# THE CERAMIC INDUSTRIAL SECTOR. ANALYSIS AND STRATEGIES

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# ABSTRACT

Some of the basic premises of this Paper are already familiar while others are derived from an analysis of the way the world may evolve. They are collated in this document with the aim of offering a point of view that may serve as a complement to the difficult question of predicting future scenarios, in this case essentially:

- 1. To establish the current competitive environment up until 2020 with a basic formulation of strategies and making reference to *quality and sustainability*.
- 2. To envisage a market and technical scenario up to 2050.

As in any medium-term, up to 2020, and in the long term, up to 2050, forecasting exercise, the reality may turn out to be better or worse, but at least it will give us something we can refer to for support.

At this moment in time, the situation in which the CERAMIC INDUSTRIAL SECTOR (CIS) finds itself in Spain, which is no different to that of most industrial sectors, can be summarized as follows:

- structural maturity
- a market situation in recession nationally
- a very tough global competitive environment
- exceptional growth of local and global competitors

The opinion shared by most experts and specialized organizations is that by 2050 39% more people will live on this planet and the population will increase from 6,800,000 to 9,500,000: this translates into thousands of millions of new consumers (*See Figure 1*).

Radical changes, at the political, technological and employment level, are inevitable to ensure that in 2050 we consume the equivalent to the ecological resources of a single planet, instead of the resources of 2.3 planets, which we would need if we were to continue with our current business model.

# **1. THE CURRENT COMPETITIVE ENVIRONMENT UP TO 2020**

#### 1.1. Use

Ceramic tiling, analyzed from the point of view of use, affords a resistant and hygienic covering with a range of decorative and textural possibilities. In areas with a lot of movement of people (railway stations, airports, etc.), when used for paving surfaces, tiles yield good results. Employed in kitchens and bathrooms, they are easy to clean, as well as aesthetically versatile and durable, and they have special applications in the façades of buildings, swimming pools and the urban environment.

From a global perspective, ceramic tiles have had and continue to have a niche market, which in the developing regions of the world is evolving as the life standards of their populations increase. They are environmentally friendly and there is likely to be a continuous and stable increase in demand.

Pressure from substitutes (paints, natural wood, carpets, natural wood, vinyl floors, natural stone and powder and resin agglomerates) within the ceramics market itself is due either to their special applications, climate, customs, aesthetics and, in most cases, price.

#### 1.2. Technology and its "vulgarization"

Until well into the 20th century, ceramic tile manufacture was a traditional process, which consumed products of local origin, without the use of heavy machinery or intensive labour and, because the production centres were small, their impact on the environment was moderate.

The ceramic sector has been marked by rapid technological development, both in terms of processes and equipment: the incorporation of the spray drying of clays, progress in the pressing and firing of tiles, the introduction of electronics and special machines for selection, manipulation, control, etc., in conjunction with specialized research centres and prestigious design studios, were responsible for the development of a strong industrial sector.

Note that there has been a transfer of technology and processes from manufacturers to areas with a demand for ceramics and the initiative to produce them, which have also assimilated Western organizational systems, forms of management and commercial concepts into their mindset and procedures.

They even follow standardized environmental criteria, which, fortunately, put them on a par in terms of this requirement with companies and production plants all over the planet and which share the same costs.

### 1.3. Manufacturers

Social development gave rise to customers with disposable income and housing needs suited to the use of ceramic tiles.

As a result of the application of modern technologies, readily controlled fuels, powerful and efficient, energy and capital-intensive industrial equipment, combined with a progressive reduction in the cost of the transport of raw materials, manufacturers have developed into large industries, which require specialized business management and a larger customer base.

Strong production groups with major capital assets and even stock market funding have established themselves close to regions of sharp economic and social growth, competing with robust and distant markets. Investment groups and industrial conglomerates often include ceramic processes as yet another of their portfolio share options, with a focus on major ceramic industries.

#### 1.4. Transport

The mass employment of enormous container ships and logistics-platform ports, coordinated with regional and local distribution to consumption points, have reduced the cost of transporting products long distances between continents to a fraction of the total cost of production, storage, distribution and commercialization, making competition in every market more aggressive and energetic.

#### **1.5. Distribution**

Market circumstances are clearly changing so that the real motivator for consumers is going to be the distribution sector, which, through its promotion campaigns and displays, will decide what the final user will purchase (least commonly architects and those who work on their behalf; contractors and property developers in most cases), depending on which product favours their balance sheet the most.

In the years to come, owing to the policy of concentrating business interests which is being applied in the distribution chain, a high percentage of the ceramics, bathroom and fittings market will merge to form a small number of distribution business groups. Taking advantage of an ever greater ability to negotiate and forcing down prices, these groups will have an overwhelming control over the ceramics market sector as a whole.

This radical concentration process will constitute the most important phenomenon and it will decide the business future of the ceramic sector. Traditional points of sale will decline in number and the market share of super stores and wholesalers that impose their conditions on the ceramics factories that supply them will increase: whenever this type of horizontal concentration occurs in a sector's distribution chain, relationships with suppliers undergo change.

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# **1.6. The Zones Of Influence Theory**

For all sector companies, demand is influenced in every geographical area by the competition and growth of local manufacturers, neighbouring countries and global competition from large producers. In every market new competitors appear and attack the position of previous players.

Increasing or maintaining the penetration of products depends not only on distribution and service, or the size of orders and a quick response to the demands of clients. By prolonging the time it takes to respond and adding its cost to other factors, the barrier posed by distance –**ZONES OF INFLUENCE or ACTION RA-DIUS -** ALSO determines the success or failure of entrepreneurial performance.



# WORLD POLULATION 2010

MILLIONS OF INHABITANTS

#### WORLD POPULATION 2050



MILLIONS OF INHABITANTS

Figure 1: Growth of the World's Population



Figure 2: Evolution of Ceramic Production

# 2. STRATEGY FORMULATION UP TO 2020

The formulation of the best strategy depends on each particular organization and its financial situation, the region and country it is in, its objectives and the experience and quality of its *management team*, its position in the sector, its productive installations and its sales force, in short, its real position in the CIS.

The strategic approach of ceramic sector companies will imply a decision to overcome the difficulties of the current competitive environment and its global reach: product uniformity, distribution and standardization of organizational and production systems.

We cannot count on restoring production to the levels seen in the first years of the 21<sup>st</sup> century. The narrow profit margins affecting the Spanish CIS will not improve substantially under current conditions.

An analysis of the sector should then be serious and rigorous: **Haven't you done it yet?** 

- Incorporating the concept "GLOBAL VILLAGE" into your route map
- Including "SUSTAINABILITY" as a basic "input"
- Determining in detail the STRATEGIC GROUPS and preferences of the company
- Considering as options for necessary change the following possibilities:
  - a) A change in strategic positioning

b) The acquisition of competitors, concentration and/or adaptation of installations

- c) The forging of product, market and service alliances
- d) Should it be the case, disinvestment

#### 2.1. Strategic Decisions

Once the approach of the company, its rationale, in other words its goals, have been defined, the aim of its STRATEGIC DECISIONS is to select the STRATE-GIC GROUP in which to include itself and the area of the market the needs of which it hopes to satisfy and hence those products which, in that GROUP, will meet this target satisfactorily.

Logically, the selected market area, the influence zone which has been marked out and the products that serve its needs (product area – market) must deliver enough profits to the company to cover its (economic or extraeconomic) aspired goals.

The intensity of the rivalry between competitors and the low profits in the CIS, the fierce competition for orders and rigid prices, which are also dictated by global competition, will allow certain installations to employ a COST LEADERSHIP strategy to improve their profit margins.

For a company that accepts that it is small and wants to remain in the sector, retaining its position, the essence of its competence should be personal service, local contacts, strict control of operations, an ability to react to changes in style and so on. In short, it must be agile and respond rapidly to changes and the demands of clients.

# 2.2. Specific national marketing: spain

The cost of the basic production factor, CLAYS, is lower if local resources are used. If clays are transported long distances, they generate  $CO_2$  emissions, which will either be directly banned or their cost will penalize the sale price of the final product.

Despite the fact that clay in Castellon is of excellent quality and produces authentic earthenware products with excellent technical and aesthetic results, for a significant percentage of specifications drafters and users porcelain alternatives have become more popular than red-bodied ceramic tiles.

In Spain sectorial informative strategies, institutional support, awareness campaigns and commercial efforts should concentrate on the message that "quality is red, which is also green".

### **3. PRESENT ANOD FUTURE FACTORS**

#### 3.1. Sustainability: Ceramic Quality

Quality is a concept which is generally associated with the fact that a product scrupulously complies with specific technical specifications. Some people cling to the view that the higher quality of their product is due to the fact that it is very thick, the glazing is perfect, its greatest achievement is its aesthetic value and so on, and they trust that, because of this, the success and profits of their business are assured.

Others, on the other hand, produce goods that verge on the edge of what is strictly acceptable, stretching standardized technical levels and manufacturing parameters as far as possible, and also hoping that, as a result, the returns and success of their business are guaranteed.

They are both right because these two extremes define their quality and, if they get it right, they will stay in the market. Otherwise, they will be driven out for not having positive profit margins. However, the concept is wider in meaning. Consider the following:

- ISO 8402 (replaced in 2000 by ISO 9000): Quality is the combination of attributes of an entity, which enable it to meet established and implicit needs.
- UNE-EN ISO 9000:2000: Quality is the degree to which a combination of inherent attributes complies with requirements.
- THE CONCEPT IN ITS BROADER SENSE: This states that an entity offers quality when it sells, the buyer is satisfied and the vendor/manufacturer makes a profit.

A factor common to all three is the clients' satisfaction with the advantages afforded by the product, given that their purchase meets their expectations. The outcome of satisfying the needs of clients and even anticipating them will be a clear advantage over competitors.

As modern societies understand the problems that human activity is producing in the environment, customer will attach enormous importance <u>to the res-</u> <u>pect their intended purchase has shown towards nature: they will regard</u> <u>it as a given requirement of their purchase.</u>

Those who are involved in the ceramic production process need to understand that, both for reasons of cost and sales rationale, the **SUSTAINABILITY** of their products must be evident, real and transparent: **IT WILL FORM PART OF THEIR QUALITY.** 

Undoubtedly, at very similar prices, the decision to buy will always opt in favour of the brand which is perceived as a **product developed**, **manufactured**, **distributed and installed in a SUSTAINABLE way and which**, at the end of its life cycle, is regarded as NOT DANGEROUS.

#### 3.2. Sustainability: a necessary goal

Given the current circumstances of enormous pressure on the environment as a result of human activity and the continuous growth in the population, any activity or product must be **SUSTAINABLE**: in other words, designed, built, used and disposed of in accordance with the strictest criteria of respect for the environment, the economy of production factors and social responsibility.

**SUSTAINABILITY** is not a scientific and ecological concept confined to presentations, congresses or specialized books. It is now the pivotal feature of every industry, process and product. During their life cycle ceramics must contribute to reducing pressure on natural resources by reforming their properties so that they respect biodiversity, the climate and ecosystems.

In their operations, companies must develop a culture of saving energy and materials, significantly reducing harmful emissions and moving in the direction of a low-carbon society, as a result of the efficient use of resources and clean energy. This approach not only reduces pollution. It will also make the companies that survive more competitive.

The adoption of strict environmental regulations, which, owing to the cost their application entails, may eventually determine the viability of an industrial process or product, does not constitute one of the factors that makes for greater quality: these are production factors, for example energy or raw materials and compliance with technical regulations.

**SUSTAINABILITY:** The generations of today must always live better, while ensuring, however, that future generations also have a better way of life.



# 4. THE YEAR 2050

During the ongoing decision-making process that business managers adopt, it is vital to interpret the technological environment and also the social and cultural setting in which their future investments will be made. The accuracy of the information at their disposal will help to ensure the viability of their companies.

We cannot deny the fact that, at this moment in time, we are set on a dangerously unsustainable course. In the majority of countries growth in population and consumption, in conjunction with inefficient policies and forms of government which are incapable of managing this expansion, are resulting in the degradation of the environment and our societies.

Although 2050 is a long way from the 10-to-15 year period, which is the usual time scale for investment forecasts and decisions, the speed of change the planet will experience means we have to start positioning ourselves today and plan our prospects in the decades ahead.

In the ceramic sector the political, social and technological changes that will occur will radically alter the way companies work. Many companies will transform themselves and adapt. For others the challenge of this transition will be more difficult and it will also interfere with their productive, commercial and applicational interventions.

#### 4.1. The market

In 2050 some 9,500 million people will live well but within the limits imposed by the planet. The world's population will have begun to stabilize, chiefly as a result of education, the concession of economic status to women and greater urbanization: i.e. rapid growth of the middle class worldwide.

This growth will attract thousands of millions of new construction, i.e. ceramics, customers. With a conservatively low estimate for consumption of 2 m<sup>2</sup>/ person per year, global demand has been estimated as  $9.5 \times 10^3 \times 10^6 \times 2 = 19,000$  million m<sup>2</sup>/year, which is more than double the global production recorded in 2010 *(See Figure 2).* 

Furthermore, 6,000 million people, in other words two thirds of the world's population, will live in cities: the global urban population will be multiplied by two. A wide range of urban, residential and leisure infrastructures, etc. will increase accordingly and will need ceramics adapted to their requirements.

# 4.2. Energy

In 2050 global emissions of carbon will halve (taking 2005 levels as our baseline), as a consequence of changes in systems for generating electrical energy with low  $CO_2$  emissions (renewable energy sources) and the improvement in energy efficiency from the point of view of demand. Greater demand for electrical energy will stimulate innovation and investment in its supply, transport and distribution. This will favour the expansion of the renewable energy market and its distribution networks until it reaches the point where it leads the global energy production mix.

Consequently, the energy delivered to ceramic plants will come exclusively from the national grid. The higher cost of "clean" energy, as opposed to energy sources that are obtained by burning fossil fuels, will disappear because the processes that produce greenhouse gases will be economically sanctioned.

Solutions will be enforced so that, through the use of telecommunications and the exchange of on-line information amongst industrial sectors, industrial plants will manage their work schedules using dynamic energy tariffs. This will encourage a change in the way energy is used so that it is distributed more regularly throughout the day.

#### 4.3. The product

It is difficult to predict changes in product attributes over a time scale of nearly forty years. In this presentation the view is taken is that the product will still be basically "ceramic" and the belief is that any differences to the current technology will stem from anything that affects reductions in energy requirements, avoids environmental pressures, facilitates the use and makes the recycling of products which have reached the end of their useful life viable. These might include:

- Reduced thicknesses (the less tiles weigh the less unnecessary consumption of energy and resources during manufacture, storage and transport).
- Greater size.
- "Fluorine-free" clays and highly processed mixtures. "Water-free" glazes.
- The application of designs and textures by non-contact spraying/injection.
- Flexibility in manufacture (less waste means less consumption of energy and resources).
- Installation systems which do not require adhesives and can be dismantled. Ceramics will be included in prefabricated construction modules.

Of course, the product will adapt to a multitude of aesthetic influences and trends in use, as well as new technical demands, and it will have to compete with substitutes to which the same global market regulations will apply.

#### 4.4. The process

Manufacturing plants will be conceived as coordinated sets of automated equipment, prepared specifically for a certain type of product and format, without the direct intervention of people: Starting from the raw materials and ending with the placement of finished product batches ready for shipment in smart warehouses. The industrial process will be circular (closed circuit) and networked to other sectors, reducing the need to extract natural resources. The preparation of raw materials and mixtures will increase the accuracy and homogeneity of ceramic body compositions, in order to ensure that the attributes of finished tiles are virtually always the same.

The ceramic process will continue to be based on sintering reactions in ceramic bodies, at temperatures above 1,000°C and in kilns, which will have reached their maximum size. Glazing lines will have become shorter so that surfaces can be decorated and treated without using water and there will be no surface contact (in the case of most finishes) between the applicator and the ceramic tile. They will also be totally flexible so that models can be changed immediately.

As, during the firing and drying process, energy will essentially be consumed in the form of electricity, the equipment, without natural gas as an energy source, will be designed to be highly efficient and full advantage will be taken of any residual heat. Of course, any emissions will be treated before they are released into the atmosphere.

The concept of waste will have become obsolete. Using the smallest amount of raw materials per product unit, those which, because of their proximity, require the least possible energy expenditure to move from their point of origin to the production plant will be used. Raw materials and by-products will be recovered to manufacture other products.

The storage of waste products in the soil and the release of pollutants into the air and water will be phased out. Used products and materials obtained when buildings are knocked down or when tiling is removed will be reprocessed so they can be reused for many different purposes.

# 5. CONCLUSIONS

In 2050 governments will be better prepared and enjoy better and more intense international relations. They will agree to partially relinquish their sovereignty in order to tackle international issues, such as climate, energy, water, and shared resources. Technical limits and sectorial reference frameworks will be established globally, encouraging transparency in industrial procedures, and the inclusion and internalization of external factors and other aspects of **SUSTAINABILITY**.

When goals are defined and the rules of the game are defined, dissolving barriers, this will enable companies to innovate, develop and deploy solutions **on an equal footing**. For ceramic companies these rules of play mean that **THEIR REAL VALUE**, which will include external factors in their costs, such as environmental impact and the benefits provided by services for the protection of ecosystems and water, **will be included in the market and affect ALL COMPETITORS**. The cultural preparation and level of social commitment of citizens will potentiate systems of recognition, which will reward sustainable behaviour. Consumers will choose sustainable ceramic products not only because they are sustainable, but because they also know **they give them and society better value**.

In the context of the ceramic sector and, in general, in all industrial sectors people, companies and governments will be provident, and they will want to solve problems, be practical and capable of recovery. They will be convinced that **INTE-GRAL SUSTAINABILITY** (ecology – economy – society) is achieved by working together and adapting rapidly to a world in a constant state of flux.

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