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in the sector during the time**

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Sassuolo's ceramic district and strategic changes in the sector during the time

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ABSTRACT

Questo studio esplora la strategia interna e la dinamica del gruppo strategico delle imprese nel distretto di Sassuolo e le ragioni del cambiamento. Sulla base di studi precedenti questo articolo esamina la logica dello sviluppo del distretto delle ceramiche di Sassuolo in Italia e si concentra su alcune domande rilevanti:

Q1: Qual è l'evoluzione dei gruppi strategici nel distretto?

Q2: Quali sono quindi i principali cambiamenti e tendenze nel distretto nel contesto della globalizzazione del mercato?

Q3: Quali sono le principali sfide per il futuro del distretto?

L'articolo intende rispondere a queste domande. Per quanto ne sappiamo, prima di questo lavoro, nella letteratura internazionale mancano studi sulle dinamiche del gruppo strategico nel distretto di Sassuolo e sulle sue cause.

This study explores the inner strategy and the dynamic of strategic group of the firms in the district of Sassuolo and the reasons of the change. Based on past studies this paper examines the logic of development of Sassuolo's tiles district in Italy; it focuses on some relevant questions:

Q1: What is the evolution of strategic groups in the district?

Q2: What are then main changes and trends in the district in the contest of globalization of the market?

Q3: What are the main challenges for the future of the district?

The paper intends to answer these questions. To our knowledge, before of this work, in international literature there is a lack of study on the dynamics of strategic group in the district of Sassuolo and theirs causes.

Keywords: district; strategic group; dynamic capability, strategy, absorptive capacity

1 – Introduction

While there is a broad range of literature on the general evolution of the district (Porter 1980,1998; Pilotti 2011; Becattini 1987,1991a, 1991b, Becattini et al. 2009; Brusco 1982; Boscarelli and Tenti, 1993; Gaballdon-Estevan et al. 2016; Belussi and Arcangeli 1998; Belussi 1999; Belussi and Pilotti 2000 a,b, 2002; Mella 2006) few papers are written on the

| | SECTEUR | VARIABLES TO DETERMINE THE STRATEGIC GROUP | METHOD |
|---------------------------------|---|---|---|
| HUNT (1972) | Electronic | 3 Factors of success of strategy | Statistical analysis |
| NEWMANN (1973-1978) | Chemistry | 2 Factors of success of strategy | Multiple Regression |
| PORTER (1973, 1979) | Consumer products | Dimension of plants | Regression |
| HATTEN AND SCHEDEL (1977) | Beer | Variable of production and marketing | Regression |
| HARRINGAN (1980) | Few industries in decline | Marketing strategy | Strategic map |
| OSTER (1982) | Products of consumption | Strategy products: advertising /sales | Statistical analysis |
| BAIRD AND SUDHARSHAN (1983) | Electronic | Strategy products: advertising /sales | Factor analysis |
| LAHTI (1983) | Knitted | Dimension of plants | Statistical analysis |
| HERGERT (1983) | 50 industrial plants (USA) | 5 variables: advertising / products, R&D / Products / Market Share, | Cluster analysis |
| HAWES AND CRITTENDEN (1984) | Supermarket | 6 Variables of Marketing | Statistical analysis |
| DESS AND DAVIS (1984) | Paint | 21 Strategic variables | cluster et factor Analysis |
| HINTERHUBER (1984) | Building | 3 Factors of successful strategic | Regression |
| RYANS AND WITTINK (1985) | Aeronautic | Financial variables | Cluster et factor Analysis |
| PRIMEAUX (1985) | Petroleum | Dimension of plants | Regression |
| HATTEN AND HATTEN (1985) | Beer | 4 Commercialization variables (prices, advertising, trade marks, market share relative) | Regression |
| COOL (1985, 1987) | Pharmaceutical | Variables relating to the field of the activity and to the resources | Cluster Analysis |
| FIEGENBAUM, ET AL. (1985) | Pharmaceutical | Variables relating to the field of the activity and to the resources | Cluster Analysis |
| COOL AND SCENDEL (1986) | Pharmaceutical USA 1963-1982 | Variables relating to the field of the activity and to the resources | ANOVA |
| MASCARENHAS AND ASKER (1986) | Petroleum | Barriers to the mobility | Cluster Analysis |
| JEGERS (1989) | 3250 firms of different sectors 1977-82 | Dispersion of profits | Statistical analysis |
| FIEGENBAUM AND THOMAS (1990) | Assurance USA 1970-84 | Variables relating to the field of the activity and to the resources | Cluster Analysis |
| MERHA A. (1996) | Banking | Resources based strategic group | Cluster, factor analysis and MANOVA |
| NAIR AND FILER (2003) | Steel | Firm behavior | Cointegration analysis with vector correction |
| ZÚÑIGA-VINCENTE ET AL. (2004) | Financial | Asset, liability and asset liability | Model based cluster |
| DESARBO ET AL. (2009), | Financial | Financial ratio | Cluster bilinear multidimensional scaling |
| MAR-RUIZ AND RUIZ-MORENO (2011) | Banking | Demand and cost | Regression |
| ALTHUNTAS ET AL. (2014) | Insurance market | Two year 2009-2012 Profitability market share, risk | Cluster and regression |
| SONENSHEIN ET AL. (2017) | Food truck | Dimension of firm | The research is based on group prototype |

Table 1 - Main empirical studies on group strategic analysis

Source - Our elaboration

process to determine the dynamic of the strategic group in the district. With this in mind, the primary aim of the present research is explored how is the evolution of the strategy group of firms in this important Italian district.

In 1972, Hunt introduced the idea of strategic group of firms; after many scholars have studies the strategic group (Caves and Porter 1977; Hunt 1972) in different industry. Different empirical researches on the strategic groups of firms analyze industrial sectors with a high frequency for the pharmaceutical and oil-bearing sector (Riva 2007, 2009; Pilotti 2017) (see Table 1).

Pilotti (2011) analyses many case of relation between innovation, learning and culture in a regional space; other studies underline the importance of innovation in the contest of globalization (Teece et al. 1997, Mella 2012, 2017; Riva and Pilotti 2017 a,b,c,d,e,f) also based on a strong territorial identity.

The collaboration and aggregation of firms are an important asset for innovation, improvement and synergies and economies of scale (Nonaka 1994; Bottazzi et al 2005, 2006, 2007; Hamdouch 1988 Belussi and Pilotti 2000 a,b; 2002; Depret M. H., Hamdouch 2000: Martin 2000; Riva and Pilotti 2018 a,b,c, 2019) analyze the importance of learning and innovation by networking with in the Italian industrial districts (Belussi and Arcangeli 1998).

The two main key research questions of the paper are:

Q1: What is the evolution of strategic groups in the district of Sassuolo?

Q2: What are then main changes and trends in the district in the contest of globalization of the market?

Q3: What are the main challenges for the future of the district?

For answering the first question, we study the change in the strategic group during the time (Hunt 1972) for exploring inner strategy of the firms of Sassuolo's ceramic district.

For the second question, we analyze main changes and trends in the district in the contest of globalization of the market (Porter 1989,1998; Riva and Pilotti 2017 a,b,c,d,e,f; Becattini et al. 2009; Aiello 1996). For the last question, we focus on main change in the district based on main recent studies. The structure of this paper proceeds as follows. Section 2 provides some background on the research on strategy groups of firms in general and of the studies on the district of Sassuolo. Section 3 introduces the method and data set. Section 4 presents the empirical results. In section 5 there is a discussion and in section 6 the conclusion.

2 – Theoretical background and methodological approach

2.1 - *The research on strategic groups*

It is possible to sum up by chronological order main empirical studies on the strategic groups (Riva 2007, 2009; Porter 1980,1998; Riva 2018a,b).

In the first group of studies we find the application of many methodologies based on multivariate statistics.

Caves and Porter (1977) develop the concept of barriers in mobility among the strategic groups. The role of barriers in mobility is in relation with the strategic group (see Fig. 1).

Dess and Davis (1980) analyse the relation between membership in a strategic group and three types of strategy (advantage of cost, of differentiation, of alcove).

Hinteruber and Kirchebner (1984) develop a methodology in five stages to determine the strategic groups.

Fiengenbaum and Thomas (1985) use the methodology ANOVA to study the sector of insurance since 1970 until 1984. There is a difference of performance between the strategic groups and the way in which the same structure of groups changes in the course of the years.

The focus of a second group of studies is more based on the strategic factor of performance in the strategic groups of firms.

Di Gregorio (1986) analyses the group of the firms that belong to the same class of risk based on the theory of Modigliani and Miller on the cost of the capital.

Cool and Schendel (1987) study the strategic groups and relative performance in pharmaceutical industry since 1963 up to 1982.

Mascarenhas and Aaker (1988) describe a methodology to create the strategic groups based on the barriers in mobility.

Cool and Schendel (1988) analyse difference of performance which exists between plants belonging to the strategic group in *pharmaceutical industry* from 1962 till 1983.

Bradburd and Ross (1989) study difference of performance between the strategic groups of small and big firms.

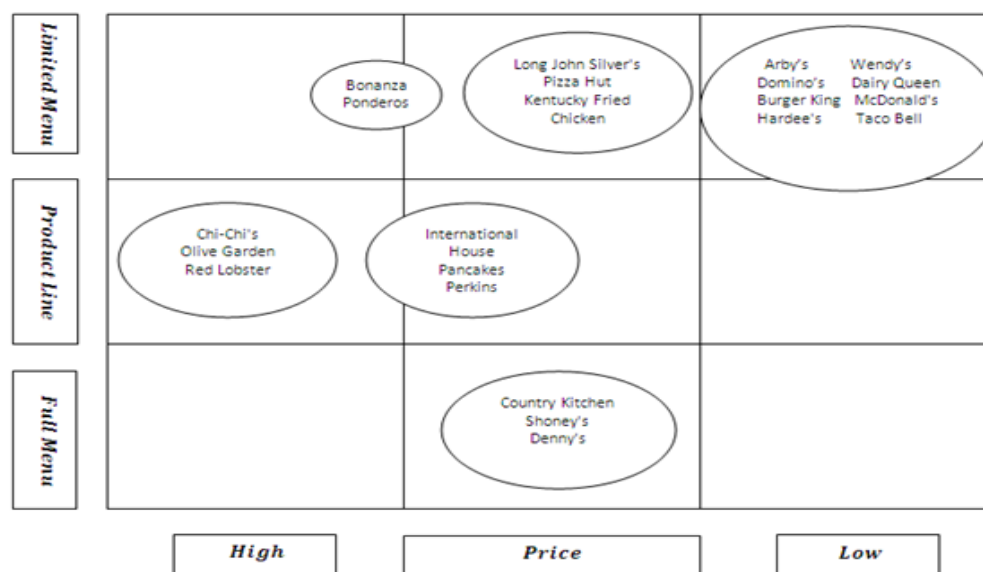


Fig. 1 - Strategic group in Restaurant chain industry

Source - Our elaboration from Caves and Porter 1997

Lawless and Tegarden (1991) describe the relation between type of industry and performance. There is a relation between type of industry and performance in the group.

Caves and Ghemawat (1992) identify distinctive characters, which create difference of benefit inside industry.

Reger and Huff (1993) develop an analysis on the cognitive representations about the strategic groups. Results show how their information can be used to construct efficient strategic maps. In this research, the analysis of cluster is used to determine the strategic groups. Research underlines the importance of the judgments of personal experts to understand the situation.

Merha (1996) analyses the strategic groups of the banking sector of the United States, based on difference in distinctive competences (see Fig. 2).

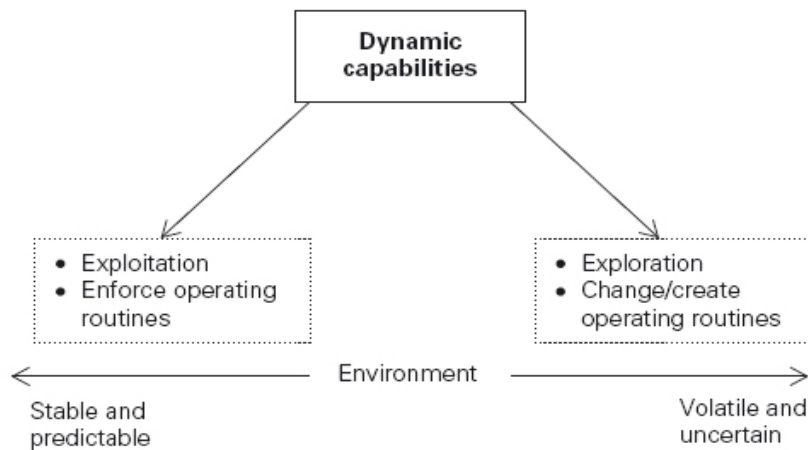


Fig. 2 - Dynamic capabilities: exploitation and exploration

Source - Our elaboration from Hamel and Prahalad 1994

Also, many recent studies on the strategic groups of firms try to find new methodology to determine the strategic group of firm.

Nair and Filer (2003) examine the Japanese steel industry to determine the presence of strategic group. The methodology used is the cointegration analysis with vector error correcting to understand long-term competitive dynamics. The period analysed is 1980-1999 and the study is based on a sample of eight firms (see Fig. 3).

Zuniga-Vincente et al. (2004) describe the dynamic of the strategic group in the Spanish financial sector during the period 1983-1997. The methodology used is an algorithm called Model-based clustering. The strategic variables used are based on asset, liability and asset liability.

Desarbo et al. (2009) examine the evolution during the time of the group in financial sector using a new methodology cluster-wise bilinear multidimensional scaling.

Mar-Ruiz and Ruiz-Moreno (2011) examine the presence of strategic group in the banking sector and also, they measure the effect of strategic level interaction on the firm performance using the regression methodology. The study is based on in Spanish banking industry.

Althuntas et al. (2014) describe the strategic groups in German propriety-liability insurance market by a dynamic strategic group analysis. They use the methodology of cluster analysis to determine the group and also a regression analysis to examine the difference of performance among the different group.

| | | | | | |
|--|---|--|--|--|--|
| | Mobility barriers and isolating mechanisms as structural and behavioral properties of groups with... | | | | |
| | Outward effect | | | Inward effect | |
| Mobility barriers (a) Isolating mechanisms (b) | Barriers to entry: group-entry causes substantial cost, time, uncertain outcome Non-group members are deterred | | | Group members preserve rents Barriers to exit: group-exit causes substantial sunk costs | |
| | Mobility barriers and isolating mechanisms may intersect the strategic space in different levels... | | | | |
| | Global level (c) | Country level (d) | Industry level (e) | Group level (f) | Firm level (g) |
| Different levels may contain different determinants of competition | <i>Globalization</i> controls for the way firms compete and shapes their strategic posture | The local <i>business environment</i> determines the essential competitive context | The <i>industrial structure</i> determines the way firms compete | <i>Group interaction</i> controls the height and integrity of mobility barriers | Firms compete primarily on the basis of <i>resources</i> |
| | Structures of strategic space and competitive context may follow a multi-level model/configuration | | | | |

Fig. 3 - Strategic group and mobility barriers

Source - Our elaboration from Caves and Porter 1997

Grant (2016) describes the strategic importance of strategic group (see Fig 4) in some sector for the strategy formulation.

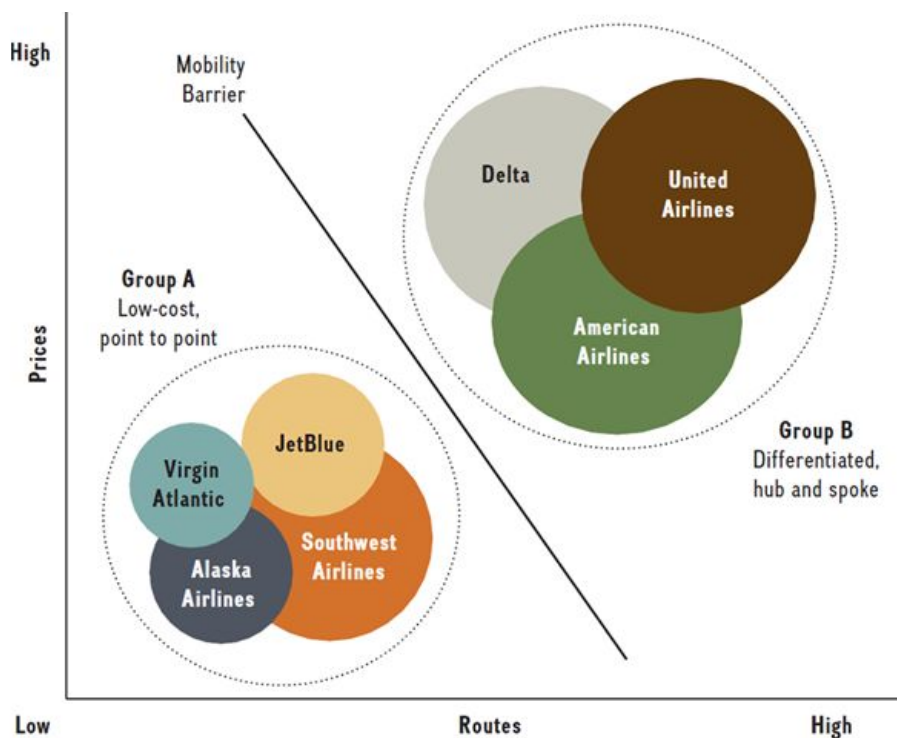


Fig. 4 - Strategic group and mobility barrier

Source - Our elaboration from Grant 2016

Sonenshein et al. (2017) use the strategic groups to identify the shapes of the competition and cooperation in the sector of food truck. The research is based on the concept of group prototype.

In conclusion, there is an interesting development of new application to study the strategic group and correlation of different dimensions of performance (risk, value creation).

2.2 - The researches on the district of Sassuolo

It is possible analyse by chronological order main studies on district of Sassuolo.

In the first group of researches we find the main study on the origin of the district during the time.

Prodi (1966) describes the district of Sassuolo with the first analytic study on district. From the 1951 to 1963, there are some important changes in the district: the number of the firm of the district change from 289 to 689 and the number of employees from 21100 to 39950.

Brusco (1982) describes the Emilia Model of development. Competition in the district is considered a positive factor and determines an increase in productivity.

Russo (1985) examines the technical change in industrial district of Sassuolo and describes the role of collaboration among the firms.

After there is a second group of studies that analyse the competitive factors for the innovation in the districts.

Porter (1989; 1998) analyses the district of Sassuolo for its capacity to innovate. The model of diamond of Porter permits to understand the factors for the innovation (Enright and Tenti 1990; Prodi 2006) (see Fig. 5).

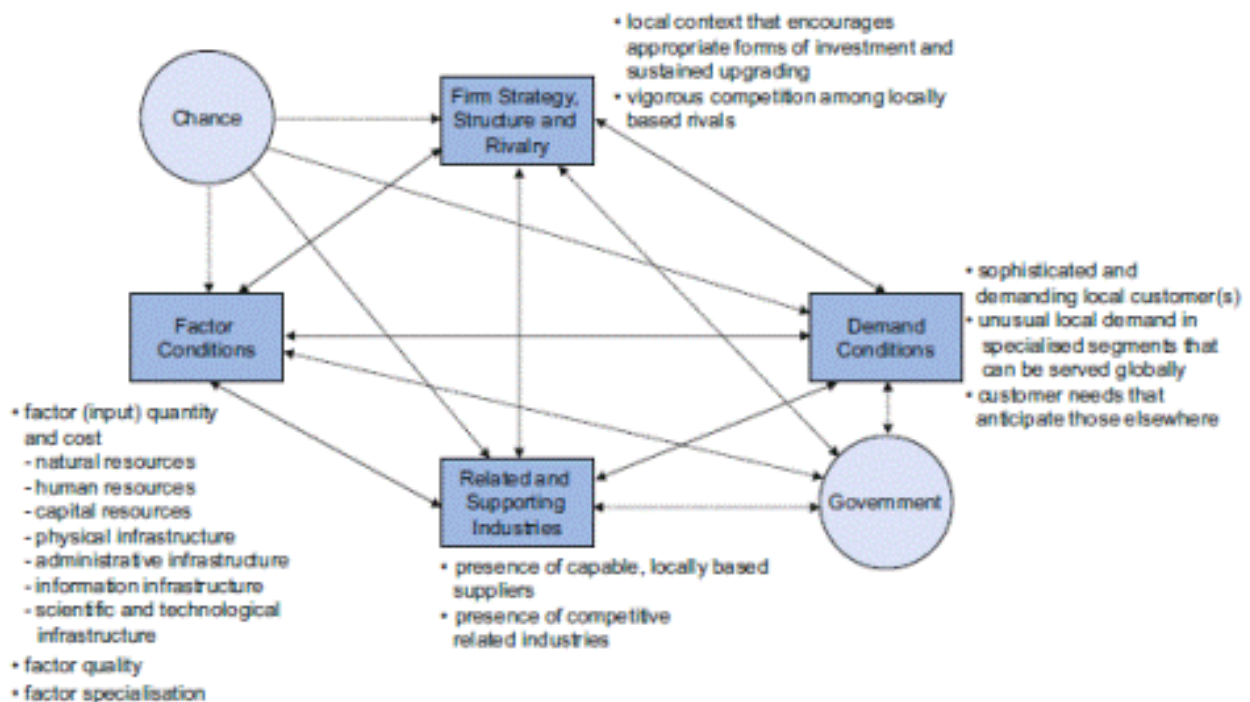


Fig. 5 - Porter's Diamond Model

Source - Our elaboration from Porter, 1989

Boscarelli and Tenti (1993) describe the importance of the operation process in the district of Sassuolo.

Visconti (1996) describes the areas in which are important to improve and the strategies to get the results in the district.

Marchi (1999) analyses the presence of collaboration and of the network in the district. There is an industry specialized in the production of machines for the production of tiles ceramics. The importance of the collaboration among the firms of the district for innovation is examined.

There is also a group of studies based on the international competition in the district in the contest of the globalization of the market.

Russo (2004) shows how the ceramic industry district facing the challenge from China. The cost of production of China is about 10% of the Italian firms. In the district, there is also a cluster of firms for the production of machine for the production of tile. The paper describes the importance of new strategic situation in which Italy is competition with China, Spain and Brazil.

Bursi and Nardin (2008) examine how the firms of the district accentuate their commercial presence on the international market. The open of the market toward other industrial countries and emergent countries caused a competitive pressure on the firms. There is an industry specialized in the production of installations automated for the production of tiles ceramics.

Hervàs and Albors (2008) analyse the development of the predominant firms also stimulated by the research of economy of scale.

Ceriani et al. (2012) illustrate the logistic process of tiles distribution in the district of Sassuolo with also an extensive analysis based on the main player of the sector (ceramic industries, logistics provider and customers). The coordination and the architecture of alliances are important in the district also for the innovation (see Fig. 6).

Lo and Han (2014) describe the role of the globalization of the ceramic industry based on the ceramic tile cluster of Foshan in China compared with the Italian ceramic district of Sassuolo. The benefits of Sassuolo are the proximity of network of industries and a positive competitive environment.

Labory and Prodi G. (2014) describe the effect of the globalization in the sector of tile and the role of innovation. The ceramic district in early 2000 reached the maximum level of production with 600 million square meters.

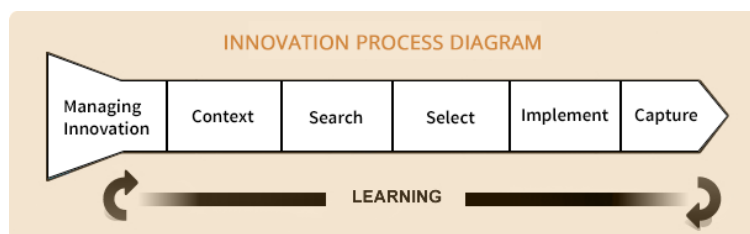


Fig. 6 - Innovation process

Source - Our elaboration from Ceriani et al. 2012 and Grant 2016

The collaboration with the different Italian fashion designers (Valentino, Versace, Krizia, Missoni, Shod, Biagiotti etc.) produces elegant lines of products. The quality of these products allowed augmenting the volume of sales.

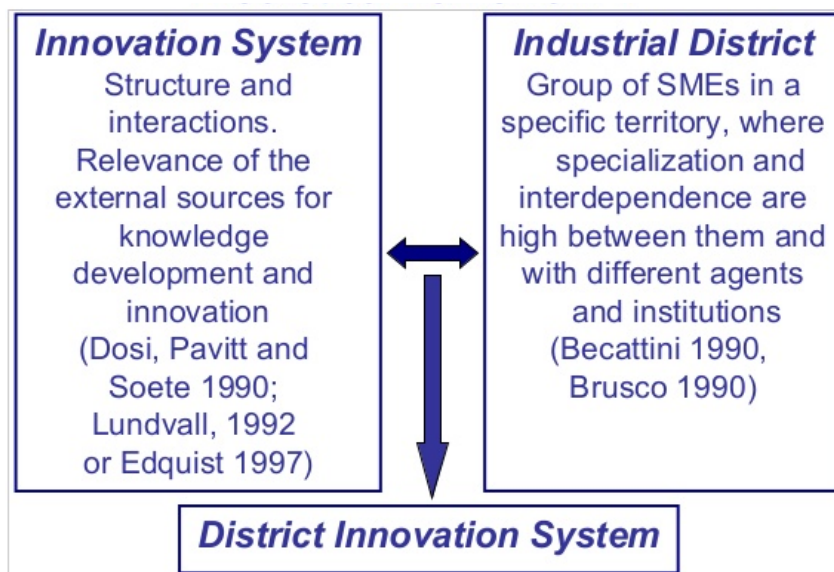


Fig. 7 - District innovation system

Source - Our elaboration from Porter 1989

Gaballdon-Estevan et al. (2016) study the process of innovation of the district of ceramic. The exchanges of knowledge between the constructors of machines and the producers of tiles are very intense also for the creation of knowledge (see Fig. 7).

A third group of studies analyses the dynamic of the district of Sassuolo in the recent years. They focus is on the impact of globalization of market and the problem of the sustainability in the long run.

Hervas-Oliver and Davide (2017) analyse the main difference between the Ceramic District of Sassuolo in Italy and the district of Castellon in Spain. The two districts are leaders in innovation and European production.

Camuffo and Giardinetti (2011) describe the strategic role of the knowledge in the development of the district in the contest of globalization of the market and the importance of a cognitive prospective.

Mattioli (2015) underlines the importance of a collaboration public-private partnership by the development of project for the city and the territory.

The statistical data (Confindustria Ceramica 2006) describes the importance of the international market and of the North American market (+12,8 %).

Blundo et al. (2019) describe how in the district of Sassuolo, the sustainability is a key element for long run innovation and growth with the implementation of Life Cycle Sustainability Assessment Model (LCSA) (see Fig. 8).

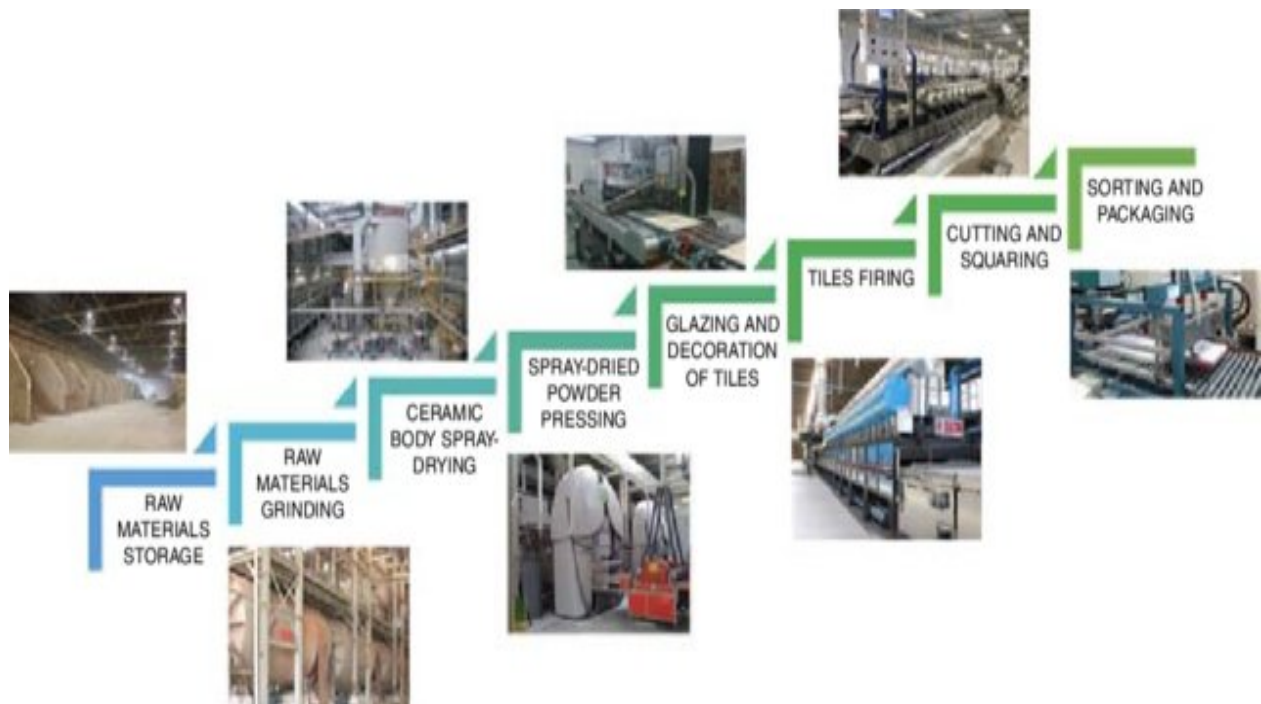


Fig. 8 - Manufacturing processing phases for ceramic tiles

Source - Blundo et. al. 2019

In conclusion, many studies on the district underline the impact of the *sustainability, globalization, and knowledge creation* as critical success factors in international markets.

3 – Methodology and data

We use a set of methodologies (Bartholomew et al. 2008; Barbarito 2011) to determine the strategic group in the district of Sassuolo:

I) the factor analysis that permits to describe variability among observed correlated variable in term of lower number of unobserved variables (factor) (Fields, 2013; Riva, 2018);

II) the strategic map based on the methodology of Porter (Porter, 1980);

III) the regression analysis base on the methodology of Hinterbuer (Hinterbuer et Kirchebner 1984).

The aim is to compare the methods and to describe the changes during the times of the strategic groups.

Our sample consists of sample 13 firms during two different periods of time in 1983 (see Table 2) and in 1993 (see Table 3) classed by revenues present in the districts of Sassuolo in Emilia Romagna in Italy.

| 1983 | export revenues | domestic sales | Employees | Price /quality | variety of production |
|-------------------|------------------------|-----------------------|------------------|-----------------------|------------------------------|
| IRIS | 83,5 | 82,4 | 2400 | 40 | 100 |
| MARAZZI | 70,4 | 71,1 | 1872 | 40 | 100 |
| RAGNO | 60,6 | 63,8 | 2290 | 20 | 30 |
| CISA | 43,8 | 23,7 | 1100 | 70 | 80 |
| CERDISA | 31,0 | 38,6 | 830 | 70 | 40 |
| IMOLA | 30,1 | 12,9 | 520 | 40 | 80 |
| SICHENIA | 23,5 | 14,2 | 600 | 50 | 50 |
| RICCHETTI | 22,7 | 13,8 | 530 | 40 | 60 |
| GARDÉNIA | 22,5 | 31 | 850 | 60 | 30 |
| CERIM | 21,6 | 14,4 | 316 | 50 | 50 |
| FLOOR GRES | 18,9 | 14,5 | 447 | 70 | 40 |
| S. MARCO | 18,0 | 22 | 450 | 30 | 60 |
| CAMPANELLA | 17,8 | 14,4 | 580 | 40 | 50 |

Table 2 - Dataset for 1983
Source - Data Bank 1983

The following variables were identified: a) export revenues; b) domestic sales; c) employers; d) price - quality of tiles (low = 0, top = 100); e) variety of production (low = 0, top = 100);
The main sources of the variables are from Databank.

| 1993 | export revenues | domestic sales | Employees | Price /quality | variety of production |
|---------------------------|------------------------|-----------------------|------------------|-----------------------|------------------------------|
| MARAZZI GROUP | 489 | 211 | 2591 | 80 | 100 |
| GROUP IRIS | 402 | 280 | 2030 | 80 | 100 |
| COOP IMOLA GROUP | 200 | 88 | 1345 | 50 | 90 |
| D'ACCORD GROUP | 175 | 100 | 900 | 70 | 90 |
| CISA-CERSIDA GROUP | 152 | 94 | 1200 | 70 | 90 |
| FLORIM | 142 | 92 | 969 | 40 | 80 |
| SIROTTI GROUP | 125 | 80,5 | 800 | 50 | 80 |
| EMILCERAMICA | 105 | 70 | 717 | 60 | 40 |
| NEW CER: RICCHETTI | 80 | 40 | 450 | 60 | 40 |
| FINCUOGHI | 75 | 55 | 370 | 40 | 80 |
| MONICIBEC GROUP | 75 | 27 | 450 | 40 | 80 |
| RIWAL | 75 | 55 | 500 | 50 | 40 |
| ITS GROUP | 73,8 | 25,2 | 398 | 40 | 50 |

Table 3 - Dataset for 1993
Source - Data Bank 1993

4 – Results

In this section, the results of the application of the three different techniques for determining the strategic groups (Caves and Porter 1977; Bartholomew et al. 2008; Barbarito 2011):

I) factor analysis (Field 2013; Riva 2018),

II) methodology of Porter (Porter 1980),

III) methodology of Hinterbuer are described for the analysis of trends in the sector of ceramic (Hinterbuer and Kirchebner, 1984).

4.1 - Results for the strategic group in 1983

I) Factor Analysis

For factor analysis (Bartholomew et al. 2008; Barbarito 2011), the technique of principal factor analysis is chosen with the method of Varimax rotation (Field 2013; Riva 2018). The results are the extraction of two factor (see Table 3).

| Factors | Measurement of standardized variance | Percentage variance | Percentage of variance explained by factors | Extraction squares |
|---------|--------------------------------------|---------------------|---|--------------------|
| 1 | 3,337 | 66,738 | 66,738 | 3,337 |
| 2 | 0,880 | 17,599 | 84,338 | 0,880 |
| 3 | 0,722 | 14,443 | 98,781 | |
| 4 | 0,054 | 1,071 | 99,852 | |
| 5 | 0,007 | 0,148 | 100,000 | |
| | | <i>Factor 1</i> | <i>Factor 2</i> | |
| | <i>Export revenues</i> | 0.95714 | -0.14340 | |
| | <i>Domestic sales</i> | 0.95130 | -0.09115 | |
| | <i>Employees</i> | 0.90209 | -0.10898 | |
| | <i>Price /quality</i> | -0.07470 | 0 .99370 | |
| | <i>Variety of production</i> | 0.59903. | 0.03102 | |
| | <i>Index KMO</i> | 0.539 | <i>Index of Barlett</i> | 67.766 |

Table 4 - Factor analysis (1983)

Source - Our elaboration

Through the results of the factor analysis we can determine a first factor made by export revenues, domestic sales, employers (see Figure 9).

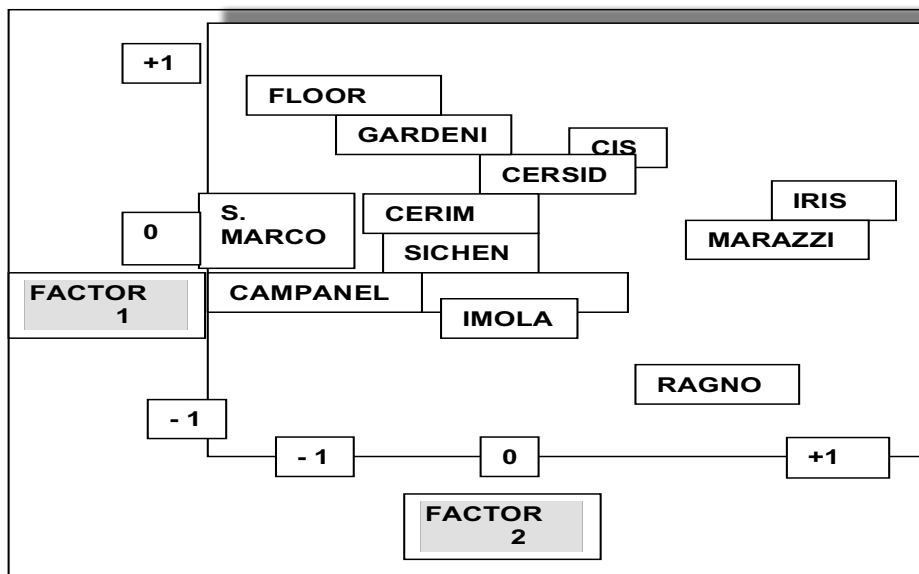


Fig. 9 - Strategic map (1983) obtained by the factor analysis

Source - Our elaboration

Observing the second factors is correlated positively with the price/quality and the variety of production. These results are useful for understanding the strategic groups in the sectors.

There is a first group of large companies Iris and Marazzi; these companies have many employers, variety of production and high price-quality

A second group of companies S. Marco, Cerim, Sichenia, Campanella, Richetti, Imola have an average level of employers and a variety of production.

Also, there is a third group Floos Gres, Gardenia, Cersida, Cisa with a marketing strategy to cover high level segments of the market.

After there is a firm Ragno, with a different strategy, focusing its attention on the lower market segments.

II) The strategic groups of the ceramics sector in Italy according to the methodology of Porter

Porter proposed a methodology that classifies data according to two strategic dimensions (Porter 1980). The data are determined by expert opinion (see Figure 10)

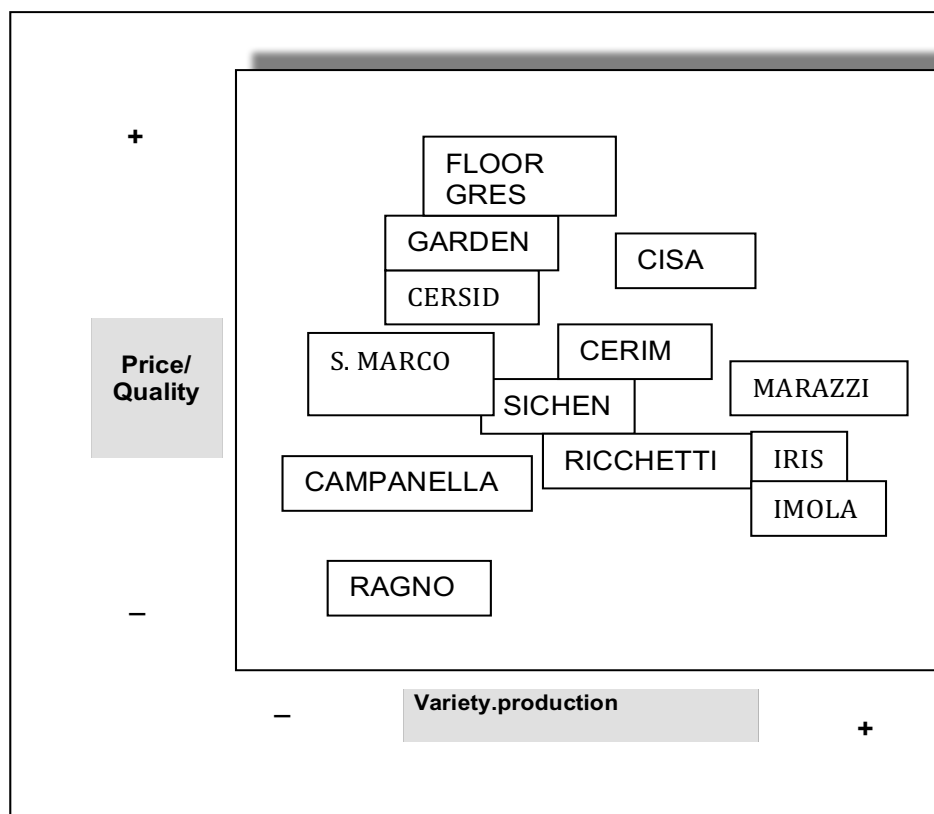


Fig. 10 - The strategic groups methodology of Porter (1983)

Source - Our elaboration

III) Methodology of Hinteruber

We need to use the process of regression for applying the methodology of Hinteruber (1984) to identify the two fundamental variables:

EXPORT REVENUES = DOMESTIC SALES, EMPLOYERS, PRICE-QUALITY, VARIETY OF PRODUCTION

In the choice of variables to construct the strategic map we choose the variables employed; the range of product lines with the best value of Beta.

| V.D. PRODUCTION | COEF. B | STANDARD ERROR | COEF. STAN. | STAT. T | SIGN. |
|-----------------------|---------|----------------|-------------|---------|-------|
| EXPORT REVENUES | 10,335 | 4,16 | 0.100 | -2,484 | 0,038 |
| EMPLOYEES | 0,108 | 0,12 | 0,121 | 0,906 | 0,391 |
| PRICE-QUALITY | 0,023 | 0,004 | 0,754 | 5,623 | 0,00 |
| VARIETY OF PRODUCTION | 0,091 | 0,06 | 0,065 | 1,509 | 0,17 |

| | | | | | |
|----------------------|----------------|------------------------|-----------|-------|------|
| CONST. | 0,265 | 0,04 | 0,289 | 6,616 | 0,00 |
| R. | R ² | R ² correct | Error St. | | |
| 0,994(a) | 0,987 | 0,981 | 3,042 | | |
| ANALYSIS OF VARIANCE | | DEGREE OF FREEDOM | F | M. | |
| REG. | 5760,783 | 4 | 155,612 | 0,000 | |
| RESID. | 74,041 | 8 | | | |

Table 5 - Regression data 1983

Source - Our elaboration

4.2 - The result for 1993

D) Factor analysis

Factor analysis for the new period gives the follow results (Bartholomew et al. 2008; Field 2013).

| Factors | Measurement of standardized variance | Percentage variance | Percentage of variance explained by factors | Extraction squares |
|---------|--------------------------------------|---------------------|---|--------------------|
| 1 | 4,029 | 80,574 | 80,574 | 4,029 |
| 2 | 0,627 | 12,533 | 93,107 | 0,627 |
| 3 | 0,225 | 4,492 | 97,599 | |
| 4 | 0,104 | 2,073 | 99,672 | |
| 5 | 0,016 | 0,328 | 100,000 | |
| | | <i>Factor 1</i> | <i>Factor 2</i> | |
| | <i>Export revenues</i> | 0,975 | -0,033 | |
| | <i>Domestic sales</i> | 0,955 | -0,069 | |
| | <i>Employees</i> | 0,971 | 0,000 | |
| | <i>Price /quality</i> | 0,826 | -0,454 | |
| | <i>Extended produced ranges</i> | 0,735 | 0,644 | |
| | KMO | 0.539 | <i>Barlett</i> | 67.266 |

Table 6 - Table Results variance deployed factors (main components technical)

Source - Our elaboration

The results of factor analysis permit to analyse the strategic group in the district (see Fig.11)

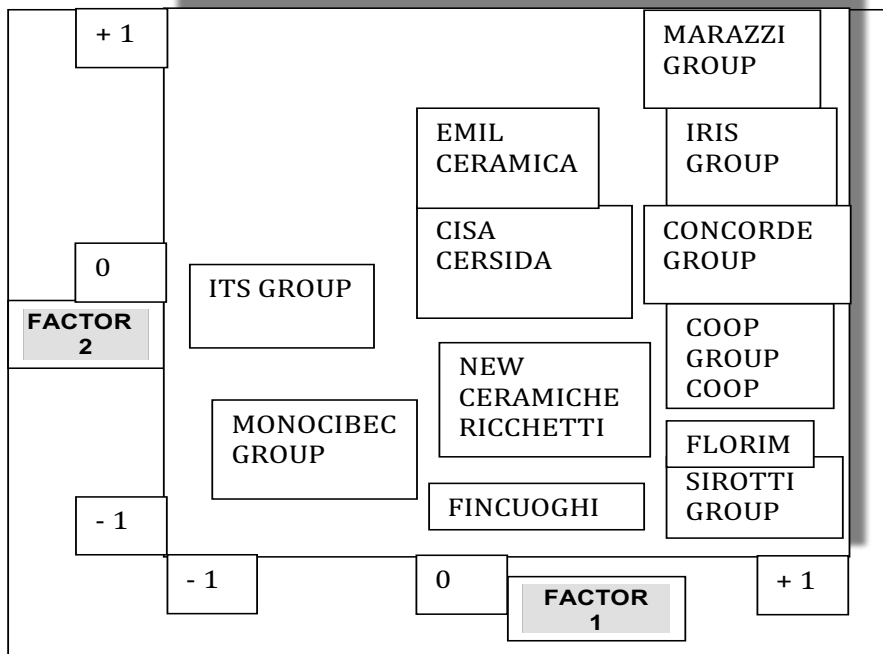


Fig. 11 - The strategic map (1993) obtained by factory analysis

Source - Our elaboration

II) The strategic groups of the ceramics sector in Italy according to the methodology of Porter

The results with the methodology of Porter (Porter, 1980) in which the data are determined by expert opinion permit to describe the structure of the firm in the district (see fig. 12)

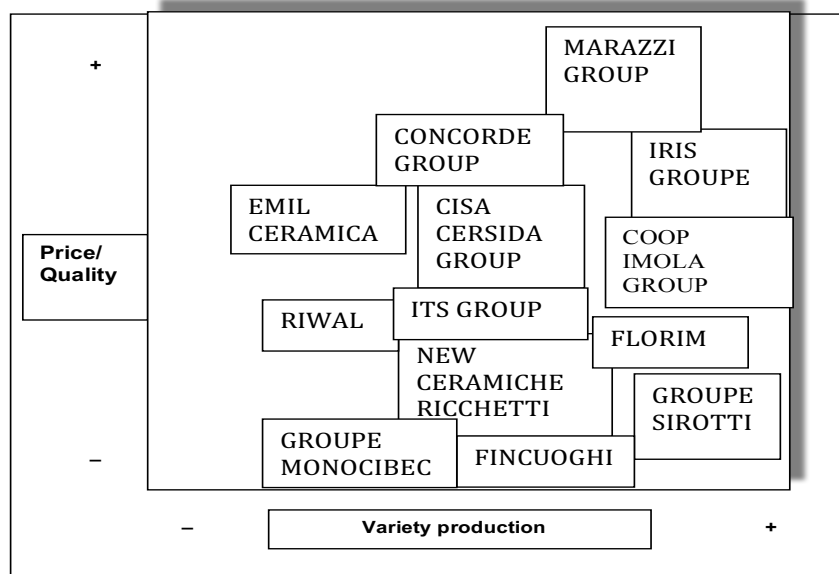


Fig. 12 - The strategic map (1993) obtained by factory analysis

Source - Our elaboration

III) Regression

| V.D. PRODUCTION | COEF. B | STANDARD ERROR | OEF. STANDARD | STAT. T | SIGN. |
|-----------------------|----------------|------------------------|----------------|---------|-------|
| EXPORT REVENUES | 0,477 | 0,267 | 0,265 | 1,788 | 0,112 |
| EMPLOYEES | 0,150 | 0,030 | 0,769 | 5,029 | 0,001 |
| PRICE-QUALITY | -0,112 | 0,884 | -0,013 | -0,126 | 0,902 |
| VARIETY OF PRODUCTION | -,0166 | 0,490 | -0,029 | -0,340 | 0,743 |
| CONST. | -5,863 | 51,066 | | -0,115 | 0,911 |
| R. | R ² | R ² correct | Error Standard | | |
| 0,986(a) | 0,972 | 0,958 | 27,080 | | |
| ANALYSIS OF VARIANCE | | DEGREE OF FREEDOM | F | M. | |
| REG. | 202300,11 | 4 | 68,965 | 0,000 | |
| RESID. | 5866,755 | 8 | | | |

Table 7 - Regression 1993

Source - Our elaboration

By applying the methodology of Hinteruber (1984) to identify the two fundamental variables we find the employers and

EXPORT REVENUES = DOMESTIC SALES, EMPLOYERS, PRICE-QUALITY, VARIETY OF PRODUCTION

In the choice of variables to construct the strategic maps with the best value of Beta we choose the variables employed and the range of product.

5 – Discussion

In order to achieve a positive quality strategy there are some relevant considerations and practical implication based analysis of the evolution of strategic groups the district of Sassuolo. In comparison with situation from 1983 till 1993 using the result of factor analyse there are important changes (see Fig. 13) in the district of Sassuolo.

The concentration between the different firms of the system allows phenomena of economies of scale (Pilotti 2011).

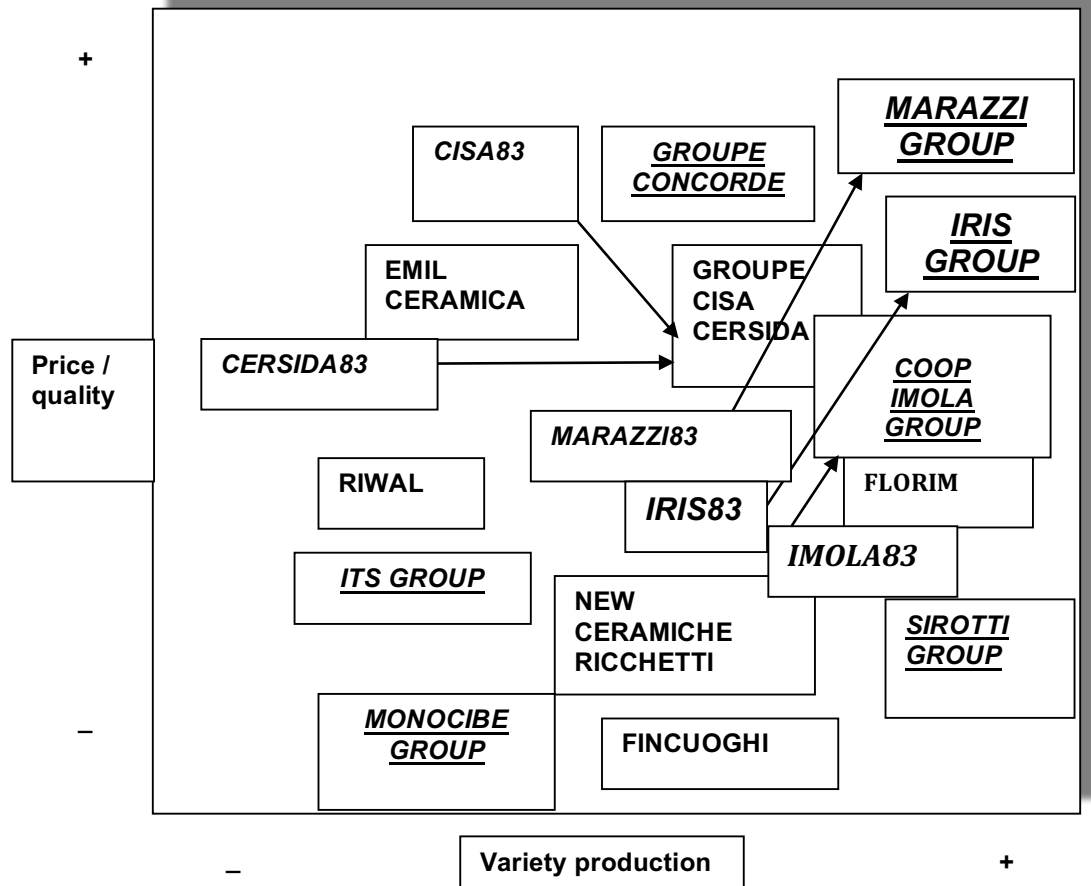


Fig. 13 - The change in the strategic group in ten years (comparison used strategic map based on results of factor analyse)

Source - Our elaboration

a) Iris societies and Marazzi became groups: Emil Ceramamica Group; Iris Group; other firms also became groups: Coop Imola group, Concorde group, Cisa-Cersida group, Sirotti group, Monocibec group, ITS.

The birth of the group Cisa comes from fusion between the firm Cisa and Cersida. This group augmented its range of products.

b) The Iris firm supported its predominant position on the home market but she lost on the foreign market compared to Marazzi. The role of the foreign markets is very important and allows to get a considerable growth. The predominant role of a firm is more easily taken by the biggest firms, since they have a organization for invest in innovation of the product and also control of distribution. Marazzi and Iris change their position from an average level price-quality to high price quality.

All these firms have the possibility of augment their dimension and their segment to become more competitive. Strategic changes were analysed in the sectors of tiles ceramics of Sassuolo for 10 years (1983-1993). There is a strategic role of dynamic capabilities (see Fig. 14).

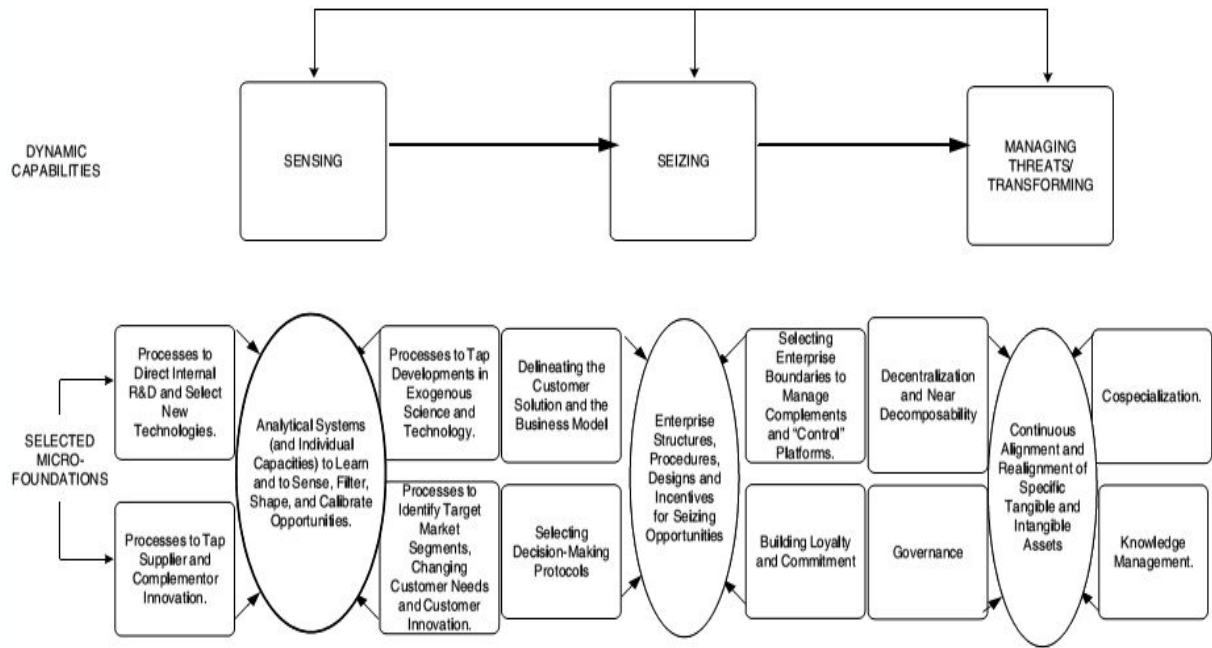


Fig. 14 - The creation of dynamic capability and the change in strategic groups

Source - Our elaboration from Teece, Pisano, Shuen 1997, Martin 2000

In the district of Sassuolo many institutions (university, school, association) give a contribution very important for the improvement of competitive position (Riva and Pilotti 2017 e,f). The competition between the firms in the region is considered to be a positive factor and determines an increase of productiveness of the economic system (Lo and Han 2014; Porter 1998; Kotler 2014). In the region, information and knowledge increase of the collective learning of the firms (Confindustria Ceramic, 2015; Riva 2007; Mowery et a. 1996; Lane et al. 2006).

The results of this study are consistent on the utility of using a set of methodologies determine the strategic groups to understand the dynamic in the district (Pilotti 2011; Becattini et al. 2009; Visconti 1995; Mella 2015).

6 – Conclusion

The competition of the emergent countries (China, Brazil, Spain) exists (Labory and Prodi 2014; Blundo et al. 2019). The competitive advantage (Porter 1989; Pilotti 2011; Riva and Pilotti 2017 a,b,c,d). of the district is based primarily on the dynamism and innovation of the firms (Mella, 2012, 2015 a,b; 2017; Coda 1995; Bosch et al. 1999,Cooke 2011) in the supply chain of the district.

The idea of strategic group of firms allows including the internal structure of a sector (Porter 1998). In general, the variables used for the identification of the strategic groups are very differ with preference for variables of marketing (price, advertising, part walked, etc.), financial (ROI, ROE, financial index, benefits, margins), relating to the domain of activities and of

resources (productive capacity, material resources, etc.) and strategic (degree of differentiation, vertical integration, factors of success) (Todorova and Durisin, 2007).

With reference to the *first question* (What is the evolution of strategic groups in the district?) we discover that:

First, during the time in the district we discover the concentration and the formation of groups (Bursi, 1997). This can be explained as the importance of dimension for economy of scale, control of chains of distribution, synergy and development of dynamic capabilities (Eisenhardt and Martin 2000; Szulanski 1996; Mella 2012, 2015 a,b; Pilotti 2011,2017; Belussi and Pilotti 2002; Bosch, et al. 1999; Schillaci, 1987) In this context, specialization and economy of scale are important for the strategy of the firms. The results show the strategic role of acquisition and fusion (Riva, 2009; Belussi 1999) in the district with the formation of new group: Emil Ceramamica Group; Iris Group, Coop Imola group, Concorde group, Cisa-Cersida group, Sirotti group, Monocibec group, Its group.

Second, the development of two important leader firm (Marazzi and Iris) permit to be more competitive with also the possibility for investment in innovation (Itami and Roehl, 1993; Pilotti, 2011). We can notice a *strong tendency to competition and collaboration between the firm in the sector of the ceramic, inter-company alliances* (Schillaci, 1987, Depret and Hamdouch 2000; Turchetti 2001; Hamdouch 1998; Bradburd and Ross 1989; Szulanski, 1996; Zahra and George 2002) have a permanent character because the development of new products are the result of the collaboration between several firms (Cooke 2011) and for the development of absorptive capacity and knowledge creation (see fig. 15).

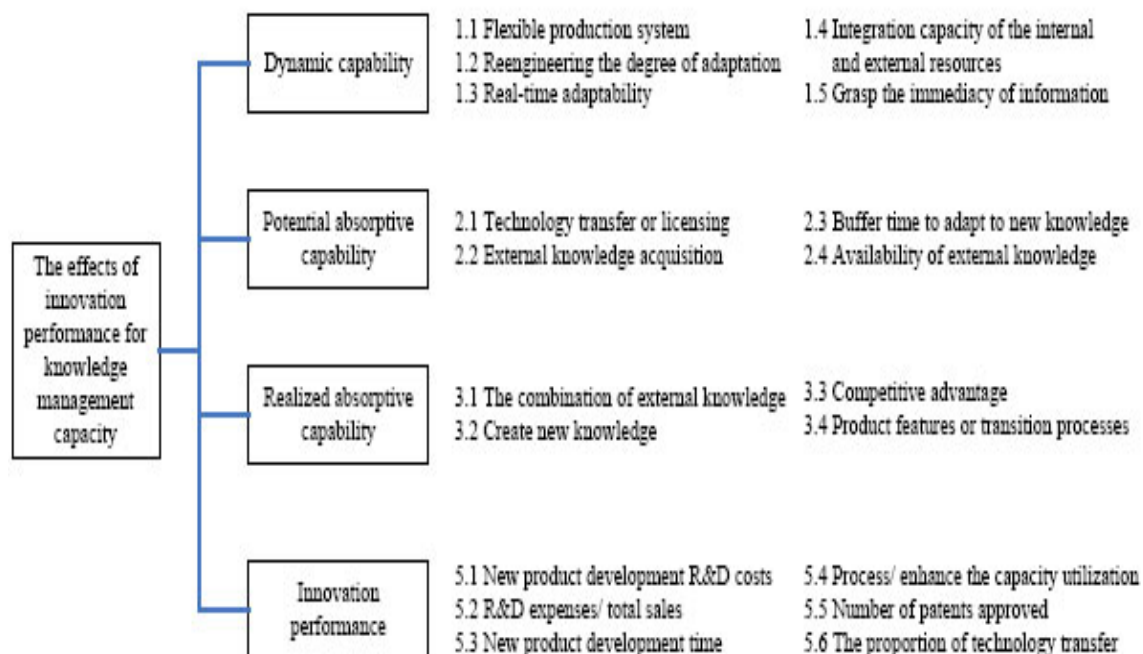


Fig. 15 - Dynamic capability, absorptive capacity and effect on performance

Source - Elaboration from Zahra, S. A., and George, G. (2002)

The results are consistent with past studies (Porter 1989,1998; Becattini 1987,1991, 1991, Becattini et al. 2009; Mella 2006, Pilotti 2011; Riva and Pilotti 2017 e,f).

For what concerns the *second question*, (What are then main changes and trends in the district in the contest of globalization of the market?) we discover that:

First, integration and concentration (Mowery 1996) of distribution and international marketing are very important phenomenon in the district (; as a matter of fact, the leader firm Marazzi group is present in 140 countries. The strategy of many firms in the district is to enter in many international markets to reach economy of scale and scope.

Second, the collaboration firms, suppliers and commercial distribution permits to improve the capacities and innovation for the customer satisfaction (international distribution and marketing, research laboratories, structures of training, etc.) (Pilotti 2011; Theodosiou and Leonidou 2003, Coda (1995), Ugolini and Baccarani 1995; Althuntas 2014, Valdani and Bertoli 2014; Guido et al. 2010; Depret and Hamdouch 2000).

Third, the multichannel marketing is important for a strategy for the globalization of the market based on standardization of the product, price, promotion and distribution (see fig.16).

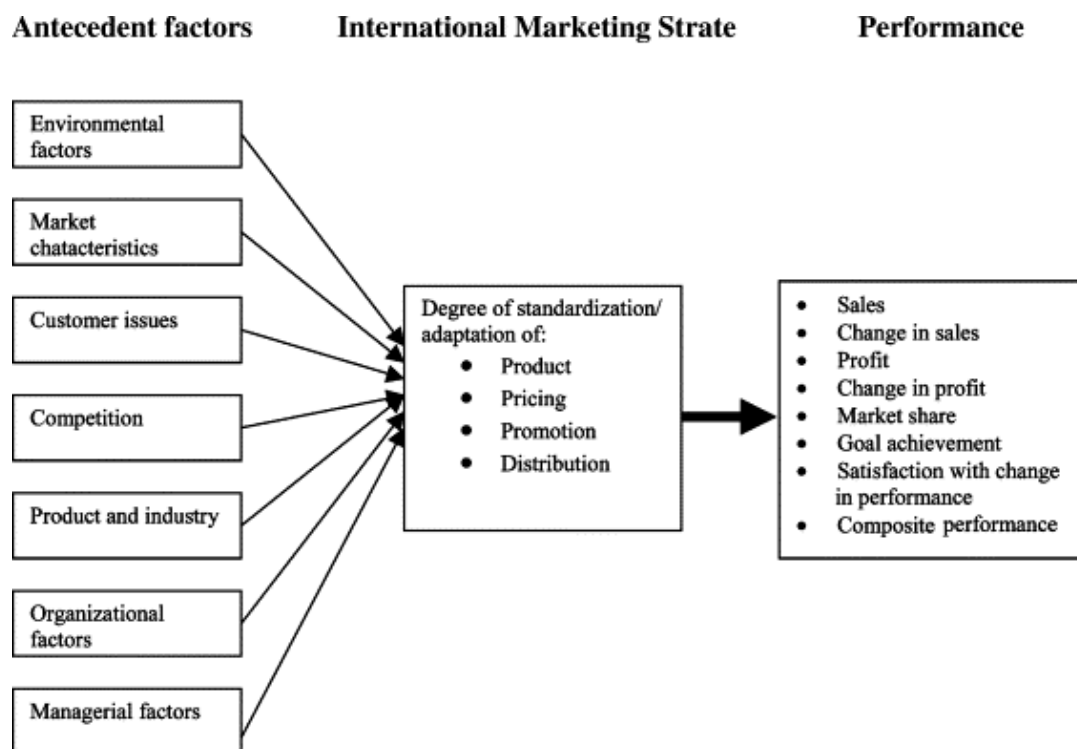


Fig. 16 - Standardization versus adaptation in international marketing

Source - Our elaboration from Valdani and Bertoli (2014) and Kotler (2014)

The results of the second question are in part consistent with precedent papers (Porter 1998; Pilotti 2011; Riva and Pilotti 2017 e,f; Becattini et al. 2009; Prodi 2006; Nardin 1997).

For what concern the third question: (What are the main challenges for the future of the district?) we discover:

First, we find the strategic importance of sustainability and the collaborative supply relationship for the development. It is important a strong network of relationships among firms. The Sassuolo ceramics district is located between the provinces of Modena and Reggio Emilia, and its heart is found between Sassuolo and Fiorano.

Second, the capacity of continuity innovation, before others do, is the key to leadership in the area of design, production and marketing therefore maintaining good economic performance. The network in the ceramic industry is important innovation center for the production and distribution in the international contest. The challenge of globalization in new market is important factors for the competition (see fig. 17).

Thirds, this process of internalization of the market and the important for the development of an international supply chain. The importance of the global context in which the industrial districts are competing is the new focus of analysis (Assopiastrelle 2015; Confindustria Ceramica 2015).

The results of the thirds question are coherent with past studies (Porter 2009; Pilotti 2011; Blundo et al. 2019, Mella 2006, 2012; Mattioli 2015), underline the importance of the sustainability, innovation and knowledge creation, globalization, as critical success factors and challenges in international markets.

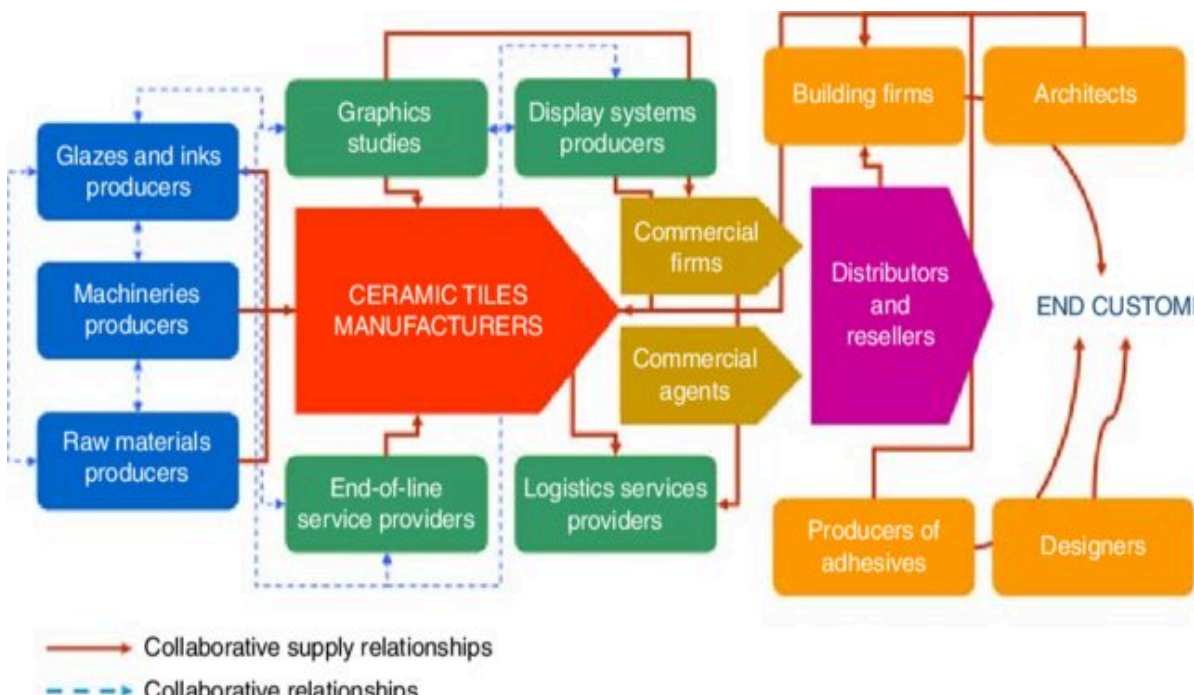


Figure 17 - Supply chain of a ceramic district of Sassuolo

Source - Blundo et. al. 2019

The original contribution of this paper and the production of new knowledge in the field are:

- a) the original description and analysis of the dynamic of strategic groups in the Sassuolo district and the importance of create new dynamic capability and absorptive capacity (Cohen and Levinthal. 1990; Eisenhardt and Martin 2000; Itami and Roehl 1993; Lane et al. 2006; Teece et al.) by acquisition and concentration of firms;
- b) to give a new practical framework to analyse the dynamic in a sector and the strategy in a contest on globalization of the market (Kotler 2014).
- c) describe some main challenges (sustainability, innovation and knowledge creation, globalization) for the future of the district.

The limit of this study is to analyse only a case of Sassuolo. Future research can analyse the impact of globalization on the sector with the presence of new important players (Brazil, China, Spain) and the strategy for sustainability.

The interesting case of district of ceramic of Sasuolo describes the importance to for the firms to have a long-range strategy for sustainability and innovation (Hamel and Prahalad 1994, Pilotti 2011, 2017, Ohmae 1982; Mella 2006, 2012, 2015 a, b; Becattini et al., 2009; Coda 1995; Cohen and Levinthal. 1990).

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