish cultural foundations or business to organize the work of each section.
- Innovation marketing: marketing is used to publicize and promote the image of a brand. Therefore, marketing innovation can be used in the actual design of the product or service you want to sell, and in the form of communication that the same company uses to capture the attention of customers.

All these innovations are accompanied by so-oriented strategies to be achieved. More and more companies using innovative strategies within your organization where you can get to combine different types of innovation, such as marketing innovation with product innovation.

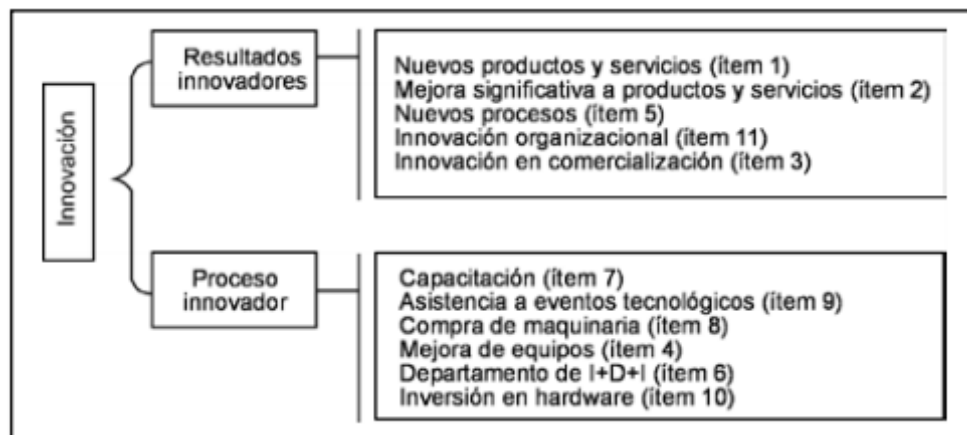
2.2.5. Examples of companies known for innovation

In the age of technology we can find certain companies that have been known and have reached success through innovative methods.

Innovation can be distinguished by the innovative results you want to achieve through innovation and innovative process techniques. That is, it depends on the goal, if you want to innovate the final product, innovation will be aimed exclusively at improving the functionality or appearance of the product / service ready to consume, if innovation is to be applied to the manufacturing process to improve product quality, innovation apply to parts of the production process.

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Figure 2; Factors to establish the degree of innovation in business



Source: Julia Clemencia Valencia Naranjo cultural profile of innovative companies. A case study in metalworking companies - Research Group Organizational Culture and Human Resource Management, National University of Colombia

Throughout history, companies have decided to invest in an innovation in one of the activities that form the business sector, and its decision has been successful. These companies belong to the modern era and support of technology.

In the case of Apple, the technology company with annual sales more. Apple was among the first companies launched a mobile phone with touch screen. Although it was not the pioneer, yes it could provide consumer interaction with graphics that showed, ie access applications and folders by touching the screen or stretch and shrink images. Also included Siri, the popular application that allows the user to converse vocally and request information without writing. This company is an innovative company and customers are always amazed with their additions. In 2018, Apple surprised the world with the introduction of new wireless headphones. In this case, the Apple brand chose a product innovation, based on selling wireless headsets with the characteristic that they are independent, that is, there is no cable that one to any device, or among themselves. This innovation has been perceived as a necessity thanks to the convenience of use.

On the other hand, we find The Washington Post, a digital newspaper that has innovated a new software to improve its web platform. In 2017, the company added more than one million new subscribers thanks to this marketing innovation adapted to your page.

We also find Google, a company known worldwide. Google uses a process innovation as it has the best computer scientists and researchers in the digital market. These employees are responsible for constantly seek innovations in the process of creating

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web platforms. Innovations such as the ease of finding information on a given topic without detailing required, for example, search for a song by typing a piece of the refrain. It has also managed to provide indications of traffic across mobile platforms, with the convenience of asking the application via microphone.

The case of Judit Catala, explain about a pathological entrepreneur who helps small entrepreneurs virtually. J. Catala heads Elevator Publi a digital marketing company that has brought knowledge and experience during his life entrepreneur. During the years in which he has dedicated his work has observed and experienced many results which have made him learn to manage situations successfully. It counts with online training that provides assistance to SMEs or companies that need business and structural formation. This is an organizational innovation, as your company provides support related to marketing, to sales, with the structural organization, with customer service, etc. This company, shows models of business performance.

3. CERAMICS

The word ceramic comes from the greek language keramos, which means earthenware clay. Pottery is the set of activities that determine artistically decorative elements, therefore, ceramics can be defined as the art of working porcelain, earthenware and clay. These activities are carried out by using solid and non-metallic materials with high hardness and strength.

Ceramics is aimed at different types of target audience since it started manufacturing decorative and complementary elements such as family dishes, and has ended up being a key element in the construction sector. By having such a broad market, the ceramic industry can differentiate between different types of industries such as the ceramic industry and ceramic arts sector. In addition to the difference between the consumer each sector ceramic, we also found the difference in the form of production. In the ceramic industry the production process is continuous and complex due to the number of varieties involved in the final product, however, the ceramic artisan sector has a much more manual production with the total intervention of the labor force and the use of less raw material.

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3.1. History of ceramics industry

Pottery is one of the oldest manufacturing processes developed by the man. Man, driven by the urge to capture all his experiences and insights led him to interest to form and fabricate devices with their own hands. They know each other pieces made in the year 24,000 b.c. made with clay and water, by the man himself known.

With the birth of fire, humans began to cook food on clay soils, this led to check, said bases made with clay taking a stone appearance after passing through high degrees. Thus adecuaron knew and using heat to create objects with clay. In addition to this, man discovered various mineral products such as fairings, marl or gypsum, which adopted the production process of artistic objects and entertainment.

For the years 9000-7000 ac, born pottery in ceramics, that is, the technique of creating and invent ceramic elements using a mixture of clay and water. This technique grows following when man leaves the nomadic life and begins to develop a civilization following a few guidelines.

Were ever greater number of objects that make getting to your daily routine, and decorative elements ever they had a greater artistic skills. Thanks to the extremely high melting points and good thermal and electrical insulation possessing all these materials, ceramics moved to the construction. Between 7,000 and 6,395 bc brick was created, since they have been found in deposits of these Mesopotamia. The building also contained a decorative part, so that ceramics became productive technique par excellence for thousands of years.

Figure 3; Decorated brick Achaemenid Dynasty



Source: Honra2. Comprehensive reforms

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Although its use was massive, the evolution of ceramics has been very slow in the beginning, until various types of materials are included and managed to create the first plant glaze in 575 b.c. With new knowledge construction with decorative fads and new materials in the construction process ceramics deeper into the lives of citizens.

In the third century b.c., under the need for higher temperatures ceramic furnaces were created to achieve more degrees of cooking. Eventually furnaces were improved and sale of ceramics increased by providing a large number of exports to different parts of the world. Pottery was a product with high demand and investment dedicated to the production processes was growing.

Innovation in the history of ceramics comes from the hand of the improvements made to the ovens. The main study has focused on incorporating features that allow greater control of the temperatures and lower production costs.

The first ovens were small open pits, where there was a risk of fire and thermal heat escaping. This led to the introduction of a mud wall around the fire, to achieve more effective production.

In Asia wood stoves were developed in caves, called Angama, where there was a more effective use of production factors and getting a more controlled temperatures. These ovens, were adapted to the outside, that is, maintaining the shape and function, are built on the ground surface. This method was improved ceramic firing by introducing chamber furnaces, that is, following the same approach, several chambers were constructed on a hillside. This process allowed the saving of manufacturing costs, since they took advantage of the upward circulation of the heat to reach the desired temperatures of the rest of the chambers. Simply, costs were involved in the lower chamber, and it transmitted heat upwards.

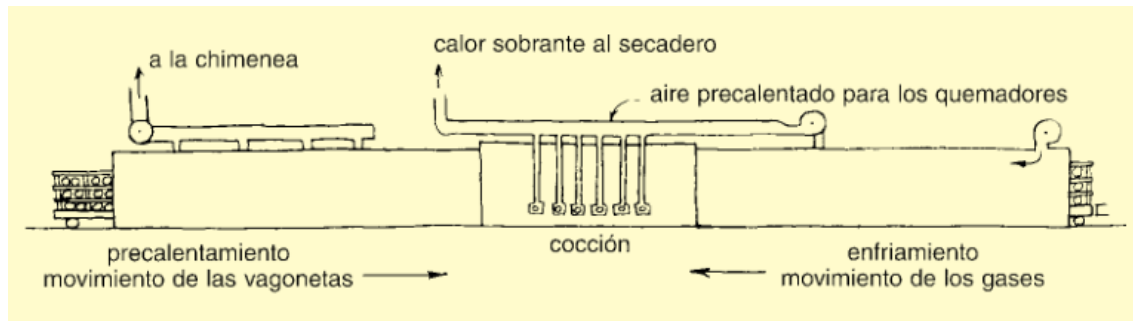
In Europe there are no changes in the production process until the arrival of the Industrial Revolution in the eighteenth century. Innovations in the European industrial ceramics sector focus on designing, manufacturing and traffic control heat.

Fuels used changed from the twentieth century. Humans known wood and coal for the creation of fire and heat, but subsequently appeared petroleum substance allowed reach high temperatures. From First World War, natural gas and electricity in furnaces joined, the latter resulting in high costs for manufacturers.

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Currently, industrial ceramic furnaces are continuous furnaces tunnel, where the ceramic can be transported therethrough. This allows higher performance within the production process. The use of this model is developed in section 3.4.

Figure 4; Straight tunnel furnaces circular



Source: Hornos ceramists - Daniel Rhodes

Any industrial product aims to improve the daily lives of human beings, so the tile is completely in industrialized constructive role. The term of industrial design belongs to the field of technology because its design is not based solely on aesthetic art, but also in functionality.

As Aquiles and Samar (1994, p.14) point out:

Industrial Design synthesizes knowledge, methods, techniques, creativity, and aims the conception of objects of industrial production, considering its functions, structural and formal qualities (aesthetic and symbolic) and all values and aspects related to their production, marketing and use, taking into account the human being as user.

For a company to develop and deepen the use of all resources achievable is necessary to know and research the market, both companies engaged in the same business or businesses of complementary products and substitutes. With this information, the company can more favorably meet the needs of consumers and plaintiffs.

Industrial tile has a design from technological and social demands tastes influenced by the economy, ie costs and revenues. The technology used is to develop an artistic model exploiting all its resources efficiently. The resources include the production process of industrial ceramics are the raw materials, the cost and quality of the machinery used, the skills of workers, the technology used, media, competition, etc. Moreover, all this is necessary to be done with the exchange of information with companies involved in this market.

3.2. Clusters

An industrial cluster is the study and analysis of all factors entornan the company to enhance its use in the process of the production chain. This term is formed by grouping different companies with different business, but with the same vision, to develop and incorporate new features within the industry and to establish a high competitive level. This study isheld in a nearby geographic range. These companies, contributed each other, all strong factors provide that have value are provided.

Clusters are usually formed by characterized by placed in various steps of the value chain by producing goods and related services including universities and centers and related businesses.

As Salom and Albertos (2006, n.p.) point out:

This area has the characteristics of a mature local production system, which has developed in recent years an excellent innovative and dynamic, with economic growth and a significant socio-institutional development. Studied long as the canonical example of industrial district, successive analyzes have highlighted different aspects that characterized it as such: the geographical agglomeration of markedly specialized industrial activities and a higher than average economic dynamics, the existence of inter-company cooperation and, especially the rapid introduction and dissemination of technological innovations.

For a given sector is helpful to belong a cluster and it is considered real advantage is to pertain to it. This brings positive aspects of the sector directly and indirectly through the interaction of various entities together form. The advantages that can be found organizations belonging to a cluster are:

- Improved competitive position because of the knowledge provided R + D. This can reach more quickly the needs and desires of buyers.
- Access to new markets related to other entities. The power have allies within the construction sector will benefit from the knowledge of other branches of the market, and thus able to reach and develop sales aimed at other audiences.
- Access to high-cost resources and complementary. By having educational and research centers, a cluster allows to obtain and achieve resources found at

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higher levels for the company itself. In addition, they can learn to develop these resources efficiently.

- Joint implementation of projects. The cluster allows a company to work exclusively on joint projects and to increase the level of knowledge and experience to future work.

The ceramic sector has the advantages of a cluster, based on the benefits of changing trade, commercial and technological information. Support organizations in the industrial ceramics sector are a clear example of the importance of the existence of a relationship between companies.

Table 1; Classification of forms of access to a cluster using as a criterion linking and cooperative relationship with other companies in the same before and after the process.

Nuevos miembros	Relación con firmas establecidas	Vinculación con las empresas madre.	Cooperación
1. Diversifying entrant	Firmas ya establecidas que acceden al mercado vía crecimiento interno o adquisición	Misma sociedad	Cooperación absoluta previa y posterior. Forman parte de la empresa matriz.
2. Parent company venture (Ito, 1995)	2.1. <u>Joint Venture</u> : participada por diversas compañías (Es habitual encontrar un capitalista y otro que aporte conocimiento)	La relación se establece antes del nacimiento de las sociedades generadas a través de un proceso de agreement o acuerdos con objetivos estratégicos similares.	Media un proceso de negociación de las condiciones en que va a surgir la nueva empresa y el acompañamiento posterior.
	2.2. <u>Franquicia</u> : Contrato de una empresa previamente establecida con otra que accede al mercado		El franquiciado firma un contrato, que ratifica el acuerdo y regula la relación padre-hijo.
	2.3. <u>Parent Spinoff</u> : Compañías independientes fundadas por otras firmas del sector		No hay ningún contrato previo pero la relación de agreement condiciona la dotación de capacidades previa y la supervisión posterior.
3. De novo entrant	3.1. <u>Entrepreneurial Spinoff</u> : El fundador ha estado previamente empleado en alguna empresa del sector (Klepper, 2001)	Diferentes sociedades, generadas a través de un proceso de disagreement por visiones de negocio diferentes.	No hay colaboración de ningún tipo tras el proceso de escisión. Progenitor y progenie pasan a ser competidores.
	3.2. <u>Start-up</u> : No existe vinculación previa con el sector.		Es la tipología con menor grado de colaboración. No se produce ni antes ni después del nacimiento.

Source: *Evolution and organizational reproduction in the cluster of Castellón: Spinoff complementing processes.* José Luis Hervas Oiver, María Lleó Nalda and Roberto Cervelló Royo

The ceramic industry is formed by producing companies that belong to ceramic clusters, as is the case of the province of Castellon, where there are the most important

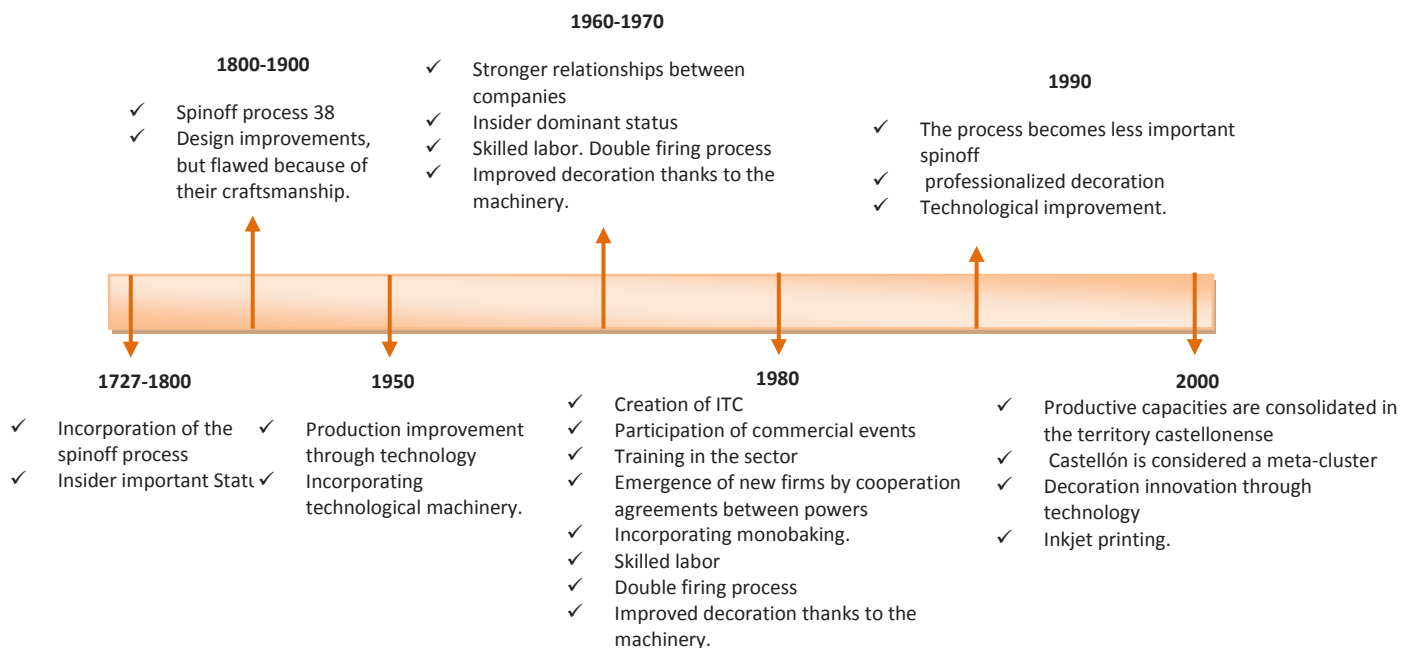
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ceramic cluster market is Spain. This cluster, called meta-cluster by Hervas-Oliver and Alborns-Garrigos (2007), includes all activities that make up the value chain of manufacturing tiles, and various organizations oriented research and development (R + D), as in the case of the Institute of Ceramic Technology (ITC-ALICER) or Universitat Jaume I. Besides being supported by public institutions, the Castellón cluster is backed by private companies like Ascer, ANFFECC and Asebec.

Castellón ceramic cluster was formed in the early twentieth century, consists of four towns in the province, Alcora, Vila-Real, Onda and the municipality of Castellón. Companies that emerged in the province were formed by local entrepreneurs, which many of them kept a family relationship between them.

The importance of the Cluster has been increasing over the years since, with the birth of new technologies, these relations have been way more involved in the project.

Graphic 1; Cluster temporal axis of Castellon



Source: self made

Support in the cluster of Castellón is heavy, all entities that are part of the same provide all possible resources. The Universitat Jaume I has a Bachelor of Chemical Engineering Ceramics, as well as master's degrees and graduate with the help of ITC-Alicer courses.

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A cluster is a good value proposition for sectors where the operating range can continue to increase. Ceramics is a growing business and its production and sales interaction many levels where you can improve and achieve the desires of customers appear.

3.3. Ceramic sector in Castellón

The pottery is one of the sectors with the highest turnover of Spain, since 80% of its production goes for export (190 countries) reaching 3 billion per year. The Spanish ceramics industry is considered a powerful competitor in the sector due to its large investment in innovation and development of new models and new manufacturing methods and equipment. Within the statistics, Spain is as the largest exporter of ceramic industry in the European Union and the second worldwide, behind China.

Table 2; Major ceramic producing areas

Áreas	2015 (millones m2)	% de prod. mundial	% variación 15/14
Unión Europea (28)	1.218	9,9	2,2
Resto de Europa (Turquía incluida)	572	4,6	0,4
América del Norte (Méjico incluido)	327	2,6	6,2
América central y del sur	1.193	9,7	-0,1
Asia	8.627	69,8	-0,9
África	413	3,3	3,0
Oceanía	5	0,0	0,0
Total	12.355	100,0	-0,1

Source: Acimac Survey department. Ceramic Worl Review.

The 90% of the Spanish ceramic production is concentrated in the Valencia region of Castellón thanks to its ability of production and chemical composition of clays found in the lands. In addition, the proximity of the port of Castellon to the port of Valencia has devised a fully automated processes, resulting in a growth of 6% in the sector every year. In the province of Castellon we found several municipalities in which the ceramic development is increasing since the last decades, is the case of Alcora, Borriol, Onda, Nules and Castellón de la Plana.

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Table 3; Summary table of key industry data

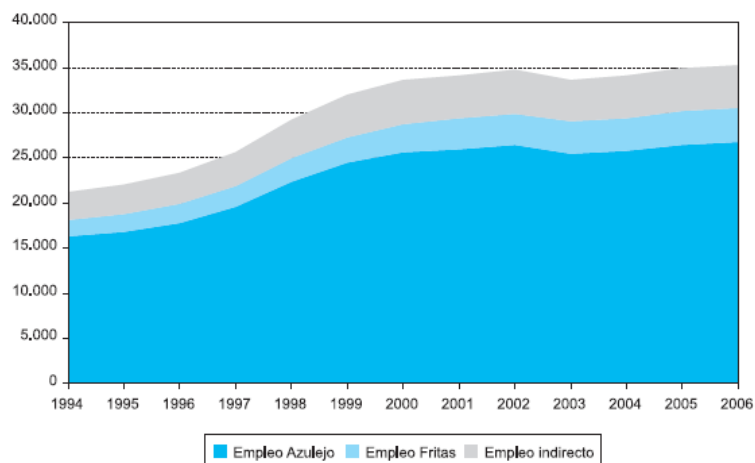
El sector cerámico en 2018					
Producción	530	Exportación	2.727		
Empleo	15.400	Ventas totales	3.597		
Producción y ventas del sector					
	2014	2015	2016	2017	2018
Producción	425	440	492	530	530
Ventas mercado nacional	574	643	746	824	870
Exportación	2328	2452	2570	2686	2727
Ventas totales	2902	3095	3316	3510	3597

Ventas en millones de EUR y producción en millones de metros cuadrados

Source: ASCER

Despite being born as small businesses and family origin, in the Province of Castellón there are many large companies dedicated exclusively to the manufacture and sale of ceramic products, particularly ceramic construction products. These companies have a high rate of job creation, since in Spain about 25,000 jobs per year related in producing ceramic industry are created.

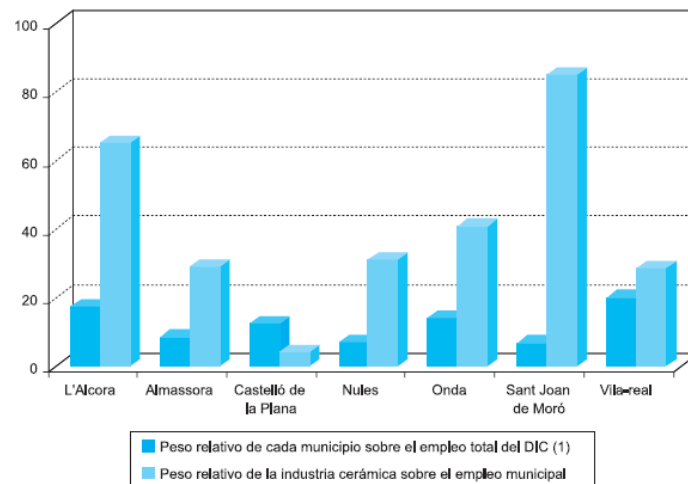
Graphic 2; Evolution of employment in the ceramic sector



Source: El distrito de la cerámica de Castellón. Vicente Budí

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Graphic 3; Distribution of employment by municipalities. percentages



Source: *El distrito de la cerámica de Castellón*. Vicente Budí.

The market for ceramic castellanense is important for the high number of billing brings in Spain, but also receives important number of jobs it brings to families. At present, the process of creating a ceramic tile has a certain degree of complexity which is divided into various tasks, therefore it requires people with special knowledge and skills to carry out all necessary steps for the customer successfully receive your product. This team of workers is formed since personnel serving manufacturing processes until personnel that develop models adapted to the demands of society, so that making pottery is guided by the tastes and needs that arise in the market. These needs are changing, either because of fashions that may arise between customers or new uses or components that are associated with the final product.

3.4. Production processes and their evolution

The production process of the ceramic sector consists of several steps from the treatment of natural raw materials to packaging and preparation for sale of the final tile.

1) Preparation of raw materials

Tile production process of the use of natural raw materials, untreated or previously homogenised minimally, in order to maintain and secure their natural characteristics. These materials are clays, feldspar, sand, carbonates and kaolins by mixing the paste for the manufacture of ceramic occurs.

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2) Grinding by dry or wet

Grinding is defined as the activity to move and mix the paste with mills. This type of motion can be achieved through dry milling, using mills or pendulous hammer, or wet milling by ball mills. The resultant is different depending on the type of grinding to which the paste is subjected, being the main feature the number of microns obtained. The reason that moves to decide on a process or not is the cost of each type. Due to technical improvements, milling par excellence is obtained wet and drying.

3) Wet milling and drying by the spray composition pathway.

Once wet milling proceeds to remove the excess amount of moisture to develop the process. This step is performed by atomization, a technique of considerable benefit the production process of the following steps.

4) Kneading

The paste obtained after drying is remixed with water of the raw materials used in the first step, in order to obtain an easy plastic molding paste.

5) Shaping parts

This process consists of two parts, first dry pressing, by hydraulic presses, and on the other hand extrusion, which consists of traversing a column of pasta to make a cut.

Figure 5; Manufacturing process of ceramic tiles



Sources: Programa de Afiliados de la Construpedia. ASCER

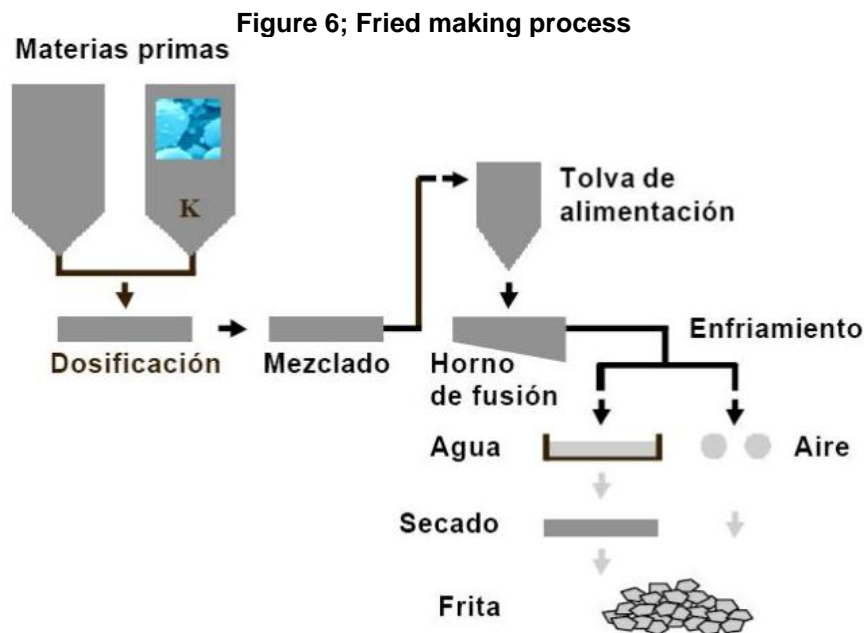
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6) Drying shaped parts

After creating the form of the final pieces, they are again passed through a drying process to facilitate cooking and enameling subsequent processes. This drying is carried out using vertical or horizontal drying, the latter with lower production consumption in the drying hot gases is performed.

7) Enamel

Glazing involves the application of different properties in order to provide the colorful tile appearance, gloss, texture, etc. This step is part of decorative ceramic process. This becomes important frits, defined as the melting vitreous compounds at high temperatures and subsequent cooling.



Sources: Programa de Afiliados de la Construpedia. ASCER

8) Cooking

Once enameled, the tile pass high temperature to obtain firing which may enable the required strength of the final product.

9) Sorting and packaging

The classification of tiles is supervision and selection of the end elements in order to achieve a set of equal parts or semi-equal forming the final product, the box tiles. Then

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the packaging is done following guidelines determined by the company and the pallet where it will be stored until its sale is formed.

The production process of ceramic tiles has undergone an evolution based on mechanization and innovation production. Initially, the ceramic tile is manually manufactured with a traditional process with the help of products required for drying, baking and shaping parts.

When demand grew tile, the manufacturing specialized and mechanized, thus was born the production process by bibaking. That is, the part is subjected, twice, at elevated temperatures (900°) in order to accelerate the formation of resistance and hardness. This type of cooking required more time to properly perform the desired production, so the sector decided to invest in a process that was formed by more efficient parts, but just as effective. Thus he was born the monobaking.

Currently, in most factories azulejeras, the production process used for its parts is the single firing, that is, only firing at about 1100° for 35-55 minutes is performed.

The double firing was replaced by the single fired by the economic advantages presented this. There are differences between the two methods of production based on other aspects of the production process. Among the advantages of the double firing, we found that are valid for products antihelacy, leaves a porous support that facilitates enamelled parts, production is more delicate and made of a more durable time and can remove defective parts in the first firing.

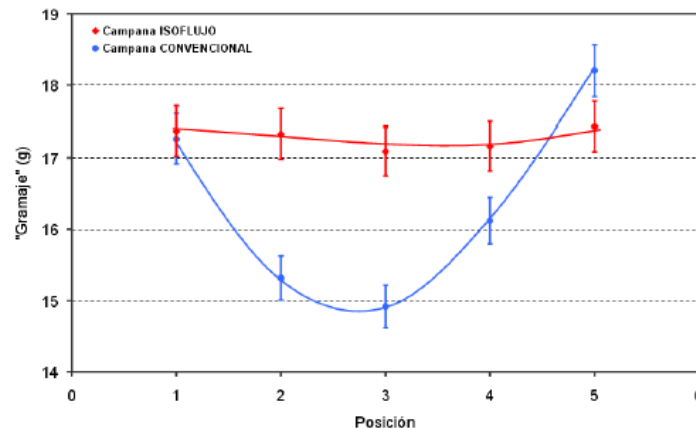
The onset of the production process monobaking changed completely, fuel costs are lower, the temperature of baking is greater and production times are reduced. In order to improve competitiveness and get the most benefit possible projects based on studies to exploit the industrial ceramics sector arise.

In the case of RE-THINK project, which studies the development of new products while reducing manufacturing costs thereof, in order to achieve a more competitive posture. This project aims to study the current manufacturing process of industrial ceramics and develop new methods of enhancing production, equipment and tools available. This thought arises because many times during production lost times due to various support compositions and creating different sizes and models of parts. To increase competitiveness, this project focus on promoting the creation while cheapen costs and production times are reduced.

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Following RE-THINK has developed a system of enameling is based on the application campaign, called isoflux. This way of applying glazing has shown that the enamel adheres perfectly to the part, showing no failure, unlike the conventional bell application.

Graphic 4; Comparison with the conventional application



Source: *Cerámica: origen, evolución y técnicas. África Carrillada Huerta. Universitat Jaume I. Results of R + D + i. Infoday Day 2011. Technological Observatory.*

Ceramics will continue to evolve, since it is a business sector that is affected by a lot of increased demand and should conduct studies to suit their production needs. This adaptation is considered difficult because of the large number of companies forming the ceramic sector, but innovation and creativity applied in every way within the sector to continue growing and improving their positions and market reach.

4. VENIS SA

Venis SA is part of the 8 companies in the Porcelanosa Group. Venis was born as a second option the group in 1986, following the experience in the ceramic sector of Porcelanosa.

It is a company dedicated to creating tiles at its facilities in Vila-Real, with a work team of 491 employees. Venis had sales of 120 million euros, approximately, in 2017, achieving an increase of 2 to 5 million euros annually.

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Graphic 5; Evolution of sales Venis SA



Source: Datos comerciales Venis S.A. El economista.

Venis SA ranked No. 1536 in the ranking of the best positioned companies in Spain, the number 17 in Castellón and, as for the ceramic industry, ranked No. 7 companies producing tiles. Despite the increase in sales annually, Venis place in this ranking is affected every year, since there are more and more competitive companies in the sector and investment in R + D should be increased.

Table 4; Evolution positions 2016-2017

Ranking	Posición 2016	Posición 2017	Evolución Posiciones
Nacional	1.441	1.536	95 ↓
Castellon	16	17	1 ↓
Sector CNAE 2331	6	7	1 ↓

Source: Datos comerciales Venis S.A. El economista.

Venis SA is considered a company dedicated to the absolute satisfaction of his client, showing their strong commitment to them and providing high quality products and totally modern and innovative designs. To this end, it has an important creative team and it is commitment to new technologies for production systems.

4.1. Process technologies in Venis S.A.

Venis SA is the second brand of Porcelanosa Group, so it is technology innovation never emerges from it is core, but adapts methodologies and processes developed by Porcelanosa.

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As in exposes Porcelanosa Grupo (2019, n.p.):

Venis comes from the experience of Porcelanosa as ceramic manufacturer. Therefore it becomes a leading company worldwide in the manufacture of tiles, stoneware and porcelain from the beginning.

With an innovative spirit, which is maintained over the years, it has been one of the companies that has evolved the ceramic product in all areas from design, quality and ecological commitment in the manufacturing process, to finding new applications in contemporary architecture.

Among the facilities Venis S.A. employees held a traditional organization based in routine production steps. That is, within each department activities structured by processes, and the product is observed as such at the end of production. The existing communication within the team Venis is a personal communication by telephone and only carried out by circumstances require. They are organized through an application called CAU, which provides support for the management of departmental organization and between departments.

The production process has focused on access other tile patterns because of the great competition of the parquet. Therefore, a brand new wood-based ceramic parquet simulation, the Starwood brand was created in 2017. This innovative product has innovated perception tile design, relying on textures that mimic the feel of wood.

It is resistant to water and created by sustainable materials, with a thermal sensation adaptable to prevailing weather conditions and little maintenance, among other more properties.

Figure 7; Starwood coating



Source: Porcelanosa Group

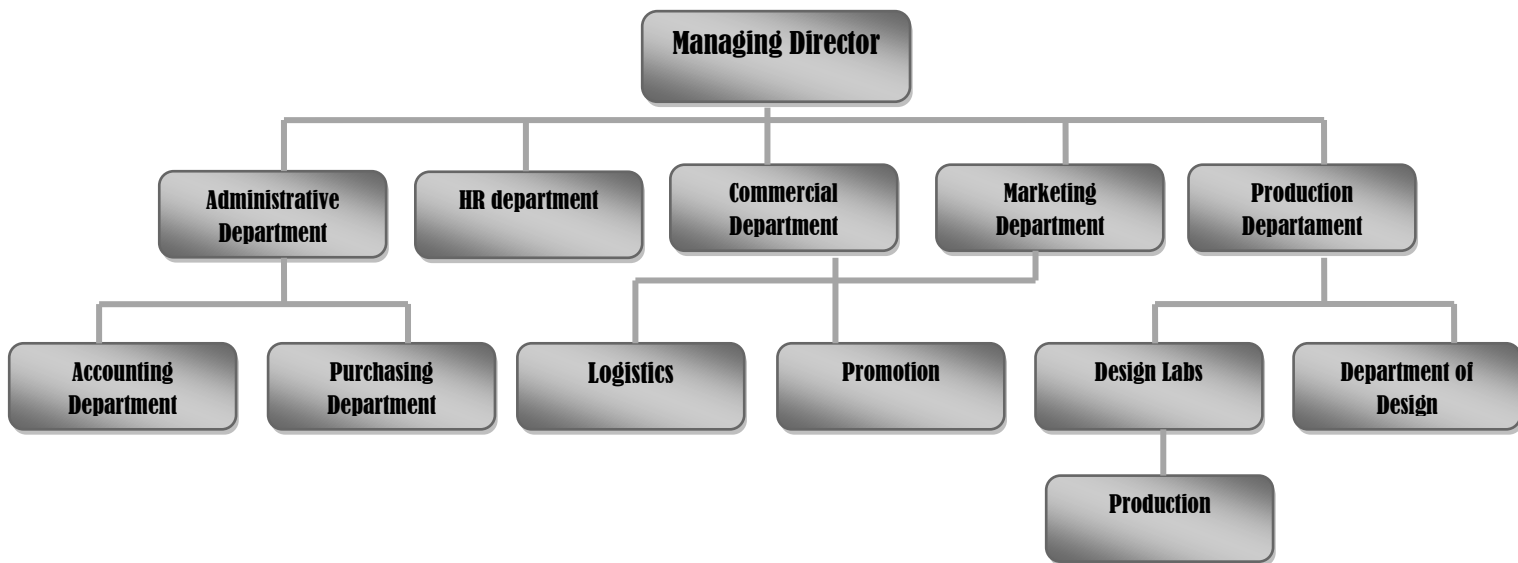
Venis S.A. has made a change in some models of his brand, has increased the size of his tiles. This allows a reduction in manufacturing times and an increase in manufactured square meters. With this introduction in the Production Department, his machinery has improved and his production process has been more efficient.

4.2. Creative team and its importance in Venis S.A.

During the last 6 years, Venis have developed two departments that work exclusively to the design and development of aesthetic models and study to reach and agrees to connect with the customer is engaged. These departments are the Department of Design and the Department of Marketing, the latter completely formed during 2017. This trend indicates that the tile organization has decided to invest in creativity and innovation, has given importance to the relationship with the customer and has created an essential place in the process to carry it out. Venis organization chart currently is as follows:

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Graphic 6; Flowchart Venis SA



Source: self made. Information obtained by Venis SA

How can be seen from the above chart, the Department of Marketing and Design Department are at different stages, but communication and projects among them are constant. The Design Department is responsible for devising the shape of a factor, product or feature of a product, and the Department of Marketing studies how that creation has to come favorably to the customer. Inversely, Marketing can study and find a need and Design Department is responsible for shaping the studio.

In parallel we find the Design Lab, working with the Department of Design. The Design Department devise and the Laboratory structures the production, consequently going to the Production Department, where it is produced.

In addition, the creative team has created an experience for employees and customers, where you can get all the features tile approaching a small sample of it. This chip is in the architects room, also known as Ceramoteca, where small samples of each model of all tiles and ceramic products that sells Venis. It is a chip containing all the necessary information on the properties, characteristics, color, material, size, etc., of the piece that approaches. This facilitates attendees the necessary sample information they are interested in more quickly and efficiently.

The creative team within a company, particularly within the tile producer has Venis S.A. increased his importance becoming crucial. Thanks to these departments, Venis gets to a larger number of clients among which there is great diversity. In addition to the

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good results and good publicity it brings to the brand, the creative team can favorably enhance and manage phases of production and the factors that interfere in it.

4.3. Importance of marketing in Venis S.A.

In recent years, marketing has been considered essential in every business deal. The emergence of new companies in the same industry has required that institutions have a department specialized in studying and developing actions that enhance marketing competitiveness.

In Venis S.A., the Marketing Department has been formed over the past two years since, the ceramic tile has been threatened with companies that have resurfaced (of the crisis) with a very high competitive level.

The Department of Marketing has worked during 2018 in creating a documentary series called *Eternal Dates*, where everyday situations shown. This idea arises from the analysis, via social networks, of ages from customers and it has contemplated that your audience is between 20-40 years. By observing this data, they studied the possibilities of how to reach a young audience, since Venis carried out aimed at people over 45 years campaigns.

The series was to show product placement, since the purpose is simply to make known their tiles. In this case, they chose its flagship product, *Starwood*.

Figure 8; Chapter 1 frame *Eternal Dates*



Source: Porcelanosa Group

This marketing technique wants to reach the public and try to create a relationship through 12 episodes. Currently only available the first two, since its publication is consecutive. This is an online campaign where betting on a totally different

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communication. Venis S.A. is considered an innovative company, but thanks to innovations in recent marketing, it has achieved sales experience and has sold no tiles. This point is difficult to achieve by a product, therefore, wanted to reach and engage the attention and emotions of the client.

Prior to this project filmed, Starwood tried to reach the customer through demonstrations of craft work linked to the creation of the tile. He also integrated parts of the process of creation and processing of wood within your campaign, showing their interest and perseverance in creating a ceramic that simulates original wood. The campaign features a video posted on his Youtube channel, Starwood Porcelanosa Group.

Figure 9; Starwood frame, Eternal crafts



Source: Youtube. Procelanosa Starwood Group

Venis S.A. has demonstrated its potential in marketing comes from the hand of collaboration and mutual assistance with other companies. In the case of Sacmi Iberica S.A., a company dedicated to building machinery dedicated for use in the industrial ceramic sector. Sacmi is constantly researching and developing their products and services to obtain the required quality react and cope with competition and promote technological innovation within its machinery. These characteristics have led to Venis count on Sacmi in various projects to develop joint collaborations where they can get mutual benefit. The two companies have cooperated together to contribute their experiences and knowledge to a common goal.

On the other hand, we also found the company Kerajet S.A., with which collaborations have been made due to innovation in design printed it. Kerajet is a company that brings much value to Venis, as its global patent system and digital printing machine, has developed a breakthrough in the production process of the tile. Consequently, for

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Kerajet, collaborate with Venis, also a great benefit, as this business relationship can open many doors in the industrial ceramic world to Kerajet.

Investment in marketing and design azulejera Venis S.A. is paying off in recent news, since its image regarding the quality, design and customer commitment is being enhanced among potential customers.

5. KERABEN GRUPO S.A.

Keraben Grupo S.A. is part of the geographical area of Nules, where there is a high percentage of companies producing ceramics, belonging to the ceramic cluster of Castellón.

Keraben Group S.A. was born as a small family company called Gres de Nules due to its location. Its steady improvement in productivity gave him access to obtain rapid growth. Its main function was the creation of ceramic tiles dedicated to construction, but has always highlighted by innovation, design and quality products provided. This economic expansion led him to create Keraben, a subsidiary that quickly became a parent company.

The tile producer continued a steady and continuous growth, and during the 90s, could allow the acquisition of Metropol and Athena, two companies dedicated to the realization of pavements. This merger originated Keraben Group S.A., and came to the public as a physical store worldwide.

The financial crisis of 2007 affected the entire industrial ceramic sector, and Keraben Grupo was faced with the need to obtain shareholders to save its capital. In 2015, a new majority shareholder, leaving with minority joined the founding family. This organizational change allowed the financial structure will be further enhanced, and managed to cope with the crisis.

The main mission of Keraben Group is to create ceramic coating products with high quality, innovative and contemporary at an affordable price geared to the needs of a segment of medium-high customers' designs. Through this mission, they want to get their vision of leading position in the industrial ceramic sector.

Keraben Group S.A. is positioned at number 1421 in the National Ranking, which has worsened in 30 places since 2016. This deterioration is due to the decline suffered by

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the volume of sales in the years 2017 and 2018. In the Ranking provincial is located at number 14, with an improvement compared to previous years due to the crisis that has existed in the ceramic sector, Keraben has remained strong before the financial problems that haunted the rest of companies, so the fall of much of the ceramic sector has improved the position of Keraben in the Provincial Ranking. Finally, it is at number 5 in the Sectorial Ranking Manufacturing Ceramic Tile.

Table 5; Evolution positions 2016-2017 Keraben Grupo S.A.

Ranking	Posición 2016	Posición 2017	Evolución Posiciones
Nacional	1.391	1.421	30 ↓
Castellon	15	14	1 ↑
Sector CNAE 2331	5	5	0 →

Source: Keraben Grupo S.A. El economista

As discussed above, the turnover of Keraben Group SA has been affected in recent years due to the crisis in the ceramic sector. This crisis has caused the closure and suspension of the ceramics activity of various companies, but Keraben has managed to overcome all obstacles despite the decline in sales.

Graphic 7; Sales evolution Keraben Grupo S.A.



Source: Keraben Grupo S.A. *El economista*

Keraben, has experienced steady growth over time, except for the duration of the financial crisis. Once its financial structure was established and returned to its growing productivity, sales revenues continued to grow until today.

5.1. Process technologies in Keraben Grupo S.A.

The production process of Keraben Group SA is the same as other companies engaged in the production of ceramics. To carry out the process, Keraben just integrate the BIM model in their work techniques. BIM acronyms come from Building Information Modeling, and describe a working model in the construction sector in which the information is essential for the production process.

On several occasions, the BIM methodology is confused with the concept of software, though, that the model works thanks to software, this definition is not the correct. BIM is a methodology that integrates all individuals acting in the production process and provides a stream of communication at all levels. This communication allows the company to display a virtual model of your product at all stages. BIM is considered a totally beneficial method that brings benefits to the company as a real-time and updated every stage of product creation, prevents this information is not lost and are

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kept constantly in the memory of computers, optimizes manufacturing process and reduces costs and times of answers.

Keraben adopted this methodology in early 2018 in order to optimize their production processes and their results have been remarkable. Subsequently, in December 2018 it was established by law the use of BIM in all construction of public buildings. The need for this type of organization comes from the consequences produced pottery crisis, as the sector was faced with problems that had never before resolved. Keraben Grupo S.A. noted that 70% of orders were not done in the estimated time and that their original budgets increase 75% to original. Therefore, there was a real problem, a problem involving all agents and their productive activities of the organization. A model that would be more competitive, with more effective communication is needed, with reduced costs and time and totally geared to the customer. BIM was ideal for the growth of many construction companies method.

This model is fully in line with the technological times today because it allows customers to check the final virtual models Bimobject platform where its portfolio of differentiated products collections shown.

Figure 10; Brancato colos Gray Flooring Collection



Source: Bimobject Keraben

Keraben Grupo S.A. is considered a company that invests in technologies for the creation and production of their products, and engage in quality and design required by the customer. In the month of May 2019, Keraben installed a pilot plant, created by

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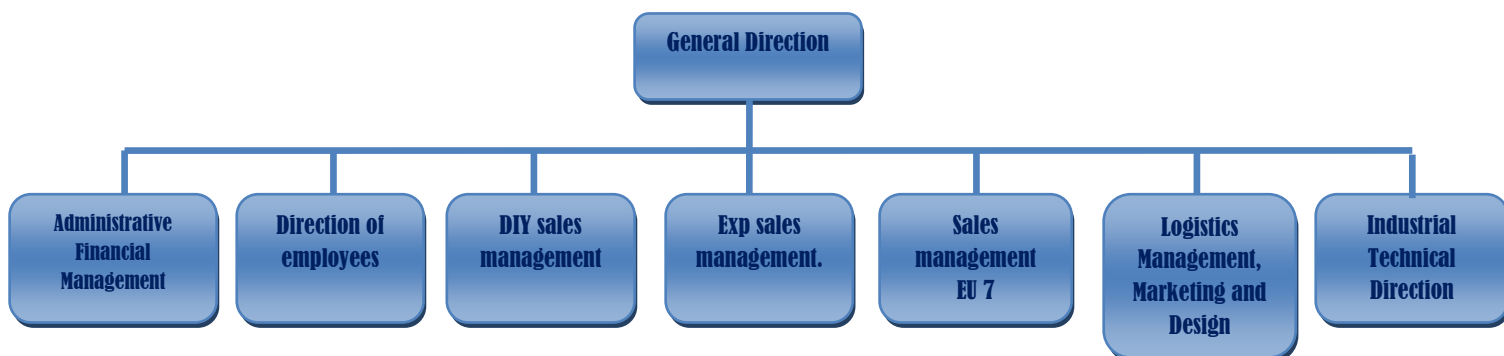
ITC, to demonstrate the benefits of technologies that support the advancement of sustainability. Specifically, this pilot plant, through monitoring systems, aims to show emissions that cause the ceramic kilns.

This initiative comes on the heels of the European Dream ITC Project, which seeks to explain that through technological innovations in the ceramic sector can also collaborate with the environment. This project is funded by Horizon 2020 of the European Commission. The clear message from all these organizations that collaborate with ITC Dream Project, is that technological innovation and the environment, they can go hand in hand.

5.2. Creative team and the importance in Keraben Grupo S.A.

Keraben Grupo S.A. has had a creative team since its inception. Its main mission, reach the customer upper-middle class with an innovative and high quality product requires intense study and elaborate market.

Graphic 8; Flowchart Keraben Group SA



Source: self made. Keraben Information Group SA

As can be seen in the chart, Keraben has a department which includes activities Logistics, Marketing and Design. The Marketing team and the Design team work together carrying out all the projects together. Keraben aimed at creative people a platform to carry out activities related to perception, contact and customer relationship tasks. This department obtains information from purchases and sales, ie, the flow of company turnover. This data can be key to the development of research projects of developments in the product innovations in advertising and innovations in the production process.

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This department maintains a direct relationship with other departments and sub-departments, since investment in R + D + i was born and developed within it. Keraben creative team is directed exclusively to the creation of innovative platforms to promote the development of the ceramic sector. These studies focus on the development of the production process minimizing the negative impact on the environment. His research has yielded results as Cool Tile, a tile that reduces energy consumption, Dream, production process that reduces energy consumption, emissions and production costs, or Lifeker, product lining the walls and allows self-cleaning.

The creative team of Keraben SA, brings a new vision, based on customer needs, through the creation of communication media. This team, with the technology available, has created a 3D platform that allows customers to personalize a space virtually, with the use of its products. This allows the customer to have a direct relationship with the company and know the tiles displaying a completed purchase. This platform provides contact with all kinds of clients simultaneously, which provides entertainment in the form of game, which interferes with the sales process.

5.3 Importance of marketing in Keraben Grupo S.A.

Keraben Grupo S.A. has been investing in Marketing for 30 years. Its commitment to the customer, providing quality, design and environmental care, is high because studies conducted by the Marketing Department. This department studies and analyzes the loyal customer and potential customer while researching ways to establish a lasting relationship.

6. DIFFERENCES BETWEEN THE COMPANIES ABOUT INNOVATION IN THEIR TECHNIQUES

The two tile producer developed along this study show a very similar profile, but their differences are distinct when we focus on innovation. They are two industrial companies creating ceramics, within the same industry and industrial cluster.

Venis S.A. is part of a large group, Porcelanosa Grupo S.A., where its position is second in the ranking of companies belonging. This forces you to stay waiting for each performance of Porcelanosa, and be not considered a pioneer in certain innovations. Your investment is less in innovation and development, but remains as an innovator in design and quality in the industrial ceramic sector in Castellón. Venis S.A. has a great creative team of the Departments of Marketing and Design has enabled the company

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to reach an audience that were not addressed before. His previous experience in advertising and the contribution of creative professionals have developed advertising communication platforms that try to link closer and relationship with the customer.

Since it is supported a great company, innovation does not go beyond how to reach the customer and establish a relationship of trust. Innovative and creative studies are based on enhancing the communication paths to the customer through a product already created. That is, they start from a tile already manufactured and create the means whereby the customer gets to know them. His improvements ceramics are tailored to customer demand without changing the manufacturing process. Their analysis of marketing is based on know which one is the method suited to communicate with customers and capture their attention.

Eternal Dates birthed of a product already created, Starwood, based on a contemporary demand. To enhance its image in the youth market, Venis S.A. has developed media oriented to their new target audience. Through the Youtube platform, it ups various advertising videos about everyday situations of society where, subliminar form, it shows their products. With these roads, the company aims to entertain possible future consumer and create an image in your thoughts.

In addition to this work, Venis S.A. has focused its advertising on social media technology, since there is the vast majority of your potential customer.

On the other hand, we find Keraben Grupo S.A., a pioneer within the group. Keraben is a company that shows a high investment in innovation, both in its manufacturing processes and the organization of his team. They use new technologies to create products with better finishing and interfere favorably on the environment, as they are considered an environmentally friendly company. In addition, the use of virtual platforms to keep communicated to all links in the production chain, time providing data and information in real time and updated.

This is a company that studies all aspects needed to reach the client. Implements a policy and a cultura based on care and respect for the environment, this is a ideology can lead to create an affinity within a certain group in society. Their commitment to nature is exploited with great participation in sustainable projects involved in the business future. These implications respectful with nature are both in the materials used for the creation, as in the machinery that develops the product.

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In addition, this ecological development is carried out in order to minimize manufacturing costs. Keraben constantly studying the reduction of manufacturing costs because your target audience belongs to a medium-high social class and must adjust prices to demand. This indicates that the innovative team works in various fields of the company, both creative, advertising, financial and economic.

The innovation of this company is oriented to the virtual and technological communication with the customer, as they have created platforms that enable customers to experience their products before purchasing. This technology investment also implanted into the company with its routine procedures guided by technology organizations, the BIM. Through this type of organization, there is a greater complicity between the various links in the hierarchy and knowledge of all the production process is more explicit. This methodology leads the company to work together and allows you to reach any problem and improve it through innovation.

These two companies engaged in the same business, with similar final products and production process itself, but its innovative and creative resources are affected by different factors.

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