

Eco-innovation and Economic Performance in Industrial Clusters: Evidence from Italy

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Abstract—The article aims to investigate the presence of a correlation between eco-innovation and economic performance within industrial districts. The case analyzed in this article is based on a study concerning a sample of 54 Italian industrial clusters entitled "Eco-Districts" that has compiled a list of the most eco-efficient districts at the national level. After selecting two districts, this study assesses the economic performance of the last three years through the analysis of trends in four indicators. The results show that only in some cases there is a connection between eco innovation and economic performance.

Keywords—clusters, industrial districts, eco-innovation, economic performance.

I. INTRODUCTION: ECO-INNOVATION AND INDUSTRIAL CLUSTERS

AN increasing amount of research indicates that geographic proximity of economic activities enables higher levels of productivity and innovation. Clusters, i.e. geographically co-located producers, suppliers, service providers, research laboratories, educational institutions, and other institutions in a given economic field, are important drivers of dynamic regional economies [1]. Already in the late 19th century, the economist Alfred Marshall [2] investigated industrial districts. He identified externalities that were caused by the local availability of qualified labour, a growing demand in the location and a high specialization of companies at different levels of the values chain. He came to the conclusion that the industrial atmosphere contributes to the improvement of social and economic performance of the companies located in the districts [3,4].

Since then, but especially since the late 1980s, the phenomenon of territorial agglomeration has received increasing interest among scientists, business leaders and politicians.

The European Cluster Observatory carried out, for the first time, a quantitative analysis of European clusters based on a fully comparable methodology. This shows that

clusters are an important part of the European economy. Based on his analysis, it can be assumed that roughly 38% of all European employees work in enterprises that are part of clusters. In some regions, this share goes up to over 50%, while in others it drops to 25%.

The relation between clusters and innovation is clearly complex. A comparison between the regions having relevant industrial clusters carried out by the Regional Innovation Scoreboard [5] shows that 7 out of 19 regions having a strong presence of clusters are among the top third most innovative regions. The RIS benchmarks 208 European regions on the basis of 7 indicators, including human resources in science and technology, patent applications and employment in medium-high and high-tech manufacturing. This result suggests that a positive correlation may exist between the strength of regional cluster presence and regional innovation performance.

If many studies analyzed how the "milieu" of the industrial districts could improve the economic performance of the companies there located, the connection between this aspect and Eco-innovation is not still in-depth investigated. Surely, it has been demonstrated that the presence of a large number of SMEs in the industrial clusters increases the environmental relevance (and impact) of this kind of agglomeration.

A number of studies attempt to provide 'insights' into particular environmental problems from SMEs for specific countries. For example, a report [6] estimated that SMEs accounted for 60% of total carbon dioxide emissions from businesses in the UK and concluded that there was substantial room for improvement in energy efficiency and emissions reductions among SMEs. Again, estimates from the Netherlands and the United Kingdom suggest that the commercial and industrial waste from SMEs represent on average 50% of the total. These studies further support the claims that SMEs can exert considerable pressures on the environment. A recent survey in France [7] showed that SMEs could be responsible of 40-45% of all industrial air emissions, water consumption and energy consumption, as well as 60-70% of industrial waste production.

Although some SMEs have taken the lead in managing their own environmental impacts in a well structured way, the majority of SMEs are still characterised by a lack of awareness concerning their environmental impacts and, especially, the ways in which such issues can be effectively managed. A recent and well documented UK study by NetRegs [8] shows that only 7% of businesses in the UK believed they undertook activities that could harm the environment, but when prompted with a list of activities, this figure rose to 41%. A survey among Polish SMEs [9] shows that 86% of the interviewees declared that their

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companies do not have a negative impact on the environment or that the impact was not significant at all.

A survey carried out by the Institute of Directors [10] reported that members involved in sectors such as construction, mining, transport or manufacturing that are 'heavily exposed' to environmental regulation showed relatively low levels of awareness: 59% of members in manufacturing knew 'not much' or less; for construction, mining or transport, the corresponding figure was 52%.

For the reasons mentioned above, many industrial districts are developing common activities to move together towards Eco-innovation, by applying methodologies and tools that are resumed with the term "Cluster Approach" [11].

Networking and cooperation between organisations emerges from several studies and empirical evidences as one of the most important factors fostering the diffusion of Eco-innovation. Many authors [12,13,14] emphasise that working with groups of companies is a useful and efficient way of adopting Environmental Management Systems particularly for SMEs.

Moreover, the European Commission has recently confirmed the key role of networking for overcoming the constraints and barriers for EMS adoption between SMEs [15]. The Commission has, in fact, highlighted its commitment to promote and encourage the introduction of eco-innovation in industrial clusters or districts of SMEs, using specific cluster- or supply chain-oriented approaches. Taking into account these indications of the European Institutions, in the recent years some international projects have been developed to foster the "Cluster Approach" to disseminate eco-innovation in industrial districts.

An interesting on-going initiative is the ECCELSA project ("Environmental Compliance based on Cluster Experiences and Local Sme-oriented Approaches"), co-funded by the EC with the Life+ Program. The project started in January 2009 and involves ten clusters of SMEs located in five Italian Regions (Toscana, Lombardia, Liguria, Lazio, Emilia Romagna) and it is coordinated by Sant'Anna School of Advanced Studies. The Eccelsa project aims at developing the "cluster" approach, so far applied only to some specific environmental policy contexts, to make it a general and widely applicable method, capable of improving the local and territorial governance for sustainability and the environmental performance of the SMEs operating in the clusters.

Another interesting project co-funded by the CIP-Ecoinnovation Programme is named IMAGINE (Innovations for a "MAde Green IN Europe"). This project aims to disseminate Emas certification system, and to the Ecolabel for environmental quality in four Tuscan production districts in the fashion industry thanks to a "supply chain approach". The project's goal is to promote the sustainability and traceability of the fashion industry, highly important in the regional economy.

II. HYPOTHESIS AND METHOD

This article aims to investigate the existence of a correlation between eco-innovation and economic performance within industrial districts.

Specifically, the article takes as reference the results of a study entitled "Eco-Districts" carried out by research

Vol. 4, No. 6, 2010 and universities in Italy in 2009, which led to consider the factors of eco-innovation adopted in a sample of 54 Italian industrial districts.

Based on a set of objective and reproducible criteria, the study has compiled a list of the most efficient and active industrial districts in terms of eco environmental compatibility. Inspired by this ranking, the authors have selected two districts in the same industrial sector (food), classified in the study with a different rate of eco-innovation, which are respectively the third (District of Langhirano) and the twenty-ninth (District of San Daniele) according to the classification of Eco-Districts. The food sector was selected among the 18 present in this study because it had 7 different districts at different levels of rankings, thus highlighting types of "environmental commitment" significantly different from one experience to the other.

Moreover, among these seven districts the attention focused on the Districts of San Daniele and Langhirano because they are very distant in terms of marks obtained, and compared to the present position achieved from other experiences in the ranking.

These two industrial clusters have been subject to the investigation of their economic performance in order to verify the existence of a correlation between eco-innovation and competitiveness in the two areas covered by the article. The reference methodology applied for conducting this research is that of the comparative "case study" analysis.

The economic performance of the districts selected have been evaluated based on the analysis of trends for the years 2006, 2007, 2008 for the following economic data: number of companies, number of employees, production capacity and export.

III. THE "ECODISTRETTI" STUDY

The study "Eco-Districts" assessed the environmental performance of 54 Italian productive districts representing 14 regions and 18 sectors of production [16]. The survey was conducted by the research institute "Ambiente Italia" in cooperation and support of some Italian Universities, and endorsed by the Network Cartesio (Rete Cartesio), a network established by the Regions of Emilia Romagna, Lazio, Liguria, Lombardy, Tuscany and Sardinia that, since its birth in 2007, aims to promote environmental management and eco-innovation in industrial districts and clusters.

The survey was conducted for the first time in 1999, and it was updated yearly until 2003.

In 2009 it reached its fifth edition when the sample of the survey was broadened from 33 districts to 54. The widening of the sample is related to the increase that the phenomenon of districts is having in Italy, going from about 150 experiments in 2001 (ISTAT data), to more than 200 (data Club districts). The information on the level of eco innovation, as existing in the districts, were obtained through interviews conducted with key actors in the local economy, such as trade associations, consortia among firms and public institutions.

The results of the study, in addition to having been presented at numerous national and international conferences, have been subject of a publication "ECO-DISTRICTS 2009 Made "Green" in Italy: the

environmental policies of local production systems and of industrial districts".

The districts surveyed were chosen for their commitment, albeit to varying degrees, in reducing the environmental impact of production cycles that characterize the system of local enterprises. The data have emerged from the interviews, and refer to the period 2005-2008.

Little information was gathered from published references, or requests aimed at professional national organizations and relevant institutions. The environmental performances of each production system were evaluated on the basis of 7 assessment criteria (Table 1) applied to assess the level of eco innovation in every cluster. The choice of indicators, the allocation of weights and the scoring was carried out by the Scientific Technical Committee of the Network Cartesio (Rete Cartesio), based on the experience and knowledge arising from the activities implemented in the regions of the network. For each evaluation criterion, specific scores have been established on the basis of eco-innovation in the Cluster.

TABLE I
EVALUATION CRITERIA OF ECO-INNOVATION CLUSTERS ADOPTED BY THE STUDY "ECO-DISTRICTS"

Criteria of eco-innovation	Description
1. Infrastructures and services for environmental and energy management	Existence and functioning of an comprehensive environmental plant (water treatment, dual industrial water supply, waste treatment, energy production) at the service of the industrial enterprises in the district, managed by private or public institutions. An higher assessment has been granted to those plants which realize a reduction in the use of Service centers (technical assistance and consultancy on environmental innovations) for the companies present in the district.
2. Dissemination of environmental technologies (BAT)	Presence or absence of cleaner technologies (BAT) based on IPPC, and possible identification of specific initiatives of companies.
3. Environmental Certificates/Registrations	Number of companies certified according to ISO 14001 or EMAS registration (Regulation EC No 761/2001) compared to the overall number of companies in the district, and to the number of those certified at the regional level.
4. Trade marks, labels and product policies	Presence of companies using the technique of life cycle analysis (LCA) to assess the environmental impact of products or whom have acquired an environmental quality label on the product.
5. Environmental Controls	The presence or absence of programmes of control, and systematic environmental monitoring is often a spur to the introduction of innovative tools of environmental management, besides to being an important factor for control of the environmental aspects generated by SMEs.
6. Environmental conflict	It assesses the presence in the territory of the phenomena of conflict-related environmental aspects, as well as the impacts of companies in the typical local production system.

4. No. 6, 2010 of innovative instruments of environmental management	It was examined whether in the district there have been implemented or are under implementation initiatives which are public or private, related to the promotion of tools for business environmental innovation.
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Each criterion is divided into several indicators which have been assigned a score that varies according to their relevance and innovation. The set of indicators has a score of 10, the value being associated with each evaluation criterion. In the table below is reported an example of scores that were awarded in the case of the evaluation criterion related to the presence of BAT (Best Available Techniques).

TABLE II
EXAMPLE OF SCORING WITH THE CRITERION "PRESENCE OF BAT"

Description	Score
Absence of BAT	0
In the district there are sources of renewable energy	2
In the district there is production of energy from co-generation	2
In the District at least one BAT has been implemented	2
In the District at least 2 BAT have been implemented	4
In the District at least 3 BAT have been implemented	6

The fulfillment of one or more of these indicators allows the district to acquire the related score, up to a maximum of 10 (the value of the criterion). This score adds up to those achieved in relation to other factors of eco-innovation, structured similarly to the example above. This procedure determines the overall score achieved by each district.

A different weight has been assigned to determine the final evaluation of the various criteria. Considering the whole spectrum of criteria, the total score that a production district can receive ranges from a minimum 0 to a maximum of 100.

As follows, is indicated the algorithm applied to the assessment of the level of eco-innovation in the districts, or by the arithmetic weighed average according to which the values for each criterion (C followed by the identification number of each criterion in the table) before being added up have been multiplied with their respective weight (14 or 15) to their purposes.

The value of SC (Score Criterion) under each criterion has been obtained by summing the marks obtained by each district compared to the indicators (In) forming the basis of measurement:

$$PC.1 = \sum In$$

The total value was divided by 100, being this the total weight of weighting.

$$TOTAL = \frac{[(P.C.1) * 14 + (P.C.2) * 14 + (P.C.3) * 15 + (P.C.4) * 15 + (P.C.5) * 14 + (P.C.6) * 14 + (P.C.7) * 14]}{100}$$

Based on this evaluation system a ranking of the 54 Italian districts investigated has been drafted.

TABLE III
DISTRICT RANK

Position	Region	District	Industrial sector	TOT ranking
1	Toscana	Capannori	Paper production	78,3
2	Emilia Romagna	Sassuolo	Ceramic production	75,9
3	Emilia Romagna	Langhirano	Food	73,1
4	Friuli VG	Livenza	Forniture	64,3
5	Veneto	Arzignano	Tanning	61,5
6	Toscana	Prato	Textile	60,0
7	Toscana	Santa Croce sull'Arno	Tanning	59,8
8	Emilia Romagna	Parma-Reggio Emilia	Agri-food	59,7
9	Liguria	Val di Vara	Agri-food	58,3
10	Veneto	Treviso	Forniture	56,5
11	Campania	Agro Nocerino	Agri-food	52,4
12	Piemonte	Biella	Textile	51,9
13	Piemonte	Cusio	Mechanical	51,2
14	Campania	Solofra	Tanning	50,6
15	Toscana	Carrara	Mining marble	48,3
16	Marche	Pesaro	Forniture	47,4
17	Lazio	Civita Castellana	Ceramic production	47,1
18	Veneto	Belluno	Glasses	46,8
19	Veneto	Verona	Forniture	46,3
20	Friuli VG	Manzano	Forniture	44,3
21	Umbria	Marsciano	Forniture-Mechanical	43,9
22	Veneto	Murano	Glass	42,9
23	Basilicata	Vulture-Alto Bradano	Agri-food	42,7
24	Lombardi	Serico-Comasco	Textile	42,6
25	Toscana	Poggibonsi	Forniture	42,6
26	Veneto	Rovigo	Fishing	39,2
27	Lombardi	Valli Bresciane	Mechanical	37,9
28	Liguria	Imperia	Agri-food	36,4
29	Friuli VG	San Daniele	Food	35,5
30	Toscana	Lucca	Footwear	34,8
31	Lombardi	Gallaratese	Textile	34,7
32	Sardegna	Calangianus	Cork production	34,4
33	Lombardi	Lecco	Mechanical	34,2
34	Emilia Romagna	Mirandola	Biomedical	34,1
35	Lazio	Roma-Viterbo-Latina	Ship Building	32,8
36	Lombardi	Brianza	Forniture	31,8
37	Friuli VG	Maniago	Mechanical	31,4
38	Puglia	Casarano	Footwear	31,4
39	Basilizata	Matera	Forniture	31,3
40	Veneto	Vicenza	Goldsmith	31,1
41	Piemonte	Valenza Po	Goldsmith	30,1
42	Emilia Romagna	Carpi	Textile	29,7

As one can see from the table, the first three positions are occupied by the paper District of Capannori that earned a score of 78.3 out of 100, from ceramics industrial district of Sassuolo (75.9) and by the local food production system of Langhirano (73,1).

The District of Capannori is the most important cluster of Eu paper production, here are located the major multinationals operating in this sector. Since many years it pursues initiatives to reduce the environmental impact of businesses located in the territory, and for the introduction of eco-innovation.

In recent years a local "Promoting Committee" coordinated the efforts of all public and private actors towards environmental sustainability. Moreover, in the past years the district implemented a strong promotion of environmental management systems, and certifications in accordance with ISO 14001 and EMAS, as important elements to focus on. The process began with the participation of the District of Capannori to the project Life-Environment PIONEER "Paper Industry Operating in Network: an Experiment for EMAS Revision". This led to the EMAS registration of 23 companies and obtained a recognition by the National Committee that handles the application of the EMAS Regulation in Italy (EMAS certificate for homogeneous production areas).

The experience of Sassuolo focused especially on the promotion of technological innovation. In the last few years significant investments have been carried out, enabling the district to acquire very innovative equipments in the re-use of waste processing of ceramics and wastewaters. This procedure has been implemented even apart from the introduction in the District of systems for the re-use of exhausted lime, cogeneration plants and more efficient systems for the recovery of steam. The presence of innovative technologies has been combined with the dissemination of environmental certification and improvement of the control systems.

The District of Langhirano ranked third by investing primarily in social policies to prevent the emergence of environmental conflict situations.

The analysis of results shows that in two regions of the Network Cartesio (Rete Cartesio), being them Tuscany and Emilia Romagna, focus 6 out of the 10 practices that the

report of Eco-Districts considered as the most significant, for 4, 2006-2010. In 2006, data have been collected, to analyse if there is a link between eco-innovation and economic performance.

IV. RESULTS

The districts of Langhirano and San Daniele are the two clusters where our analysis focused on the economic performance and the connections between it and the environmental performance. Langhirano is one of the districts that, with respect to the classification of "Eco-Districts" was among the national experiences so much more involved in eco innovation.

Differently, the District of San Daniele classified in a lower position in the standings (29th place). These two productive contexts, similar in their production process (identical final product) and impacts on the territory, followed a different path in promoting eco-innovations to improve their sustainability.

The District of Langhirano specializes in the meat processing sector, mainly in the production of ham. It is also known as the Food District of "Prosciutto di Parma", it comprises a total of 18 municipalities and it is coordinated by a consortium that manages the regulatory framework of the specification for the recognition of the Denomination of Protected Origin. The entire productive process conforms to the regulatory framework of the specification undersigned by companies, carried out in the so-called "traditional area of production" in which there are around 200 businesses employing 2500 people.

The sensitivity of local firms towards environmental issues has been developed thanks to two service centers serving to favor the information and training on issues such as environmental legislation and technological innovation in the food sector. Eco Innovation in the district is strengthened even more thanks to the widespread presence of environmental certifications such as ISO 14001 (35 firms) and EMAS (33), also stimulated by information and awareness initiatives conducted in collaboration between public and private actors.

The District of San Daniele is characterized by the production of ham that takes its name from the homonymous town of San Daniele in the province of Udine. The district comprises 6 municipalities, although according to the regulatory framework of its specification for the achievement of the DPO label, the production of this type of salami is possible only in the town of San Daniele. The ham sector is the predominant sector of the District with 30 companies. Overall, the district consists of around 100 companies involving about a thousand employees directly, and another 700 indirectly [16].

In respect to eco-innovation in this district, there is a collective water purification and waste treatment plant, while the competent authorities have set up initiatives to promote a co-operative waste separation and awareness policies on environmental issues. However, the district has achieved a quite low score in the classification of "Eco-Districts". As mentioned beforehand, in the case of these two districts the data on trends of economic performance in

The economic analysis of the two districts has enabled us to compare their environmental performance trying to understand how the economy has "responded" to two contexts, similar in their production process but that have invested in a different way in reducing their environmental impact. The first aspect considered is the development trend in the number of active enterprises. In 2008 in the District of Langhirano there were 164 enterprises, 4.3% less than in 2005. The District of San Daniele was considered as a whole, consisting of 106 companies belonging to the area of meat processing, food, dairy and beverage industries. Of these 106 companies 30 come from the town of San Daniele and are members of the consortium for the protection of the homonymous ham.

In the following chart is compared the trend of growth in the number of firms in the two districts over the past two years, taking 2006 as base year (t0) in the context. It can be noticed that in 2008, in the case of Langhirano, there has been a 2.4 % reduction in the number of active companies, that continued in 2008 with a decrease of 1, 8% of firms.

The district of San Daniele, instead reports an increase in the number of firms by 2.7% in 2007, and 1,3% in 2008.

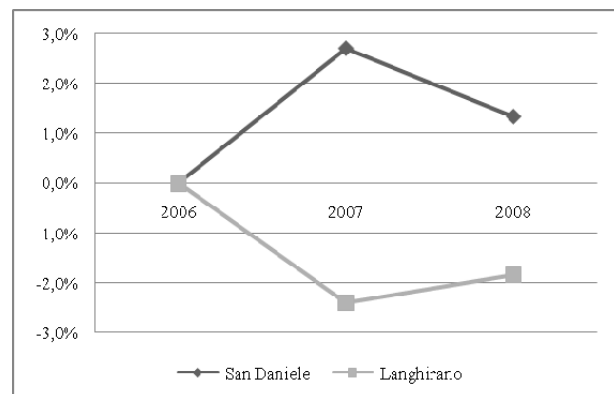


Fig.1 Number of Companies trend. (Source: San Daniele Prosciutto di Parma Consortium and Districts)

A first observation of the graph shows that the excellence in eco-innovation of Langhirano did not produce beneficial effects on the trend in the number of companies. However, it is noticed how in the last year analyzed the trend of that district is growing strongly, while that of San Daniele is in decline. This situation has partially offset the gap existing in the beginning of 2007.

Another factor considered in the analysis of economic performance of the two districts has been the employment trend. The employment trend allows to understand how the district responded to changes in economic and market developments that have characterized the recent years, and how the occupational level of the district has been affected by the subsequent changes.

The companies present in these districts are of small and medium size. in the case of Langhirano there are about 3.000 employees working in the manufacturing sector of ham. San Daniele is largely made up of small enterprises (2-5 employees), whereas there are only 3 companies with over 50 employees.

The employment trend in the District of Langhirano was stable, while the same indicator showed a negative trend during the same period in the context of production of San Daniele. In 2008 there has been a reduction in the workforce by 21.3%.

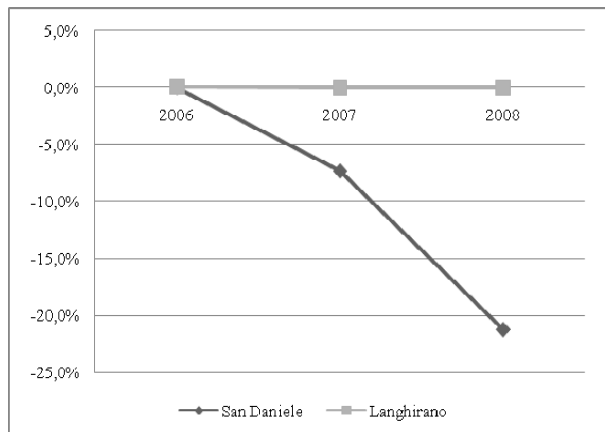


Fig.2 Number of employees trend. (Source: San Daniele Prosciutto di Parma Consortium and Districts)

In the graph it is clear that despite the decline in the number of companies highlighted by the chart above, the District of Langhirano managed to maintain stable employment rates. Although there may be several variables influencing this result, in this case, in respect to the goals set by the research, it is noticeable a correlation between eco-innovation and ability to maintain employment.

Due to data availability in the next graphs is reported that the reference standard for the District of San Daniele is composed of 30 companies, making up the Consortium of San Daniele Ham, deemed representative of the whole district. The District of Langhirano was instead taken as a whole, ie. 164 companies members in the Consortium of Parma Ham.

The production of the two districts has significantly different dimensions also given the large number of companies. In 2008, in the District of Langhirano were produced 9,771,000 hams, while in the one of San Daniele 2,756,379. During this period the productivity of the two districts has been positive with an important result achieved especially in 2008.

Since 2007 Langhirano has registered a trend of growth in its production by increasing the number of the hams being produced of almost 1%. In 2008 the figure has continued to be positive and the district has achieved an increase of 2.6% in the amount of ham being in the market. Same trend for the 30 firms in the District of San Daniele for 2007 which recorded a growth around 1%, but sharply increased next year when the production was up by 2.9%.

Even in this case there is not a substantial difference between the two districts, both have maintained over time a trend of positive growth.

As it regards the data of exports, in 2007 the District of Langhirano recorded an increase of over 9% over the previous year. In that year of reference there were nearly 2 million hams exported, worth a total of 180 million euros. Exports accounted for 22% of such annual production of Parma ham, a data particularly significant when compared to the national average of the food industry, which stands at

16%, 2010 a market share of 65% the EU still absorbs the bulk of exports, although the share of non-European countries is growing rapidly and has significantly exceeded the half a million pieces.

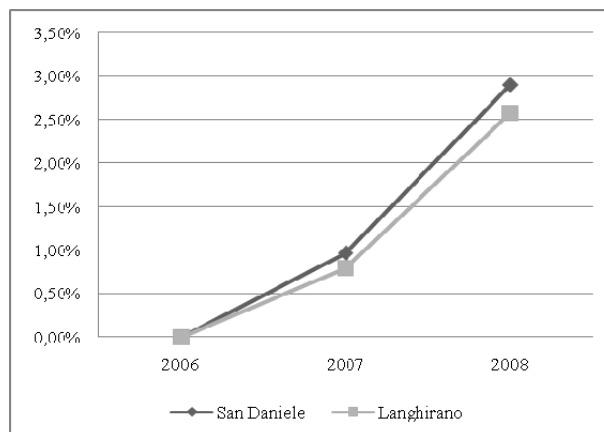


Fig.3 Production (Source: San Daniele Prosciutto di Parma Consortium and Districts)

This positive trend was interrupted in 2008 with a loss of 2.7% of exports related mainly to the reduction of sales in France and in the U.S.

For the Consortium of San Daniele exports account 15% of its production. The main foreign market is France that is targeted for 40% of exports, then Germany and the Benelux. Countries outside Europe represents 29% of exports, of which the U.S. Grant 13% and Switzerland, Japan and Australia respectively 3%.

In 2008, the contraction in the worth of orders in the European and international markets for the San Daniele ham was around 12%.

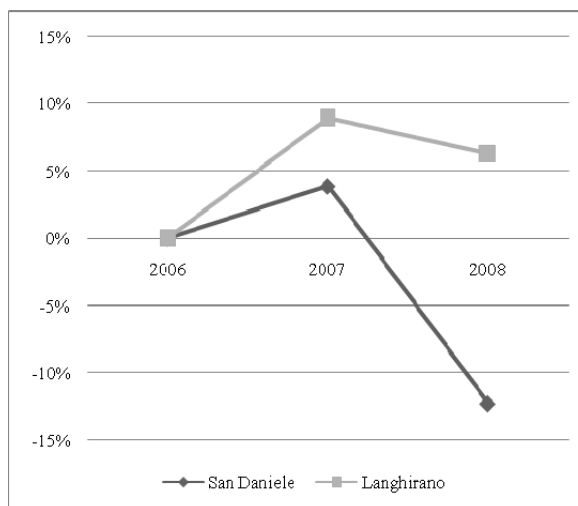


Fig.4 Export. (Source: Consorzio Prosciutto di San Daniele and Prosciutto di Parma Consortium)

In the case of exports, Langhirano falls from a level well above the district of San Daniele. By linking this data to the level of eco-innovation of the two districts, it can be assumed that some foreign markets in which the production of Langhirano might have taken account of the environmental initiatives implemented in the district and rewarded it by increasing its worth in orders.

V. CONCLUSION

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The comparative analysis carried out on the two districts reveals that there are controversial evidences concerning the link between Eco-innovation and economic performance. It should be considered that the study refers to a period of economic downturn, making it even more difficult to assess if and how the efforts carried out by each district (to a different extent) were able to sustain the economic trends shown by the main performance indicators.

A first qualitative conclusion can be drawn with respect to the better performance of Langhirano in facing up to the demand crisis (especially as concerns exports) and to the capability to preserve occupation in the district. This might be a consequence of the higher investments made in developing eco-innovation (i.e.: creating new opportunities and even new jobs connected to environmental management) as well as of the better response to the higher environmental sensitiveness of foreign consumers.

This is counterbalanced by the fact that Eco-innovation might have contributed to raise the economic difficulties of the local companies by increasing environmental compliance costs and resource inputs costs. This might explain the decrease in the number of companies, as compared with San Daniele, in the first year of the study.

In more general terms, the collected evidence emphasizes that Eco-Innovation can strengthen the resilience of those companies of the district that, in the longer run, are able to upgrade their managerial and strategic behavior, so to align with the most innovative competitive challenges (including environmental excellence).

There is no clear signal, though, that ranking higher in Eco-innovation directly produces economic advantages on the market and benefits in the production efficiency. All in all, the comparison between the two district still leaves the question open on how Eco-innovation can be valorized and fully exploited by a district on the competitive arena.

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