

研究ノート

Monograph on the French competitiveness cluster PAST: History, Governance, Organization and Trajectory⁽¹⁾

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Abstract: This paper aims to describe a case of the French industrial cluster of the PACA (Provence, Alps, Côte-d'Azur) region specialized in the fragrances, aromas, cosmetics and flavors sector. This region, populated by artisanal and family SMEs, have not nurtured the tradition of organizing a collective entity, while the State policy promoted a cluster building. Thus, the cluster has encountered many difficulties in assembling the various actors to create local dynamics. This monograph is mainly based on the interviews made during our visit to Grasse in 2018 and visit to Marseille-Manosque in 2019, and the documents collected in place. We will first present the general landscape of the fragrances, aromas, cosmetics and flavors sector in the PACA region, then the origin of the PAST cluster. After that, we will follow successively the functioning of the cluster, the nature of the projects of the science-industry collaboration and the historical evolution of the pole. We will finally conclude by examining the overall outcome and some tangible cases the cluster achieved and produced during fifteen years of its activity.

Key Words: Industrial cluster; Pole of competitiveness; Regional advantage; Traditional skill; Family enterprise; Small & Medium-size enterprises

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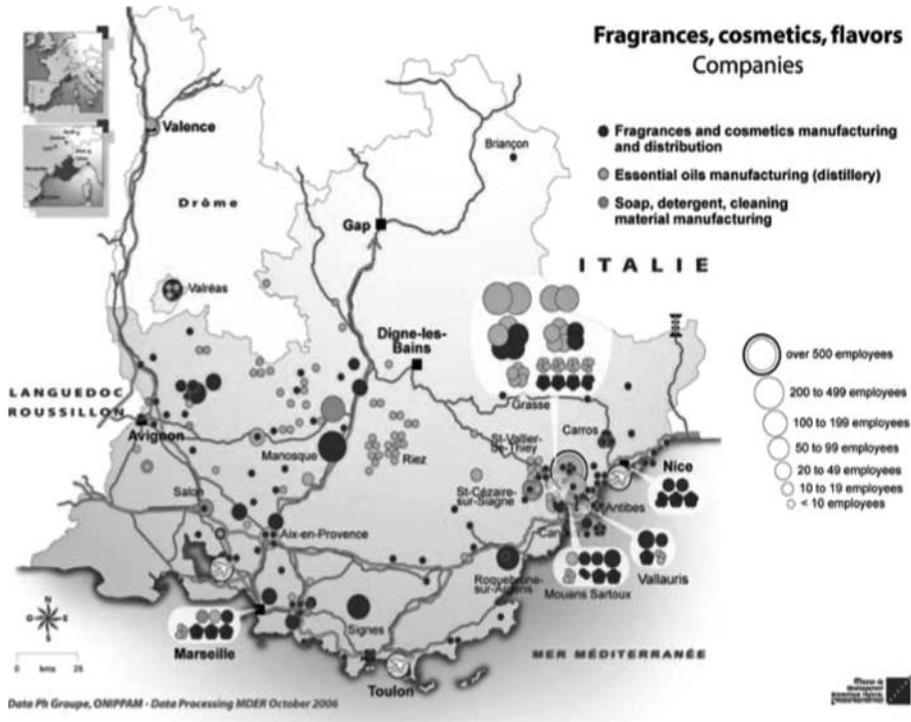
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The French region “Provence” has the privilege of bringing together all the actors in the aroma and perfume sector: farmers, transformers producing aromatic substances, companies formulating cosmetics and perfume compositions, and commercial & marketing companies. Statistically, the PACA region (Provence, Alps, Côte-d’Azur) is the 1st national territory for the creation of perfume compositions, the 1st territory for perfumery cosmetology, and the 1st region for the distillation and assembly of perfumes and essential oils. The entire sector generates 17,000 direct and indirect jobs and 2.5 billion euros in turnover per year, according to the INSEE industrial database (source: INSEE 2016).

This region, populated by artisanal and family SMEs, does not have the tradition of organizing a collective entity. Under the aegis of the State, companies in these sectors were nonetheless encouraged to set up, in 2005, a competitive cluster focused on aromas, perfumes and scents, in order to strengthen their capacity for innovation. The hub extends from Grasse and Sophia Antipolis in Côte d’Azur to the Pays de Haute Provence or up to the Drôme Provençale (see the map below). Given the location of the companies concerned, the PAST competitiveness pole is placed in an interregional perspective between PACA and Rhône-Alpes. A strong geographic concentration of companies is located in the departments of Alpes Maritimes (Grasse), Alpes de Haute Provence (Forcalquier) and Vaucluse (Manosque). Characterized by an artisanal culture, this cluster had from the outset great difficulty in sustaining inter-company cooperation and science-industry collaboration. At each point of assessment – or “labeling audit” -, it faced the risk of being disqualified according to the criteria set by the State. The PAST cluster, after surviving three evaluations (in 2008, 2012 and 2015) with more or less organizational changes, ended up merging with another agricultural cluster in the region in 2019.

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visit to Marseille-Manosque in 2019, and the documents collected in place. We will first present the general landscape of the perfume and aroma sector in the PACA region, then the origin of the PAST cluster. After that, we will follow successively the functioning of the cluster, the nature of the projects of the science-industry collaboration and the historical evolution of the pole, and finally conclude by the listing of the outcomes left by the cluster's fifteen years of activity.



1. The configuration of actors in the four connected fields of PPAM (Agricultural production of Perfume, Aromatic and Medicinal Plants)

The manufacture of perfume relies on a set of different trades.

First of all, the biodiversity of the PACA region makes it the first French territory for the production of PPAM (Perfume, Aromatic and Medicinal Plants): in 2016, nearly 2,000 farms cultivated 80 species destined for the cosmetics industry, perfumery, food industry and pharmacy on 23,000 hectares (source: Ceddem⁽²⁾). It has become the first French region for the production of PPAM from organic farming.

Thus, the PACA region (and Drôme) concentrates most of the production of perfume plants that shape the landscapes. The sector is organized in cooperatives of farmers producing essen-

tial oils of fine Lavender, Lavandin and Rosemary, which are exported around the world. The territory of Grasse, threatened by the foreign plant production and chemical ingredients, still cultivates the Centifolia Rose, Jasmine and Sage making up the most prestigious perfumes. Provence is also the leading French region to produce aromatic raw materials obtained by processing PPAM, and fruits and vegetables (distillation, maceration, extraction). The region has real know-how in terms of distillation; it represents 96 of the 130 French distilleries. Those distilleries are located near the cultivation areas in order to distill fresh plants. Challenged by the strong price pressure from foreign competitors, especially Bulgaria and China, the local distilleries still manufacture natural ingredients. These companies⁽³⁾ are export-orientated (75% of their turnover by mean) and employ more than 5,000 people in Provence.

This primary activity, being subject to the seasons, climatic hazards and fashion trends, is decisive for the different industrial end-users and pushes 'transformers' to work together with farmers. The perfume and cosmetic compositions industry has nearly 200 companies divided between formulation, design and marketing activities, i.e. 55% of national production, 1.3 billion euros in turnover and more than 5,000 direct jobs. The region hosts 25% of the sector's head offices (source: Ceddem Ibid.).

The Grasse area has around 60 companies that produce perfume concentrates for perfumery, cosmetics, food flavorings and detergents. There are large companies like Mane SA or Robertet alongside very small family businesses such as Probionat Provence, Sicaf à Valréas, Azur Fragrances which formulate and produce cosmetics for brands that do not have laboratories. L'Occitane in Manosque has spawned a spin-off of subcontracting companies, a source of job creation and wealth in the area that also contributes significantly to the international reputation of Provence.

A network of service companies completes this sector: toxicological tests, analytical chemistry, advice and support in the creation of samples and marketing, and trade broker. There are both private laboratories such as Immunosearch, which has developed alternative immunity tests to animal tests or Helioscience specializing in the evaluation of sun protection, as well as public R&D organizations. The GREEN laboratory of Avignon University (one of the actors behind the Valréas eco-extraction platform), the Faculty of Sciences of Sophia-Antipolis University, the Polytech school of Nice, the Laboratory of Galenic Pharmacy at the Faculty of Pharmacy of Aix-Marseille University offer a large range of services or/and training.

In the following sections, we will examine how these actors have acted in the past and how they are now interacting in the framework of regional competitiveness pole, organized by the State under the cluster policy.

1-1. A Short Histoire of the Construction of the Pole PAST

The pole PAST, specialized in Perfumes, Aromas, Scents, Flavors, was officially created under the statute of the Association of 1901 Law and labeled ‘Competitiveness Pole’ by the CIADT (Interministerial Committee for Land Use Planning and Development) in 2005. This was a response to the national call for projects launched by the CIADT in 2004. Three major organizations, the SNIAA (National Syndicate of Aromatic and Food Industries), PRODAROM (National Syndicate of Aromatic Products Manufacturers) and COSMED (French cosmetics association for SMEs) acted as project leaders in this bid along with local authorities such as the county of Alpes de Haute Provence or the Community of communes in the Alpes-Maritimes. They were also joined by some regional universities, entrepreneurs’ clubs of Grasse, the urban community of Sophia Antipolis, etc. The major objective stressed in this project was to equip the actors of the sector with the scientific competences, methods, analytical tools necessary (R&D and Training) to develop new ingredients and aromatic compositions which could meet the criteria of health, safety and respect for the environment in accordance with the future European regulations⁽⁴⁾.

Before the period of 2005, there were already certain forms of governance of the aromatic activity in Grasse in the eastern part of PACA, and in the Pays de Forcalquier in the western part. Even if the aromatic and perfume industry are characterized by a culture of secrecy which weakens links and cooperation between local SMEs, the evolution of the entrepreneurial mindset has contributed to the development of local initiatives to develop a collective governance in the beginning of the 2000s. In 2003, Grasse thus obtained the Local Productive System (SPL) label⁽⁵⁾ from DATAR⁽⁶⁾. The SPL “Arômes et Parfums” was run by the “Club des Entrepreneurs du Pays de Grasse” which is one of the founding members of the PAST cluster. In Forcalquier, there was also an SPL supported by the Pays de Haute Provence (the grouping of local authorities concerned by PPAM) which was its governance structure⁽⁷⁾. But instead of this body, it was the University of Flavors and Scents (UESS)⁽⁸⁾ which participated in the future governance structure of PAST.

Negotiations started in 2004 in order to conceive the future structuration of the competitiveness cluster in PACA. A first meeting brought together professional actors – the professional union PRODAROM, the SNIA, the COSMED association and the University of Flavors and Scents-, and they took up the project to set up a future competitiveness cluster. Many PPAM SMEs have expressed their difficulty in understanding the logic and interest of competitiveness clusters in general, all the more so for a cluster like PAST in which small or even very

small businesses are predominant. Therefore some leaders of the professional unions/associations took a lead in the discussion at the origin of the project, in order to respond to the conditions imposed by the CIADT.

Thus, the establishment of the pole PAST was the result of joint actions of some leaders who have come together to arouse the interest of others. In this case, their actions precisely took place within the framework of professional associations and unions, in particular four organizations: the PRODAROM, the COSMED, the SNIAA as well as a small local structure, the “Club des Entrepreneurs du Pays de Grasse”. This friendship club, although minor in terms of economic importance, was ultimately decisive for the cluster’s labeling, because it created a social cohesion between local entrepreneurs. In addition, the creation of the pole has been clearly supported by a very proactive attitude from the part of local politicians, governors and representatives of the State in PACA region⁽⁹⁾.

It is worth noticing that, at the start of the discussion, higher education and research organizations were almost absent and played only a secondary role in the constitution of the cluster. The research organizations or university labs were co-opted after the final decision was made, in order to meet the institutional requirements for the labeling of clusters. Members of the scientific community of Nice area were strongly solicited to participate to the project, due to the initial ambition to orient the pole PAST towards biotechnologies⁽¹⁰⁾. Thus were invited to join the pole PAST, the Institute of Molecular and Cellular Pharmacology (IPMC) in Sophia Antipolis, the chemistry lab of the University of Nice-Sophia-Antipolis, the CHU of Nice with two of the three INSERM units in dermatology, the Cosmetics Division of the University of Aix-Marseille. Some private laboratories such as Galderma⁽¹¹⁾, a subsidiary of L’Oréal and Nestlé (the largest European private research laboratory in dermatology at that time) located in Sophia Antipolis, Skinethic⁽¹²⁾ (the leading French company in synthetic skin) located in Nice and the CRIEPPAM (Regional Interprofessional Center on Experimentation with Perfume, Aromatic and Medicinal Plants) were also associated with the project.

On the industrial side, some twenty companies of the region such as Mane SA, Robertet, Raymond Payant, l’Occitan etc., have taken part in this initial move in view of creating the local development based on the mutual synergy.

1-2. Founding members of the PAST cluster

We have already mentioned the three professional organizations which were at the origin of the establishment of the pole PAST. The cluster was based on powerful professional unions both in cosmetics (COSMED in Marseille), and in the manufacture of aromatic products

(PRODAROM in Grasse), as well as in food flavorings (SNIAA). In reality, these unions were conveying the strong will of the leaders who were very involved in the creation of the pole PAST. We will take a look at the general characteristics of these funding members:

- 1) COSMED is a cosmetics industry network geared towards SMEs and VSEs. Its missions are to promote the development of SMEs/SMIs in the cosmetics industry, to defend their interests against health authorities, to pool and disseminate professional information among members and to provide professional training. Recognized as a key actor in the cosmetics industry, this association is made up of 80% of small and medium-sized businesses. Founded in Marseille in 2000, at the initiative of a dozen of cosmetic-specialized SMEs, it now represents more than 600 member companies and more than 17,000 jobs throughout France (www.cosmed.fr). Its representative within PAST, Robert Faure, reportedly said *“When the policy of competitiveness poles arrived, Cos Valley in Chartres decided to create a competitive cluster – and I decided to do the same. We first got closer to Prodarom in Grasse and then widened the circle in order to reach a critical mass.”*
- 2) The National Interprofessional Office for Perfume, Aromatic and Medicinal Plants, ONIPPAM, was a public establishment under the supervision of the French Ministries of Agriculture and of Finance. The function of ONIPPAM was to monitor developments in the production and markets of perfume, aromatic and medicinal plants (PPAM) as well as the regulatory aspects concerning these products. ONIPPAM was integrated into the National Establishment of Agricultural and Marine Products (FranceAgriMer) on April 1, 2009. The latter is now tasked with coordinating the various actors of concerned sectors, in order to implement, in a concerted manner, all of the proactive actions in the service of strengthening competitiveness of the PPAM sectors. (www.franceagrimer.fr)
- 3) The National Union of Manufacturers of Perfumes and Aromatic Products, PRODAROM, is a national union made up of manufacturers of raw materials and compositions for the perfume industry. Based in Grasse, PRODAROM is a representative union whose presence is strong both at the regional, national and European level. This union aims to defend, support and advise its members on a wide range of issues related to the perfume industry. Its presence at these different levels allows the union to collect, pool and disseminate various kinds of information from all over the world. Sixty-seven companies representing 6,000 jobs joined PRODAROM in 2018. (<https://www.prodarom.com/>)

- 4) Founded in 1945, the National Union of Food Aromatics Industries (Syndicat National des Industries des Arômes Alimentaires), or SNIAA, is a professional body representing the French aromatic industry vis-a-vis public authorities, consumer associations and the media. The SNIAA brings together some sixty food flavor manufacturers, i.e. almost all food flavor manufacturers and sellers, 90% of which are SMEs. Given that 40% of its members are located in the PACA region, it works closely with PRODAROM (<https://www.sniaa.org/>).
- 5) **Le Club des Entrepreneurs du Pays de Grasse**, the Country of Grasse Entrepreneurs' Club, is an interprofessional club of around one hundred members. Its purpose is to enhance the economic dynamics of the area and promote the particular know-how of Grasse. The Club, an association governed by the 1901 law, is a place where local entrepreneurs lead a strategic reflection, and try to set up a force for proposals and actions in the service of the economic and social influence of the territory. United by certain common values, the members of the Club remain nonetheless characterized by their diversity: the Club brings together as many companies in the aromas and fragrances sector – the spearhead of the economy of the territory – as in other fields of activity. This type of organization, although informal and friendly, contributes to create a social cohesion in a given community. (<https://club-entrepreneurs-grasse.com/site/>)
- 6) The European University of Flavors & Scents, UESS, is based in Forcalquier, in the Alpes de Haute Provence. The UESS offers cross-disciplinary, technical and regulatory training for companies in the scents and flavors sectors. Located at the medieval Couvent des Cordeliers, the UESS is a private university specialized in the study of natural aroma compounds, cosmetics and flavorings. Founded in 2003 by a local entrepreneur, the university is distinct among perfumery schools in that its teaching focuses exclusively upon raw materials of natural extraction, often those produced locally. The institution offers a wide range of academic programs, from vocational training in agriculture and cosmetics to undergraduate and graduate degrees in business and science, taught in conjunction with Aix-Marseille Université. Also held on campus are workshops in perfumery and aromatherapy for professionals and amateurs alike. (<https://www.uess.fr/>)

2. The objectives of the creation, the cluster's strategy and the governance

2-1. The objectives of the competitiveness pole

Bringing together local companies producing aromatic ingredients, the Pole is intended to

federate the network of companies and laboratories in the aromatic, cosmetic and nutraceutical sectors of the PACA region. The first mission of the PAST competitiveness cluster is to support its members to structure innovative projects for their development. Such motivation is expressed in different ways; through the projects it labels, the collective actions programs (ER-INI, Platform of Eco Extraction of Valréas – see below in detail) it implements (measurement of environmental impacts ...), and the scientific events it organizes (cycle of conferences on green chemistry ...)

What the pole PAST intended to do was twofold. The first step is to promote R&D activities and to strengthen innovation capacities of local companies, in particular SMEs, in cooperation with higher education and research organizations. Second, it aimed to support the internationalization of SMEs in the sector. To start the construction of the pole, the pole thus implemented two types of approach, an offensive collaborative strategy, followed by more defensive strategies;

- 1) **Offensive objective:** at the time of constitution of the pole, some cluster members explicitly referred to the ambition to make the PAST cluster **a global knowledge center on natural plant products**, which is a way of exploiting technical know-how mastered by several Grasse historical companies. The image of Grasse, which has been based for centuries on the quality of its flowers/plants⁽¹³⁾, would have naturally be strengthened. The revival of **natural materials** – therefore floral components when it comes to perfumes – is timely to fit into this perspective. Thus, the collaborative R&D projects, which are both the stake and the expected result of the cluster, must make a significant contribution to this objective.
- 2) **More defensive objectives:** the cluster's other ambition was to ensure that this industrial cluster would become a major global center for the characterization and evaluation of ingredients in perfumes, aromas, cosmetics, and agro-aromatic products. From its inception, it has chosen to place this dynamic under the banner of sustainable development, by making the quest for safer ingredients, cleaner technologies and more responsible management the common objective of public and private research. This objective must be understood in the context of the publication of a series of new European and global standards on chemicals which made the control of chemicals used in the products much stricter. In fact, the EU has adopted in 2006 the new European legal regulation on chemicals (REACH⁽¹⁴⁾: Registration, Evaluation, Authorization of Chemicals), which should take effect in 2012. Moreover, this defensive objective is clearly expressed on its

website -the R&D effort carried out by the PAST cluster must respond to the challenges represented by the development of these regulatory standards. The evolution of European regulations seemed to be a source of weakness for local companies in the aromatic and perfume industry. From this point of view, the pole PAST could appear as a potential resource that could be mobilized both individually and collectively.

- 3) In addition to the regulatory problem, the structural fragility of the aromatic industry in Grasse region was also highlighted, due to the fact that multinationals have increased their presence in the territory, by buying out local SMEs. Thus, a series of restructurings since the 1980s have impacted a significant share of employment, which has been concentrated in three large local companies. For the moment, these family-based companies remain rooted in the territory. If, however, they were to disappear or if they were to come under the control of multinationals -whose decision-making centers are outside the territory-, the local industry would be in danger. From this point of view, the pole PAST aimed to stabilize activities and strengthen their competitiveness by helping to mesh the local industrial fabric with formal cooperation relations.

However, behind this uniformed facade, it was also clear that all the members of the pole PAST did not share the same expectations and the same objectives vis-à-vis the pole, because the interests they would find there were partly divergent. The majority of SMEs and in particular Very Small Enterprises found it very difficult to get involved in innovation issues and R&D activities. On their behalf, COSMED defended the interests of small family businesses with few R&D resources that did not necessarily have the organizational and cognitive capacities to position themselves correctly in the cluster's approach. The other members of the cluster, who were often represented by unions like PRODAROM or SNIAA, did not have the same conception of the cluster's strategy. Due to their dominant position in the sector, they opted for a more elitist view. For large family-based groups as Mane or Robertet, the cluster's mission was to strengthen the competitiveness of companies in the sector. R&D collaborative projects they would carry out should involve a significant scientific dimension in cooperation with renowned university teams. For this purpose, the cluster and member companies must inject a great sum of financial and cognitive resources in innovative projects.

As we will see later, such dichotomy between the two types of companies – and their strategic views – will subsist throughout the pole's entire existence and strongly structure the manners in which the pole PAST will be governed.

2-2. The Governance of the cluster

We will try to describe here the organization and the way in which the cluster is structured, from an institutional point of view. We will also characterize the modalities of action of the various committees or working groups established in the cluster.

The cluster is organized as an association under the 1901 law. Its administration is made up of three categories of members⁽¹⁵⁾:

(1) Active Members grouped into 3 colleges:

- A) The first college: Founding members, the six unions and associations that worked to create the cluster (see the page 4-5)
- B) The second college: Private companies listed on the cluster's website; there are currently 130 companies (annual report in 2018);
- C) The third college: Universities, public research laboratories and academic organisms are grouped together in the third college:

C-1) First of all, six public research centres belong to PAST cluster: the CRIEPPAM (Centre régional interprofessionnel d'Expérimentation en Plantes à Parfum)⁽¹⁶⁾, Laboratoire de chimie analytique, qualité, nutrition (mixed unit between INSERM-INRA), Université Aix-Marseille; Laboratoire Chimie et Environnement; le Laboratoire de Chimie des Molécules Bioactives et des Arômes, Mixed unit between CNRS-UNSA⁽¹⁷⁾.

C-2) In the same college, there are 10 training organizations or university establishments: Asfo Grasse; Formasup PACA; IPAG (business school); the UESS; Aix-Marseille University; UNSA.

C-3) Are also members of this college, six other advisory bodies or members belonging to the scientific environment specific to the cluster; the Business Promotion Center; the Chamber of Commerce and Industry of Drôme; the Interprofessional Committee for Essential Oils (Cihef); and the agricultural union of flowers and aromatic plants (Safpa).

In total, the cluster brought together in 2017 around 160 members, including 130 private companies (70% of SMEs) representing around 12,600 employees. Given that the territory is home to around 550 companies in the sector, the participation rate is estimated at approximately 25%.

The administration of the cluster is divided between different bodies or groups:

- A Board of Directors: This board is made up of 18 members from unions and founding member associations, business representatives as well as representatives from the academic world of the PACA region.

The current President is Mr. Han Paul BODIFEE (Pt of PRODAROM)

The Vice-Presidents are; Mr. Alain ROBERT (Head of UESS); Ms. Elisabeth DUNACH (CNRS); Mr. Bernard TOULEMONDE (IFF Naturals); Mr. Michel KRAUSZ (Head of CIHEF)

- A Scientific Council: This council is made up of 10 expert members from the industry, academia and research. It is chaired by Dr Marie Florence Grenier-Loustalot who has a doctorate in Physical Chemistry (Research Director at CNRS and the CNRS Regional Delegate for the Côte d'Azur).

- A General Assembly composed of all the members of the Pole: companies, research laboratories, academics / colleges / training organizations, institutions and local authorities.

Alongside these decision-making bodies, there exist several **groups or committees that take in charge the operational actions.**

- The Training Commission, set up in 2006, aims to bring together all the training-related actors. Its purpose is to assess the state of training situation, to analyze the needs and to harmonize the training programs in order to make them compatible with the sectoral evolution. In reality, given the distance between the two major centers of the cluster (200 km between Grasse in the East and Forcalquier in the West), two sub-committees work in parallel.

- The Operational Structure includes **the General delegation** and an animation team based in Grasse and another team based in Forcalquier. In total, there are five staff members, which can be considered as a light staffing office. They have an operational role in implementing the cluster's orientations and strategic actions decided by the different decision-making bodies. The animation team provides members with various services for the networking of SMEs in the cluster. It stimulates the members in order to share the same concerns and interests and to set up the collaborative projects.

- The cluster has **a general manager**, holder of a doctorate in pharmacy, who has professional experience with R&D in the pharmaceutical sector (Interview). He has a good knowledge of the R&D environment and academic practices. With two secretaries, he is located in

the office within the Prodaron Union Building. Another person, an engineer and former researcher at ANVAR (National Agency for the Promotion of Research)⁽¹⁸⁾, plays a key role in the animation team: he acts as a project manager. He also acquired industrial experience, as he himself has a cosmetic laboratory, associated with the Imer laboratory. He works in part-time for the pole PAST. His main job consists in detecting the research seeds, in developing the collaboration networks, and in setting up the collaborative projects. In addition, he takes care of all the logistics part of the projects, that's to say all the procedure of project application.

2-3. The financial issues

The financing of the governance/administration structure of the cluster is supported by subsidies from local communities and the government through the Single Interministerial Fund (FUI). The former provides a large part of public funding, while “the state's share remains small and continues to decline” (general manager interview).

Agreements have in fact been concluded between the cluster and various local authorities (Regional Council, Prefecture, Agglomeration Community, etc.) to ensure direct financial support for projects labelled by the cluster. Local authorities also provide the bulk of the financing for the governance structure. “They are very involved in the functioning of the pole: the region, plus the departments of the region, plus the local territorial communities, such as CASA in Sophia Antipolis and CAPAP in Grasse. They finance directly the governance structure. Among these different communities, the General Council of the Alpes-Maritimes – where Grasse is located – is the largest funder.” (general manager's interview)

Via PRIDES⁽¹⁹⁾, the cluster can receive funds from the Region for some collective actions, including some small R&D activities. The PRIDES is the response of the PACA Region to the government's Pole of Competitiveness system. In fact, the PACA region has decided to set up a complementary financing system to help SMEs in innovation activities. The pole PAST is included in PRIDES program, granting the pole and its members access to additional resources. “From now on, half of the funding should come from the private sector, that is to say from membership fees and other sources, so we are trying to develop paid ‘services’⁽²⁰⁾ that our members can eventually benefit from in return for remuneration.... For example, database of pesticide risks by essential oils, marketing map by product segment, etc.” (general manager's interview)

2-4. Characteristics of decision-making and functioning of cluster

The dominant actors in the cluster are very clearly the industrial entrepreneurs: They are

powerful either through the unions that appear on the Board of Directors, or as the business leaders. This domination of industrial actors is obvious to such an extent that all kinds of strategic decisions, in particular in the field of innovation or research projects, had to seek an agreement of a large local family company -ranked 7th in the worldwide cosmetic sector- in particular its notorious CEO⁽²¹⁾.

Beyond the rules adopted when the pole PAST was created, it is more in the way in which they progressively generated collective approaches that the domination has been constructed. As we saw, the group of companies gathered in the framework of competitiveness pole exhibited different profiles and economic interests. Clearly the leading local companies through the professional unions has taken the grip of the governance.

In this regard, the pole PAST came across a serious difficulty from the start: given the structural characteristics of the aromatic activity, the pooling of tools, resources and know-how was very problematic. SMEs as well as leading companies were not at all willing to share their own knowledge. The business in this field has been for centuries based on the individual talent, tacit knowledge or secret know-how. Together they could carry out cross-functional projects that were of interest to the entire industry, for example chemical toxicity of ingredients. On the regulatory issues, they led together some interesting projects, but these projects were not likely to provide a competitive advantage to individual companies. SMEs were often unable to participate in collective R&D projects, while the leading companies were not eager to share the technical interests with other companies. By consequence, compared with other clusters, the pole PAST appeared less productive in the R&D activities.

3. The industrial contexts of Grasse city, an emblematic city of perfumery and cosmetics

3-1. Cultural legitimacy of city

One of the characteristics of the region around Grasse city is the presence of the entire supply chain -composed of various skills- in the cosmetics and perfumery industry, which can be mobilized and connected within the pole PAST: from the production of the necessary raw materials (essential oils, natural products, synthetic products), to the formulation and production of final products (cosmetics, perfumes, soaps, etc.), including the design of aromatic compositions or excipients.

In the field of perfumes and flavors, Grasse city in particular carries real legitimacy. As UNESCO classified perfume-related know-how in Grasse city in 2018 as an intangible cultural

heritage, this city retains its symbolic status as the ‘cradle’ of modern perfumery. In addition to this image, Grasse region is really a center of national economic interest. In terms of aromatic production, this territory occupies 55% of national production (730 million Euros) and more than 50% of national industrial jobs in perfumes and aromas (3,800 employees) are located there. The two flagship French manufacturers are still established there: Mane SA and Robertet, as well as more than 70 SMEs located in the territory, including some subsidiaries of international groups such as IFF⁽²²⁾ or Firmenich⁽²³⁾ etc.

However, Grasse is no more than a lightweight internationally, making approximately 800 million euros out of 11 billion worldwide turnover. Thus, the share of companies in the Grasse region in the world perfume and aromatics industry represents barely 8% of turnover. In addition, a series of takeovers of local companies by multinational firms raise concerns about the transfer of strategic decision-making centers outside France.

Before describing the evolution of the PAST cluster, we will conduct a quick review of how the territory of Grasse has evolved over the past thirty years, which will allow us to understand the local context in which the PAST cluster operates.

3-2. A perpetual reconfiguration of industrial actors in Grasse city

The traditional industry of Grasse has been characterized by an organization centered on a few medium/large family businesses (with several hundred employees). These were historical brands like Tombarel, Chiris, Méro-Boyveau. These companies were located upstream of the sector. They produced natural raw materials (floral culture was important), then extracted the natural ingredients which used to serve as a basis for the realization of perfume compositions. This core of the perfume industry has founded the region’s reputation.

After the golden age of the 1950s and 1960s, Grasse began to experience a series of changes that would significantly modify the industrial landscape of the territory: In the 1970s, the territory experienced several phases of restructuring and regrouping of local businesses. It was first of all an endogenous process, which meant that some local companies in Grasse began to regroup. Historical leading businesses have absorbed small and medium-sized local companies.

Then, companies coming from outside the region (French then foreign) settled down in Grasse by making acquisitions of local SMEs. This was the case with Sanofi. Sanofi was created in 1973 by ELF Aquitaine, when this group wanted to launch itself in the hygiene and health sector. Sanofi has grown by absorbing the Labaz and Parcor laboratories and food, animal health and perfume companies, hence its establishment in Grasse. In addition to Chiris,

Sanofi took over the former Tombarel company from the Clin-Midy pharmaceutical group and, in 1982, the company Méro et Boyveau (number one in Grasse in the manufacture of aromatic raw materials for food), thus becoming the one of the main actors in the Grasse industry. In those years, Sanofi employed up to 2,500 people. But this settlement of a big group, with management methods often ill-suited to such a specific activity, was not necessarily a success. In 1993, Sanofi, which wanted to focus on pharmaceuticals, sold out its aromatic units to a German group. This episode has triggered a series of the successive restructurings which have led to the creation of many spin-off companies. Some ex-managers then decided to create their own business, such as the companies Aromafleur, Expressions parfumées, Expression aromatique, still now in operation. At the same time, Grasse was experiencing the decline of floral culture which coincided with the abandonment of upstream production process in the sector. Only a few local companies has kept an extraction activity, while the new companies created as a result of the restructuring moved in most cases to the activities requiring less equipment and initial investment, that is to say the fragrance composition. Also, there was a diversification movement towards food flavors in territory. Consequently, the food flavoring industry would represent today almost 50% of the turnover of the industry in Grasse.

More recently, there has been waves of entry into the territory of foreign multinationals. There are 6 multinationals among the top 10 that have the production sites in Grasse. The aromatic industry is now increasingly dominated by a few large American or Swiss groups: IFF, Firmenich, Givaudan, Symrise, Cargill who control or have controlled local companies in Grasse. IFF bought Laboratoire Monique Rémy in 2000; Givaudan, a Swiss multinational, bought in 1963 and then closed Roure Bertrand Dupont in the 1980s; Firmenich acquired Danisco in 2006; Symrise bought and then closed the production plants controlled by Haarmann and Reimer and Dragoco; Cargill moved to Grasse in 2011 after the takeover of Degussa Food Ingredients. The multinational group of French origin is not exception; Sozio Descollonges, which specializes in the development and production of customized fragrances, has merged with a local family business APF Arômes et Parfums based in Mougins, to reinforce its position in Grasse and to boost its competitive position in the global marketplace. In fact, Sozio Descollonges returned to its Grasse roots with the acquisition of Sentaromatique last year and now the merger with APF arômes et parfums.

Moreover, the aromatic industry has entered a new period of concentration, which tends to significantly increase the financial and strategic capacity of the leading companies at the world level and, as a result, to widen the competitive gap with the local companies of Grasse⁽²⁴⁾. One of the last family businesses, Robertet, was the subject of hostile M&A in 2019 and 2020. In-

deed, Firmenich and Givaudan successively launched the hostile takeover bid on this old family business. The waves of M&A will continue in the perfume sector, as the global players are seeking to consolidate their portfolio of natural ingredients.

3-3. Competitive advantage of the region

At present, there coexist three types of companies in Grasse: independent small companies; medium-sized companies with local family capital; and subsidiaries of non-Grasse groups (French and foreign). This business configuration is important, because the sustainability of the industrial territory depends upon the presence of ‘sovereign’ local groups whose strategy is decided locally. It seems that we can oppose two different logics followed by these companies: a so-called financial logic, characteristic of multinational groups that have invested in the area; and an industrial, patrimonial logic, which brings together businesses with family capital in the region. Such two logics correspond at the same time to different management strategies, and to differentiated modes of insertion in the international competitive space.

As to the first logic, we observe the presence, in a restricted geographical area, of a large number of SMEs exercising similar and/or complementary professions/trades. Within this space, we can find the manufacturers of natural and synthetic raw materials, a dozen of brokers, the creators of perfume composition, and equipment/machine suppliers (tanks etc.). Many local SMEs, often manufacturers, insist on the advantage they can benefit from this concentration of diverse companies operating in the same area. In particular, this proximity allows them to constantly find the raw materials they need, either because any ingredients are available from a broker, or because they will ‘borrow’ an ingredient from a competitor who may agree to temporarily help them out. Therefore, we cannot dissociate the economic functioning of the territory from the relational and/or social linkage created between manufacturers who have known each other for a long time and live in the same community.

As opposed to the first, the second is the ability to achieve large volume of products and offer the lowest possible prices. Financial capacity therefore becomes the key success factor in the aroma and perfume industry. At the same time, marketing becomes a crucial tool of competitive advantage. It should not be forgotten that, in fine perfumery,

“the perfume itself – essential oil – only represents around 10% of the cost price of a perfume (general manager interview), while the costs linked to marketing (consumer tests, conditioning, communication etc.) represent a large part”.

In this system, the local SMEs of Grasse cannot compete with the world leaders in terms of the volumes produced, the prices offered and the marketing resources injected. Faced with

these large multinational groups, local SMEs seem to rely on several competitive advantages linked to the territory:

Grasse continues to enjoy worldwide fame, a legacy of its history more than the result of its current situation. For some groups, Grasse continues to play a necessary showcase role in an activity where the impact of the image is very powerful. It is an intangible asset linked to Grasse city.

The second strategy is to position themselves on a niche market neglected by the leaders. They oppose then the volume strategy with the niche strategy based both on flexibility and on the quality of the product and service. Many local SMEs try to bet their survival on service, on the speed of execution of orders, samples, and on the possibility of delivering small quantities. Indeed, the local companies in Grasse are able to offer flexibility of choice in terms of quantity, and quality and/or variety of the raw materials supplied, unlike the leading groups, based on pricing and volume strategies, are moving towards standardization logic. It is one of the current competitiveness factors of SMEs which are based on a form of local cohesion of proximity. The aroma and perfume industry in Grasse therefore has a specific asset which lies in the intertwining of competitive and interpersonal relations in the way of ‘Third Italy’⁽²⁵⁾.

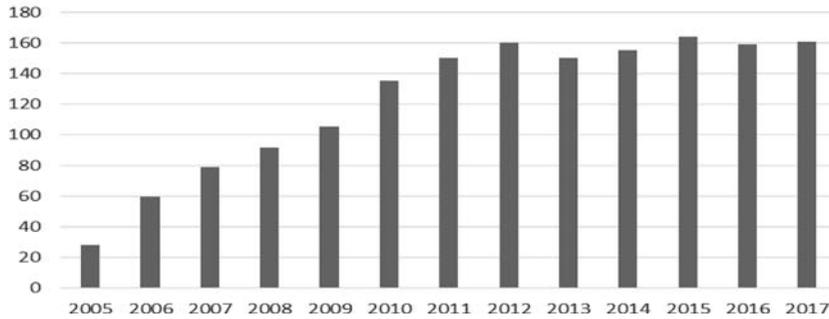
The third advantage is linked to the specific know-how of local SMEs in the field of natural extracts. Synthetic raw materials play an increasingly important part in aromatic compositions, while the know-how accumulated in Grasse is more connected to the extraction process of natural raw materials. The flagship companies of Grasse such as Mane, Robertet and Charabot have an essential know-how, it seems inexistent in any place in the world, in the field of the treatment of natural raw materials. Grasse therefore remains a major production center for natural raw materials and natural flavors. This specific asset appears to be the most strategic one for companies rooted in the territory, especially as consumers increasingly prefer naturalness or natural ingredients in both cosmetics and food.

4. Trajectory of the pole PAST between 2005 and 2018

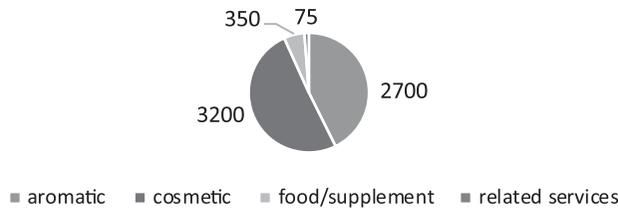
4-1. some key figures

We will take a quick look at the key figures concerning the evolution of the cluster, presented by the general manager at the moment of our visit to Grasse (in September 2018). In terms of adhesion, the cluster saw a steady increase in the number of participants until 2012, the end of the second phase of the evaluation, starting from a low level – some 25 companies. In 2014, it recorded 155 members with 20 more companies in one year. After this period, the

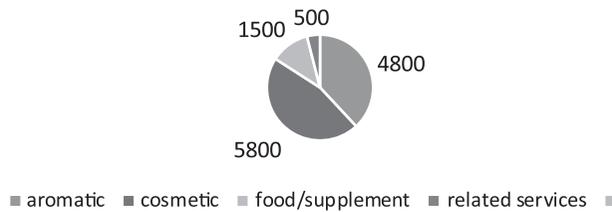
Figure 1 Number of member companies
Titre du graphique



turnover (millions euros)



N° employee



number stabilized around 160 members (in 2017). Among them, 130 were private companies, the majority of which (116 companies) were SMEs (less than 50 people). The rest was either professional unions, cooperatives or higher education institutions.

According to the balance sheet of the pole, four sub-sectors represented, in 2017, 5.3 billion euros in turnover and 12,600 employees. We will examine the situation of each sub-sectors:

Perfume sector

Among the member companies, some are family-based local groups like Mane, Robertet. Others are subsidiaries of foreign multinationals as well as local SMEs focused more on the niche of composition markets than that of the manufacture of raw materials (Charabot, Albert Vieille). It should be noted that the companies that are positioned upstream, that is to say on the first stage of the value chain that needs R&D the most, are all participating in the cluster. None of the Grasse perfume companies, specialized in final products and which have focused

their strategy on enhancing the image of Grasse (Galimard, Fragonard, Molinard) is a member of the cluster. This sub-sector knew a steady growth about 3% per year, but the most salient aspect of this sub-sector remains a high exportation rate which stays constantly above 75%.

Cosmetics sector

The cosmetics is a sub-sector defined by its variety of products (soaps, toiletries, hygiene products, cream, etc.). This sub-sector includes a few large companies (Occitane, Biotherm etc.) and a great number of small businesses specialized in the manufacture of beauty products which spread throughout the PACA region with a higher concentration in the Bouches-du-Rhône department. In this sub-sector, the PAST cluster brings together companies such as Terre d'Oc, Collines de Provence, Bains et Arômes, Lothantique, Sophim and Occitane. The growth of this sub-sector between 2012 and 2016 amounted to 3.7%.

Aromas

The aromatic sector in PACA is concentrated in the Grasse region with large companies such as Mane, Robertet, Malango, and multinational companies such as Cargill Flavor Systems, IFF (International Flavors & Fragrances). Globally, this sub-sector is dominated by a few large groups in the world. The domination of large groups is linked to the nature of its industrial process. In fact, this industry is based both on the molecular science (natural or synthetic) and on the heavy technological equipment which must ensure the quality of aromatic products throughout the total production process. This capital and knowledge intensive sector is not suitable for the SMEs. Between 2012 and 2016, the turnover of member companies grew up by 10.3%. It is therefore the sub-sector that has experienced the strongest economic growth.

“By volume, perfume [production] is very, very little 5%, 6% or 7% to the maximum in the total production of member companies. It is the synthetic or natural aroma, for foods or detergents used in the washing machine, which dominates the production in Grasse, I do not know exactly [the proportion], maybe up to three quarters ... “(interview general manager)

One of the major initial objectives of the cluster was the development of collaborative research projects. From this point of view, the cluster has succeeded in “labeling” 26 R&D projects which represented 34 million € (euros), including 11 million € of public funding at the end of 2010. Then the figure passed to 79 projects, amounting to 49 million € in R&D costs, half of which came from public funds at the end of 2014, and to 101 projects – at the end of 2017 – of which 53 could have been financed by the FUI, PRIDES, BpiFrance or the regions etc.

Taken together, the projects mobilized 53.7 million € from the budget of which 24 million came from public funds.

“We consider that 75%, three quarters of projects, funded by external organizations or not, were able to go to the end, for us that is the success rate. » (general manager interview)

These different projects have resulted during 13 years in 18 patents, and 27 new products or services, which allowed to directly create 89 high-level jobs and 3 start-ups (2018 annual report)

4-2. Performance reviews; audits and evolution in inter-cluster relations

As already indicated, the pole PAST started in 2005 with 28 members and has successfully passed three stages of the evaluation, in 2008, 2012, and 2015 (at mid-term evaluation). However, at each stage the cluster encountered fairly severe audits against him, and received more or less drastic recommendations that changed its orientation and strategy. In particular, on each occasion the merger with Cos Valley, the most direct rival, was the subject of discussions. In 2019, the pole PAST nevertheless ended up merging with another regional competitiveness pole specialized in agriculture which is located in the vicinity. We will summarize this process, which may illustrate the tortuous path this cluster took during 14 years.

First of all, according to the first audit carried out by the Boston Consulting Group and CM International in 2008, the pole PAST was classified among the 13 clusters which only partially achieved the initial objectives defined by the executive body of the competitiveness pole policy. They were recommended to improve certain dimensions of their action. While the second phase of policy for the period 2009-2011 was launched by the State which donated a new budget of 1.5 billion euros, the pole PAST had a one-year reprieve to rework on an in-depth reconfiguration of cluster. Thus, the bureau of cluster rewrote a new “performance contract”, improving certain aspects of its actions; in particular, reinforce collaborative networks between private companies and scientific research labs; improve the functioning of governance; ameliorate the training systems; put in place the structuring mechanisms such as a construction of collaborative tools or platforms, etc.

“The government has scheduled a new audit of these 13 poles for the fall of 2009. And the CM International has been selected for it. The audit will end at the end of November 2009 and should conclude whether or not the “pole of competitiveness” label is maintained for each of them” (Magazine Usines nouvelles, on 12/08/2008).

After intense consultations with the various stakeholders concerned during the fall of 2008 and October 2009, the pole PAST has set itself the objective of becoming **an international benchmark for natural extracts used in the aromatic and cosmetic industry**, which could allow it to forge its own identity.

Indeed, the State strongly encouraged the two poles PAST and Cos Valley to merge, to “constitute an international benchmark of cosmetics”. Against such a strong pressure, the pole PAST has however succeeded in maintaining its integrity, by putting forward arguments such as “A merger would not be relevant because we are not in the same business ... Our companies supply semi-finished products to user industry, while companies of Cos Valley are working on the end products by promoting the market strategies aimed at the general consumers. However, collaboration between suppliers and users doesn’t seem illogical.” (Reported by the general manager in the newspaper *Le telegramme* published on October 03, 2008) or “We can of course optimize the network dynamics and our complementarities. The pole PAST cluster works on raw materials and designs ingredients which are then used by partners from the Cos Valley cluster, which is more specialized in research and final production.” (Op, cit.)

In sum, the bureau of the pole PAST denied the merger, but not the cooperation with the Cos Valley. Following the confirmation of its labeling as an independent “Competitiveness Pole” at the beginning of 2010, the pole PAST was able to formalize, with the State and neighboring local authorities, its strategic objectives, its technical roadmap and its development action plan 2012 through a new “performance contract”⁽²⁶⁾.

At the same time, the pole PAST formalized a partnership agreement with Cos Valley:

“The PAST has unique know-how on natural extracts, a knowledge that we clearly lack at Cos Valley. We must build bridges, not only to facilitate communication between poles, but also from business to business! It is in any case the “made in France” which will be the winner. “(newspaper article, published on October 03, 2008 in *Le Telegramme*).

In this case, the action plan drawn up for this partnership pledged “to identify areas of common collaborative interests” and “to identify complementarities”. “The two poles are already developing some joint R&D projects that go in the same direction. The idea is to develop collaborations between teams, in particular towards the co-labeling of research projects.”(Speech reported by general manager published in the ‘*Innovation journal*’ on March 4, 2009)

At the second step, during the second audit carried out by the firms BearingPoint, Erdyn and Technopolos Group-ITD in 2012, the pole PAST was once more pointed out with 16 other poles as “less efficient” than the others. The audit report classified each of the 71 com-

petitiveness clusters into three categories “high performing”, “normally performing” and “performing poorly”. Overall, the evaluators’ general conclusions were positive.

According to the report, it is however necessary – in certain poles like the PAST – to lead the revision of the policies and actions, in order to clarify the objectives and make coherent its various strategies. In addition, the report called for strengthening the role of regional authorities in steering the clusters governance, removing some “obstacles to efficiency”, remedying the lack of discussion on strategies and policy results. Finally, the report calls for an improvement in the method of financing collaborative R&D projects via the single interministerial fund (FUI which finances the collaborative R&D projects of the clusters).

They pointed out that all the needs of member companies are not “covered by current financing instruments” and suggested the development of other ways of financing research projects and innovative technical projects for SMEs.

Despite this unflattering second assessment, the pole PAST once again succeeded in its survival course, by conveying the message that “The pole played an indispensable role for the creation of the economic dynamism in the territory”. During the review-consultation with the State, the pole insisted on its key role in the territory and ended up by obtaining the labeling for phase three of the competitiveness pole policy. “A jury composed of the DGCIS and the DATAR⁽²⁷⁾ in the remedial oral that took place in September 2012 confirmed its labelling, by adding two recommendations: deepening the partnership with Cosmetic Valley; strengthening the collaborative mechanisms such as platforms” (article published on 06/07/2012 in Tribune).

The 2012-year audit report laid down the new phase 3 of this industrial policy for the duration of 8 years, up to the year 2020. However, it also provided a mid-term evaluation in 2015. As the 2015 deadline approached, the pressure was again mounting for the PAST to move towards the merger with Cos Valley. In fact, the Ministry of Industry has assumed the role of conciliator between the two poles and even issued in June 2015 a press release according to which “After several years of discussions and sometimes aborted attempts, a merger agreement was found between the two poles, on Tuesday May 24, at the General Directorate of Enterprises, which was validated on Tuesday June 28 by the Board of Directors of Cos Valley. PAST’s board of directors will have to follow the same route in next July.” (article issued in Tribune on 26/6/2015)

Despite this first informal agreement, the latter ultimately did not endorse this decision, considering that “this agreement was not balanced.” Faced with the Cos Valley bringing together around 440 companies, i.e. 21 billion € in turnover, with the big names in the cosmetics sector

(Lancaster, Dior, Guerlain, Clarins, Shiseido, LVMH etc.), the pole PAST felt threatened to be “absorbed” and lose its autonomy. “It is difficult to find the conditions for a sufficiently balanced merger between the two, not outright absorption” (op.cit.)

On the Cos Valley side, its president argued that “the future single cluster will bring together 444 members of the Cosmetic Valley and 124 members of the pole PAST, without mentioning the other partners who are working with these clusters, for a total of 90,000 jobs. Thanks to this fusion, there will be only one business community for the entire French cosmetics sector, which generated 26 billion euros in turnover last year and was the second largest contributor to the French trade surplus, i.e. 160 Airbus and 480 TGV exports... Enough to further consolidate its place as a Cos Valley in the ecosystem and to increase the consistency of the cosmetics industry in France. This future unique hub will retain its headquarter in Chartres, but the ex-PAST cluster will continue to work, with its own teams, on the themes of fragrances and scents in the Provence Alpes Côte d’Azur region.” (Speech reported in the journal Tribune dated 10/14/2015)

As for the pole PAST, the general manager replied that “It must be recognized that the member companies [of the pole PAST] are showing a great dynamism, with growth rates of between 3 and 8% and a capacity to export at 70%. And there is no shortage of research projects... It is just as important to consider these [local] synergies developed in the region as it is to wish for the constitution of a single sector, a single leader in France.... Thus, this type of fusion expected with Cos Valley is part of a purely sectoral logic ignoring the specificities of each partner, because we do not have the same ecosystem or the same tools.” (Speech reported in the journal Tribune dated 10/14/2015) He continued that “any merger requires concessions, especially in terms of the distribution of tasks, and forces us to rethink organizations. However, the remoteness of the two territories adds to the enormous organizational difficulty. “ (Le Journal des Entreprises dated January 20, 2016)

Finally, we witnessed a failure of negotiations at the end of 2015, when the former minister of regional planning and governor of the PACA region⁽²⁸⁾ opposed the last refusal. At the same time, the pole PAST was thinking about another choice, by considering that it would no longer be possible to survive on its own, because of critical mass limitation. The pole PAST then started a negotiation on a future fusion with TERRE, the competitiveness cluster for the fruits, vegetables and cereals sectors – with which the pole PAST already had multiple collaborations in terms of research projects or platforms – also based in Vaucluse, the neighboring department of PACA region. Due to timing issues, this negotiation was also unsuccessful.

The third audit in 2019 was fatal for the pole PAST. The cluster could not obtain the label-

ing on its own. It resumed negotiations not with Cos Valley but with TERRE. The extraordinary general assemblies of the PAST and TERRE clusters, held on July 1 and 2, 2019, validated the fusion project proposed in their joint application for Phase IV of the competitiveness clusters (2019-2022). This joint proposal succeeded in being labeled by the Prime Minister in 2020. With a unique positioning and strong synergies between its actors, this new pole is becoming a major player in the food and drink, health ingredients and food supplements, cosmetics, perfumes and ingredients of the flavoring industry. TERRE-PAST is today a national and international competitiveness cluster, already able to extend its actions on the European level⁽²⁹⁾.

5. Some results that the pole PAST produced

After a short narrative of the tortuous trajectory -implying not only the economic rationales but also the political games- that the pole PAST followed during its existence, we will explore what the PAST was able to really create. Despite the governance and management difficulties, the PAST cluster produced some tangible results. We will successively examine (1) the research projects – main target of the cluster, (2) platforms and (3) typical start-ups resulting from its actions.

5-1. The R&D project construction process

We will first observe the ways by which the research project has typically been set up within the PAST cluster.

The 1st step: assembly of projects

According to our interview, although project proposals often come from larger companies, in general, the project manager goes to great lengths to bring out the seeds for the innovative projects.

“I first go for a tour of public research laboratories, university transfer services ... I identify some seeds of R&D projects in laboratories and also in companies. For the lab research side, I rely on the development managers on my network or who come to facilitation meetings we often organize. For companies, I bring up projects of a very applied nature through meetings in clubs, informal meetings, the network... “.

When setting up projects, there clearly are proximity effects. Thus, the projects initiated by companies located in the Alpes-Maritimes part are carried out more with UNSA-affiliated cen-

ters or labs, while the projects coming from the Alpes de Haute-Provence side are carried out more with the Aix-Marseille University. They know each other, because of previous relationships and a geographic proximity. The interviewed project manager declared not to participate in the writing of the project

“I facilitate the assembly of the consortium project but I do not intervene in the writing of the project, if it comes from the large groups. But sometimes I put my hands in the writing of projects brought by SMEs.”

One of the difficulties seems to be to “get the different members to sit around a table. In the previous stage, I talk about this subject with each member calmly and confidentially, before everyone arrives at the negotiating table...” (general manager interview)

The 2nd step: Evaluation and labeling of projects

When the project is ready, it has to be submitted to the scientific council, in order to be examined by the experts. This council meets four or five times a year. The cluster’s labeling procedure is like elsewhere: it is the Board of Directors that, after consulting the Scientific Council, gives the final agreement. In terms of project assessment, the labeling body uses the selection criteria defined at the national level. In addition to the scientific quality of the project, it must meet a certain number of eligibility criteria such as the reality of economic opportunities, the financial viability, the modality of cooperation between companies and research organizations, the impact on attractiveness of territory etc.

The 3rd step: Searching funds

Getting the project financed is a critical step. The various steps must be taken to lead the projects towards the sources of financing. Given the diversity of possible funding sources and their application timing, one has to quickly go to the right office. Many SMEs do not have the capacity to carry out the procedures themselves with the ANR and the FUI. It is therefore more often the project manager who must accompany the projects to the financing offices. The final successes remain very uneven – around 50% according to the information given by the pole – “there are many, many things to do before obtaining funding, we must do most of the work. » (General manager interview)

Moreover, as SMEs feel poorly equipped when faced with the strong demands on the part of the scientific council, they tend to avoid entering into the complex and hazardous administrative process, and to make use -without going through labeling procedure- of PRIDES. PRIDES seems to “grant funding more easily to highly applicative projects with little scien-

tific contents.” (op.cit.)

In the future, it seems increasingly important to get access to EU funding sources for projects. For this, it is necessary on the one hand to strengthen the technological level of the project, by injecting more high-level scientific contents, which supposes the more active involvement of university research units, and on the other hand to expand the cooperation networks with European and even outside EU countries.

5-2. Presentation of some representative projects

Here we will exhibit some of collaborative R&D projects labelled and realized in the pole PAST. These examples characterize the concrete functioning of various actors.

A) Claryssime project

Claryssime is one of the first collaborative projects selected and set up by the cluster. This project was led by BONTOUX SA, a family SME specialised in the production and marketing of aromatic raw materials in particular sage. This lead company produces a very complete range of essential oils, extracts, absolutes and natural isolates. The project was also supported by the two agricultural cooperatives SCA 3 P and PPV and by the two academic partners BVPAM Laboratory of Plant Biotechnologies Applied to Aromatic and Medicinal Plants (University of Lyon) and Laboratory of Chemistry of Bioactive Molecules and Aromas, natural aromas team (University of Nice and Sophia Antipolis) and the two technical centers. After being labeled by the PAST cluster in 2006, it obtained the funds – for a budget of 2.5 million euros- from the FUI for 4 year-period. The project consisted in optimizing the production of sclareol per hectare using different approaches: identifying the genes involved in the synthesis and secretion of sclareol; optimizing the extraction of sclareol from the plant; identifying and enhancing all the byproducts associated with sclareol.

B) PerfUgard project

This project aimed to suppress the potential allergenic agents from perfumery materials by removing the incriminated, isolated molecules whenever possible, – a very costly process from identification to extraction – or by reducing the amount of any given ingredient in a formula, or ultimately suppressing it altogether. The project brought together a consortium of companies and university lab. What they have achieved is to trademark an ‘invention’ called **perfUgard** which is centered on the concept of building an invisible film barrier on the skin which works as a protection against allergenic reactions through contact with the skin. They added that there is also an element of protection during the moment of pulverization, which would imply that perfUgard also has a certain level of impact on airborne allergens, although

the focus was clearly on the skin. The solution used is a vegetal, film-like substance that is non-occlusive, soluble in alcohol, has no odor, nor color. Their expertise led them to look at a family of proteins, the prolamines, which are well known to have those properties and are found in different cereals. In the end, the team selected corn, as it is gluten-free and particularly rich in prolamines. Labelled by Cos Vally as well as the pole PAST, the project was supported by a consortium composed with Payan Bertrand⁽³⁰⁾, Biogalenys, Laboratoires ADONIS (affiliated to Alban Muller International), Laboratoires AMMIS (Université de Rouen), CRITT ADIPpharm. It obtained FUI funding for the period 2011-2014. The team announced that they would be able to start developing the “perfumes of tomorrow” soon. It remains however to be seen how this new technology would be examined and approved or not by regulatory commissions.

C) Natubaval

With the Natubaval project, labeled by the PAST Cluster in 2010, SOFIA Cosmetiques R&D Laboratories has sought any natural preservatives/additives originated from Mediterranean plants, instead of parabens-based preservatives for the cosmetics industry. A whole local plant sector could be revitalized, because natural products are in the air of time and consumers are increasingly rejecting parabens. The Natubaval project aimed to develop, for the cosmetics sector, new preservatives and/or biological additives which can be extracted from Mediterranean plants. This project, based on the possibility of replanting ancient crops, integrated the development of an agricultural sector in the R&D activities. Moreover, the Natubaval project has succeeded in rallying many financing bodies: Europe, the State as well as the Region, and the financial supports provided by the FEDER (PACA region and European Union) and the ANRT (French National Association for Research and Technology). The project consisted first in “screening” about twenty appropriated plants from a potential pool of 2000 plants. The second step went through the extraction, the analysis and the validation of some of them, until the pilot trial then the final industrial production process. Four regional partners were associated within this project: ACPHytaroma (distillation), Naturex (extraction), SOFIA Cosmetics (finished products and lead company of consortium) and the Laboratory of chemistry of bioactive molecules and aromas UNSA). This project could obtain initial promising results, notably in the identification of potential plants and in particular a patented molecule. This private-public research consortium has benefitted from the contribution of a doctoral student employed under the status of CIFRE contract.

D) Chimiosub

Co-labeled by the two poles, Agro Resources and the PAST, ChimioSub aimed to enhance

plant biomass by using the properties of so-called subcritical water. This is hot water maintained in a liquid state by an ad hoc pressure which prevents it from turning into vapor. In the subcritical state, it is much easier to dissolve certain molecules in water. This type of technology therefore makes it possible to develop new chemical processes or synthetic routes reducing the use or generation of substances harmful to the environment. Regarding the partners-members of the pole PAST (Cargill and Charabot), the project had a great interest, because it could develop “clean” industrial processes for extracting and exploiting plant material without organic solvents. This large-scale consortium on green chemistry technology brought together nine partners: CVG, Ecole des mines de Paris, Autoclave France (Oise), Cargill, Charabot (Alpes-Maritimes), CEA, Escom (Oise), PCAS (fine chemicals, Essonne) and Syral, a subsidiary of the Tereos sugar group. With a budget of 2.5 million euros over three years, this project was supported by the regions of Picardy and PACA, Oséo and the State for three years starting in 2010.

5-3. Start-ups and Incubator

Compared with other clusters, the pole PAST has not created many start-ups. Although the cluster in cooperation with local authorities (Grass city, PACA region etc.) set up some devices (Maison d’innovation, Innovagrasse incubator etc.) which could help any person build new enterprises, there were only a few start-ups. An exception is the incubator, OBRATORI that L’Occitane, one of the major actor companies in the cluster has set up in Marseille. We will present the story of OBRATORI as well as some of the others which spun off from the research activities supported by the pole PAST.

A) Immunosearch

ImmunoSearch⁽³¹⁾ is an R / D service company in immuno-toxicology dedicated to the perfume, flavoring, and cosmetics industries. This start-up results from the first collaborative research project that the pole PAST labelled in 2005. ImmunoSearch offers support for the tests and formalities required for the registration of chemical substances, which were reinforced by the entry into force of the European REACH regulation. In particular, the company has developed the alternative technology in vitro toxicology tests to avoid tests on animals. At the same time, it is a research-based company with the aim of discovering, developing, and validating new alternative toxicology tests. Immunosearch is in fact a start-up born from the encounter between private and public researchers (7 persons in total) united around the constitution of a research project on ‘the definition of biomarkers for the control of the safety of molecules used in perfumery and cosmetics’. The founder, Dr Hervé Groux⁽³²⁾ himself a former CNRS

researcher, was able to mobilize his colleagues who were all highly recognized researchers in their fields of expertise. It is a good example of a start-up build around the logics of networks: skills networks, laboratory networks, inter-individual networks and social networks.

In addition to Immunosearch, two large local groups in Grasse, Mane and Robertet – which have become shareholders of start-up – and the laboratories of the CNRS, the Inserm, the Inria, as well as the University of Nice have also participated to the consortium⁽³³⁾. The work carried out during this project resulted in the filing of 7 international patents, as well as the development of models based on the identification and characterization of biomarkers, SENS-IS[®]. This patented product is put into service under license.

B) Feeligreen

Founded in 2012, Feeligreen is based in Grasse in the Innovagrasse incubator where it works in partnership with the analytical chemistry laboratory of the CNRS and Nice Sophia Antipolis University. With support from the three competitiveness cluster PAST (Perfumes, Aromas, Scents, and Flavors), Eurobiomed and SCS (Secured Communicating Solutions) as well as the Cosmed association, this creation of company accelerated the validation of its technology and enabled it to begin manufacturing the first prototypes with local SMEs. The second stage was to negotiate partnerships with laboratories that specialise in dermatology and that are interested in its technology and in creating an industrial facility for the mass production of its medical devices. Created by Dr Christophe Bianchi, doctor in electronics, graduate of Imperial College in London, Feeligreen works on different applications of iontophoresis and light therapy in the fields of cosmetics and medicine, in order to increase the effectiveness of active ingredients by optimizing their penetration into the skin. Its team, composed of experts in microelectronics, nanotechnologies and cosmetic formulation, collaborates with the laboratories of the University of Nice and private cosmetic and pharmaceutical partners. Nine patents have already been filed and the company has received numerous awards for its capacity for innovation. In partnership with the CNRS, Feeligreen has also developed a secure autonomous system to deliver the active molecules into the skin through the implementation of a controlled current, locally and in complete safety. Its first product line, which promotes the regeneration of collagen through electro-stimulation, the Feeligold anti-ageing patch, is sold in partnership with the largest pharmaceutical and cosmetics companies. This has demonstrated its ability to implement new technologies with significant results.

C) Solidages SA.

Specialized in the development of products aimed at improving oral health and nutrition, Solidages is a successful example of the start-up based on the university research. Founded in

2011 by the professor at the UNSA and dental surgeon at the CHU, Dr Isabelle Prêcheur and Mr Cyril Sablayrolles, former HEC and serial entrepreneur, Solidages SA is positioned in the niche market of oral health and problems of nutrition. The Protibis pancake, a unique high-protein pancake intended for patients with chewing problems, was invented by the start-up, backed by the MICORALIS laboratory at UNSA, which is a pioneer in research on the senescence of oral biofilm.

This start-up piloted a project labeled by the PAST competitiveness cluster, “Cara Saliva”. Since then, Dr Isabelle Prêcheur has been working on this theme with a doctoral student. It is preparing to start a stability and biocompatibility study, with a view to obtaining authorization for the experimental use of a salivation activator tablet. Scientists are also developing a mouthwash, the active ingredient of which comes from the wild medicinal plant of Mercantour, *Solidago virgaurea alpestris*. This is now under cultivation near Grasse. The mouthwash, slightly bluish, foams because it contains plant detergents (saponins). In dry mouths, it prevents naturally occurring microscopic fungi (*Candida albicans*) from changing from a harmless rounded form to a pathologically filamentous form. With the help of her colleagues at the Institut de Chimie de Nice, a doctoral student analyzed the molecular composition of the plant. With the dental school of Glasgow, in Scotland, another student is in the process of clarifying the mechanisms of action of the plant on the receptors of the biofilm and fungi in the mouth. Tablets and mouthwash to fight against dry mouth are developed in partnership with the CHU de Nice, and should be on the market in 2 or 3 years. The two doctoral students are financed by the CIFRE contract within the framework of the collaborative project.

D) NissActive

NissActive, hosted at Innovagrass, is a very young company whose mission is to promote the wealth of nature without overexploiting it. Miss Hortense Plainfossé, founder, began her thesis in November 2016 at the Institut de Chimie de Nice, focusing on R&D of cosmetic active ingredients of Mediterranean origin for skin repair. It was financed in the form of a CIFRE contract by Laboratoires Jyta, based in Carros and specialized in cosmetic formulation. Very quickly, the first results obtained turned out to be promising, which prompted her to create NissActive in October 2017, in order to promote them beyond the simple marketing of a license and to prepare herself for a professional future in entrepreneurship. Mr Grégory Verger-Dubois, manager of Jyta, joined this adventure. Her thesis director, Dr Xavier Fernandez, should join the start-up soon. NissActive is located at the InnovaGrasse incubator and, through a collaboration contract with UNSA, has access to the laboratories of the Nice Institute of Chemistry and the Foqual master’s degree formation in Grasse. With two employees, includ-

ing a post-doctoral fellow, the start-up works in cooperation with cosmetic formulation companies.

NissActive is now developing three ingredients which have been or will be the subject of scientific publications or of patent filing. So these are not simple marketing products but effective active ingredients. Two ingredients are dedicated to anti-aging applications. They are produced by agricultural by-products, such as the aerial part of truffle oaks for one of them. The third ingredient is an active ingredient for skin repair extracted from the smooth germander. This is a local plant with many medicinal interests, but has not been the subject of any study. That's why a patent was filed last June. The next objective is to finalize toxicity tests of the first two ingredients for marketing in the first half of 2019.

E) The Case of OBRATORI Start-up Studio (interviewed in September 2019)

L'OCCITANE Group officially opened its start-up studio, OBRATORI, in February 2019. The studio is located in the heart of the Cité de l'Innovation et des Savoirs Aix-Marseille (CI-SAM), and has been designed to search for the future of cosmetics and well-being. The opening of the start-up studio OBRATORI aimed to enable new ideas to be explored and developed in a fast-moving world.

The start-ups hosted are those in cosmetics and wellbeing, as well as in the digitalisation of solutions for retail and early growth that require technical, financial, commercial, marketing or other support. The blend of product, digital and other start-ups is a must-have, according to OBRATORI, to jointly develop strong synergies of innovation and to explore new concepts, ideas, products, services and brands. The selected start-ups have to follow a support program lasting a maximum of 23 months. They can then benefit from an adapted workspace, the support of the internal resources (such as access to the prototyping laboratory, personalized advice from a dedicated team), a network of experts and mentors, and the ecosystem of L'OCCITANE Group. In order to better meet the technological needs of its incubated start-ups, OBRATORI has equipped the 950 m² space with an L 2 cellular research laboratory and a MIT compliant FabLab.

One year after the operational launch of incubator, OBRATORI succeeded in attracting 8 start-ups, not only local businesses but also Parisian businesses such as Le Rouge Français or Skinosive. Moreover, the start-up center has taken a minority stake in the 8 start-ups hosted in residence in Marseille. In fact, OBRATORI has set a policy to take a package of actions (between 50,000 and 200,000 euros per start-up) in each company. At the end of the incubation period, its position as a minority shareholder allows to monitor the company over time.

In terms of selection, OBRATORI supports early stage companies that share the values of

L'Occitane group working with research centers and universities worldwide. The incubator is on search for interesting patents to best support start-ups once they obtain an exclusive license with the university or research center. For example, the Marseille start-up Calysens, which holds two exclusive licenses, develops cosmetic products based on scientific research. This scientific project is led by Professor Levy from the Timone University Hospital in Marseille. He is working on the development of a cream against premature aging of the skin, precisely for the world of cosmetics. Likewise, the Skinosive start-up financed by Truffle Capital and incubated at OBRATORI, is inspired by a technology patented by Yale University in the United States to develop a process allowing the encapsulation of sun filters.

6. Role of Technological Platform

The pole PAST has built the two platforms as devices structuring innovative cooperative activities, so that member companies can carry out collaborative projects.

6-1. The ERINI platform (European Research Institute on Natural Ingredients)

The PAST competitiveness cluster has created in 2010, together with the professional union PRODAROM and academic partners such as the CNRS (National Center for Scientific Research) and UNSA (University of Nice-Sophia Antipolis), the ERINI platform (European Research Institute on Natural Ingredients). A public and private research partnership mechanism, the ERINI platform aimed to provide the perfume, aroma and cosmetics sectors with strategic expertise, analysis and innovation capacities on natural products. As already repeated, promoting natural ingredients is becoming one of the strategic axes for SMEs in the sector. Indeed, the trade in natural products has grown steadily for several decades and opens up important economic prospects for the aromatic and cosmetic industry. The stake in the domain is essential for the PACA region, whose economic development is based in part on the many SMEs in the aromatic sector established in its territory, and whose historical expertise in the exploitation of natural raw materials remains globally recognized. However, mastering complex natural substances is a real challenge for the industry. It therefore requires very high-level technologies and scientific skills to meet the needs for characterization, and authentication of extracts.

The ERINI platform, dedicated to the analytical chemistry of natural extracts, was created to meet precisely this need. ERINI brings together all the key actors in the academic or private research, to develop collaborative projects on natural ingredients and support the competitive-

ness of the aromatic and cosmetic sector. Its sensory analysis and training activities complete its service list.

The platform is supervised by experts and academic researchers. ERINI's technical staff includes all people with scientific training, recruited by ERINI to carry out analytical studies as part of structuring R&D projects or in the form of ad hoc analytical studies. ERINI welcomed 4 doctoral students on its premises: 2 doctoral students from the University of Nice Sophia-Antipolis who completed all their thesis work within the platform with the CIFRE contract (Bertrand Payant and IFF); 1 doctoral student from the University of Avignon who used one of the platform's analytical instruments for a few months as part of her thesis work on alternative solvents for extracting natural ingredients; 1 Brazilian doctoral student from the University of Minas GERAIS was hosted for a period of 1 year under a contract of the National Council for Scientific and Technological Development between the CNRS-UNSA and the Brazilian university. In addition, 2 experienced engineers, PhD, assigned to key analytical developments for ERINI. In each case, their recruitment was motivated by their recognized experience on the subject entrusted, both by manufacturers and by the academic world. They were remunerated by the contract signed by the pole PAST. Each year, ERINI employs many students from the universities of Nice and Sophia-Antipolis as interns.

6-2. Valréas eco-extraction platform (PEEV)

In order to consolidate the structuring action plans carried out in the sector of eco-plant extraction, the PAST cluster, with the other two poles PEIFL (European Pole of Fruit and Vegetable Innovation) and Trimatec (eco-technologies) and supported by partners such as the University of Avignon and the European University of Scents and Flavors (UESS) and FranceAgriMer, have created the France Eco-Extraction association in 2016. The purpose of this association was to promote the pooling, and the dissemination of skills, methods and tools for eco-extraction of plants and to bring out innovative and collaborative R&D projects. The objectives were clear: 1) to introduce innovative eco-extraction technologies, 2) to develop new ingredients from plant and natural materials for the agri-food, cosmetics, health and animal nutrition sectors, and 3) to realize so-called sustainable productive processes and know-how, more efficient from an economic and ecological point of view, in particular using less solvents and energy.

By building a multi-use platform, the participants put emphasis on concrete industrial actions. A real tool at the service of innovative actions of companies, this PEEV platform makes it possible to extract essential oils, aromas and molecules from plants without using chemicals,

by reducing the energy used, and by tending towards zero waste. These elements are used among others for their coloring properties, their health benefits, in agro-food products, welfare, cosmetics, or for animal health. This test bench aims to transfer scientific discoveries – resulting for example from fundamental research in the Green laboratory of the University of Avignon and the INRA which specializes in eco-extraction of plants – to industry and SMEs, for which can be carried out pre-industrial tests. If in the laboratory one thinks in terms of milliliters, at most liters, from the point of view of extraction, the platform will be able to process larger volumes and allow companies to change scale by moving to an industrial stage. Therefore, this tool makes it possible to bridge between laboratories and the world of industry.

The PEEV eco-extraction and vectorization platform is part of a complex entirely dedicated to the valorization of plants and to the facilitation in terms of technology transfer and entrepreneurship, since it is backed by an incubation center of start-up companies⁽³⁴⁾.

Notes

- (1) This article results from the comparative research Japan-France funded by the JSPS : 基盤研究 (B) 17H 02572. It corresponds to the paper F-2 in the series of French-Japanese monographs.
- (2) CEDDEM (Center for the Study and Sustainable Development in Euromediterranee) is an association bringing together several Mediterranean actors in the perfume, aromatic and medicinal plants sector. Its goal is to create a support tool for the sustainable development of Mediterranean plants and their valuation in the fields of perfumery, cosmetics, food, medicine, but also in terms of landscape, culture, and tourism on the basis of partnerships with Mediterranean countries. <http://www.ceddem.org/>
- (3) Flagship companies as Mane and Robertet (world top ten companies) in the Grasse region, Naturex in Avignon (1,700 employees worldwide), Bontoux SAS in Drôme, Technicoflor in Allauch, Ies Labo in Oraison. In 2015 Inolex (USA), world-wide manufacturer of cosmetic components, bought the company Ies LABO: “What interested this American company was our location in Provence and our industry approach which ensures total traceability of our natural products” assured one of its directors, Mr. Pierre Cappanera (La tribune dated on 02/06/2016).
- (4) Hoping to be among the laureates, the president of COSMED declared at that time to the journal Provence “We have legitimacy, an ambitious project that brings innovation, jobs and which gives a large place to cooperation between business, public research and education. We have a rich territory which can accommodate the new structure.”
- (5) The concept of Local Productive System (SPL) is an official terminology initiated in 1998 by the DIACT (ex-Datar). The SPL is a tool for considering local development. It is based on an administrative method aimed at federating, around a given trade or sector, the companies present in a territory. The challenge is to get companies to cooperate with each other. This label permits the local actors to facilitate the various administrative approaches.
- (6) The délégation interministérielle à l'aménagement du territoire et à l'attractivité régionale (Interministerial Delegation of Land Planning and Regional Attractiveness) or DATAR was a French administration working for the Minister of Territorial Development. It applied decisions taken by the Interministerial Committee of Land Planning and Development (CIADT).
- (7) According to a report, (Mendez A et al., Quelle articulation entre les pôles de compétitivité et les tissus productifs régionaux? Une mise en perspective de quatre pôles en Provence-Alpes-Côte d'Azur, le rapport du

LEST, 2008), the two SPL did not have the same degree of legitimacy within their territory: SPL in Forcalquier has a significant legitimacy among local productive actors. In Grasse, the SPL brought together some forty companies – mainly very small companies – in the aromas and perfumes sector. Until the creation of the competitiveness cluster in 2005, local policy in Grasse was organized between Prodarom (the union of perfume companies in Grasse) and large companies on the one hand, and the SPL with small family companies in the region on the other hand. However, there was no link or partnership between Prodarom and the SPL. In Grasse, the SPL “Arômes et Parfums” was therefore not very legitimate in the eyes of the largest companies and the trade union.

- (8) The Université Européenne des Senteurs et des Saveurs (UESS) (**European University of Scents and Flavors**), located at the center of Forcalquier, France, is a private **university** specialized in the study of natural **aroma** compounds, cosmetics and flavors.
- (9) This part is principally based on the report (Mandez A et al., *Ibid.*). In addition, the report goes into more details: the alliance between the professional organizations and the governor of Alpes-Maritime at the time played a decisive role in the success of project in this bid. This governor, a powerful local politician, would be later a Minister of land use planning (Ministre de l’Aménagement du territoire) in charge of DIACT. “He had decided that Grasse would have his pole....” The PAST cluster therefore benefited both from the government’s decision to expand the perimeter of the poles and from local political and institutional support relayed up to the head of State.
- (10) In the proximity area of Grasse city, there is a Sophia Antipolis scientific park – the First French Technopolis created in the 1960s – where many biotech companies such as Galderma operates. One of mystery is that the pole PAST has not succeeded in bridging between these biotech companies and its member SMEs, contrary to the initial plan.
- (11) As we will see later, this firm however has been closed in 2018. In fact, Nestlé Group decided in 2016 to close its European dermatology research center in Sophia Antipolis scientific area, at that time employing 550 employees. Originally created by L’Oréal and Nestlé, Galderma was established in Sophia Antipolis in 1981. In 2014, Nestlé took over all of the actions of Galderma, considered the largest dermatology R&D center in the world.
- (12) Created by a biologist of Austrian origin, this start-up company developed a technique allowing the artificial manufacture of human skin from surgical rejects. In 2006, it has been merged by EPISKIN, Lyon-based world leader in tissue engineering and a subsidiary of L’Oréal, which supplies Human Reconstructed Tissues to the global scientific community to support R&D activities in Toxicology.
- (13) We are not unaware of the fact that floral culture is almost non-existent today in Grasse region.
- (14) The REACH program (Registration, Evaluation, Authorization of Chemicals) would have required the evaluation of more than 30,000 substances over the next 10 years, while new regulations regarding ecotoxicity or the persistence of pollutants in the environment (pesticides, etc.) would be expected. Securing consumers has become a fact of society. The PAST pole would thus allow the industry to react, to develop new test methods and to ensure that this growing need for security is an opportunity for it and not a disaster (general manager interview).
- (15) The pole PAST having been merged in 2020 after the audit of IV labeling, the organization and form of governance have changed radically. This concerns the organization of the pole as of 2018, during our visit. (See the annual report)
- (16) The technical center, located in Manosque in the south-east of France, and created in 1993, is the research and experimentation center specializing in the development of PPAMs in the region. The association is the benchmark for aromatic plants and lavender-lavandin and clary sage. In its R&D activities, it works closely with ITEIPMAI, a national research center and the CNPMAI, a national plant conservatory. CRIEPPAM has an experimentation station. In the laboratory, in the greenhouse or in the field, the center can carry out the tests and set up nurseries for healthy plants.

- (17) UNSA (Nice and Sophia Antipolis University) has been transformed by the new French University law and now named UCA (University of Cote d'Azur).
- (18) The National Agency for the Promotion of Research (abbreviated to Anvar) is a former French public industrial and commercial establishment founded in 1967 and which merged in 2005 with other organizations supporting investment in SMEs to integrate the Oséo group, within Bpifrance.
- (19) The PRIDES (Regional Pole of Innovation and inclusive Economic Development) have been set up by the PACA region since spring 2007, in order to bring together companies from the same industry and to encourage them to cooperate. SMEs located in PACA can get access to privileged financing from the Regional Council. Less oriented towards R&D activities, PRIDES seem to correspond more to the capacities and expectations of SMEs. Innovation is only one of the five criteria retained alongside international trade, training and human resources management etc. Funded projects cannot exceed a budget of 20,000 euros.
- (20) Thus, paid services were launched such as PASS TECH (for business awareness and economic intelligence) and PASS INNOV (for innovation) in 2014, as well as PASS Durability for the assessment and control of the impact of environmental activities.
- (21) Mendez A et al. (Ibid.) noted that this CEO – belonging to the third generation of notorious local family-business – with “a charismatic personality” said “He felt he received the order of vocation for the construction of this cluster” and “his own vision of the cluster had exercised a decisive influence on its orientation”
- (22) New-York-based worldwide company, International Flavors & Fragrances Inc., provides products that consumers taste, smell, or touch. It operates through three segments: Taste, Frutarom and Scent. Taste is comprised of Flavor Compounds which are sold to the food and beverage industries for use in consumer products, such as prepared foods, beverages, dairy, food and sweet products. Frutarom segment creates and manufactures a naturals-focused suite of flavor compounds, functional foods and specialty fine ingredients. Scent segment is comprised of Fragrance Compounds, which are used by its customers in two broad categories: Fine Fragrances and Consumer Fragrances.
- (23) Firmenich SA is a private Swiss company in the fragrance and flavor business. It is the largest privately owned company in the field and ranks number two worldwide. Firmenich employs 10,000 people across 66 facilities. Major competitors include Givaudan, International Flavors and Fragrances and Symrise.
- (24) Romain Monge, « La valorisation tardive des plantes à parfum et du savoir-faire grassois au tournant du XXI^e siècle », Cahiers de la Méditerranée, 92 | 2016, 255-270.
- (25) BECATTINI G, and SENGENBERGER W. (eds.) (1990), *Industrial Districts and Inter-firm Co-operation in Italy* (Geneva, International Institute for Labour Study)
- (26) In the survival of the pole PAST, we can see the personal influence of Mr. Christian Estrosi, Governor of Alps-Maritimes (Grasse), powerful politician at the national level and Minister of Industry – minister in charge of the implementation of the poles of competitiveness policy- in the Sarkozy government.
- (27) the DGCIS (General Directorate for Competitiveness, Industry and Services) and DATAR (Interministerial Delegation for Regional Planning and Competitiveness)
- (28) See also to the note xvii
- (29) Under its new identity unveiled on June 23, 2020, Innov'Alliance is indeed the result of the merger of the TERRE and PAST competitiveness clusters. It now wants to generate, by 2022, 300 R&D projects in four business sectors: food, natural ingredients and food supplements, cosmetics, and aromas and fragrances.
- (30) Medium-sized historical company (140 year-old), located in Grasse, has focused on the treatment of local aromatic raw materials such as jasmine, rose, violet leaf or mimosa, then widen its expertise on imported raw materials such as patchouli, tonka beans, ambrette, styrax, etc. The historical site of the company is now completely dedicated to the production of natural ingredients and a large investment plan is now focused on the expansion of distillation and extraction units, but also on innovative methods. Separately-located fragrance production plant features a modern Roxane automatic compounding robot, capable of precisely mixing 800 different ingredients to an accuracy of 0.01 g, combined with a state of the art Colibri automatic blending unit.

- (31) For a detailed presentation of the company see their website <http://www.immunosearch.fr/>
- (32) Dr. Hervé Groux is a CEO, CSO, with experience and international renown in Immunology. After being ‘Director of Research’ at the French CNRS, he created two Biotech companies in France, TxCell and ImmunoSearch. He is also a preclinical consultant for pharmaceutical companies. His actual position is CEO, CSO at ImmunoSearch.
- (33) the Institute of Molecular and Cellular Pharmacology (IPMC, CNRS, UNSA), I 3 S (UMR CNRS and UNSA), INRIA, and SkinEthic SA.
- (34) the French startup ID 4 Feed, specializing in the production of herbal additives and plant extracts, has just taken a key step in its development by acquiring the Valréas eco-extraction platform (PEEV) where it plans to invest 1.2 million euros in 2019 in order to develop original and innovative technologies for the extraction and galenization of plant extracts.

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