

THE ECONOMIC ANALYSIS OF THE PAPER AND TEXTILE MANUFACTURING AND PLANT-FLOWER GROWING DISTRICTS IN TUSCANY

The aim of the study is to analyze the economic and social aspects of the paper, textile and plant-flower growing districts.

The starting point is a general outline/of the industrial district paradigm, in the sense of a local context characterized by a concentration of small and medium size businesses. These specialize in various phases of a common production chain in which the high level of integration among economic actors (enterprises, families, institutions) comprises one of the main factors of endogenous activation and economic innovation in the area.

In order to explain the potential social, economic and environmental connections that may develop within the districts and then among the districts, we examined the main features of the social and economic structure. To do this we used the following outline: 1. analysis of the main macroeconomic (GDP, jobs, consumption of goods and services) and microeconomic (businesses, number of jobs in each) indicators; 2. a description of the three production chains under review; 3. description of the main management framework with reference to environmentally significant industrial services (economic and financial indicators relative to the integrated water services, waste cycles, energy consumption and gas supply).

The review of the features of the three local systems revealed that each has a very significant role in the regional economy.

The Prato system was, and still is, the industrial organization model which, more than any other, has distinguished the process of economic development in Tuscany since the 'sixties. It produces approximately 7% of the regional added value and is typical of the textile district. This sector, in fact, creates 28% of the local added value.

The Lucca system is the birthplace and home of yet another major regional industrial district - paper manufacturing. The industrial organization model in this sector and area have undergone changes that have modified its original nature.

Specifically, with respect to the original predominance of small firms, it is now comprised of different types of businesses. In the realm of tissue production there are more large local groups that have vertically integrated the various manufacturing phases, while many multinationals have entered the field of corrugated cardboard production. Benefiting from the economies of agglomeration they have been mainstreamed into the district system using forms of decentralization through outsourcing technological phases to small, specialized firms. Currently the Lucca system produces 5% of the regional added value and within that context, paper manufacturing accounts for 15% of the total.

Along with the Lucca and Prato systems, the local system in the Pistoia district is part of a particularly dynamic socio-economic context with a highly developed manufacturing sector specializing in wood, furniture and

textiles. On the whole it produces 4% of the region's added value. It is, however, most significant in the field of plant-flower growing and the district enjoys the lead position in that sector.

These three systems are part of a particularly dynamic region in economic terms. They have the highest regional growth rates and prosperity levels (the disposable income of the families is among the highest in all Tuscany).

However, as we have mentioned, along with a growth rate that reached its maximum in the year 2000 thanks to the performance of the three districts' manufacturing and production activities (specifically the mechanics which is strongly tied with both Prato's textile and Lucca's paper industries) there is also a great deal of pressure on the environment and area in general. High energy consumption on the part of the textile and paper industries, the production of particularly polluting reflux, the use of chemicals and pest control products in agriculture produce costs that are often not taken into account in the production of local and regional wealth.

An integrated vision of environmental and productive topics

Over the past few years, there has been a growing awareness of the environmental impact of socio-economic activities. However, the environmental policies that have derived from them have led to the drafting of standards, projects and action plans that are still highly sectorial and fragmented. Certainly, in order to achieve greater

integration and coordination of environmental protection we need to make a direct effort to build information systems that make it possible to outline environmental pressures and impacts and describe the processes that are behind it all.

From this viewpoint, the current general framework of the three Tuscan systems in the textile, paper and plant-flower growing sectors wants to contribute to the in-depth and specialized study of the integration of the economic and environmental factors that characterize the three systems, conducted within the context of the CLOS D Project.

This project seems to embrace the guiding principles of industrial ecology that includes *closing the circle*, as introduced by Barry Commoner (1972). This phrase is used to express the concept of a circular economy and to assimilate the functioning of the economic system into the natural ecosystems. The importance of applying concepts of the ecological systems to the economy lies in the possibility of transferring and interpreting - by each actor - the economic phenomena, the ecological law on the basis of which there is no refuse and that all wastes are considered the intermediate products of an endless sequence of productive cycles. The point is very clear: waste can no longer be considered in a single, dissipative way. It must be viewed in a context of reutilization, recovery and productivity that can lead to a significant limitation of the impact associated with the final phase of disposal.

Today, technological advances make it possible to proceed with increased reutilization of wastes as intermediate products in countless ways and to rationalize the use of natural resources and energy.

These new eco-industrial production techniques must become widespread for the organization of industrial processes, reproposing *mutatis mutandis* the conditions of the natural ecosystems: the methods of transforming material and the relations among the entities comprising the system.

The road to follow in an attempt to develop this type of behavior at the system level can be traced to the cascade use of materials and energy, i.e. to using materials and energy in sequential applications that require gradually lower and controlled properties and to the issues of energy recovery and recycling.

A system approach, however, must be flanked by actions at the corporate strategy level. Over the long term an ecological approach to business cannot be separated from the internalization of environmental pressure factors. The costs of environmental degradation must be assessed and financed through appropriate tools. Coordinating environmental policies (along with the respective fiscal policies) must aim at identifying the subjects that create pressures and finding the tools for eliminating or limiting them.

Environmental costs are rising rapidly. This means that a more general issue of environmentally sustainable economic growth in the sense of a public asset must be tackled together with a specific issue company

competitiveness. After having sought total quality in techniques and products (eliminating wastes and inefficiencies) and the *just-in-time* (elimination of inventories), the next formula for increasing company qualitative competitiveness will be industrial ecology (minimizing environmental costs).

The research efforts in this field already offer cognitive, informative and hence innovative opportunities, transformation and integration of actions. The hoped-for marriage of business and ecology can find an ideal context for growth and development in the three local systems. Their economic take-off has been characterized by the interaction of all the local, public and private actors. This innate synergetic ability can lead to the development of another step towards a more advanced form of the local business system that is more aware of the environmental cost of growth.

Environmental Issues in the Tuscan Development Model

The environmental question linked to the regional economic system has a peculiar character. We must note that it is most significant in the more industrialized areas in the Arno basin and along the coast. Alongside of this large area there is a significant portion of the regional territory which, because of its own developmental history, has remained outside the process of light industrialization and thus kept its environmental quality nearly intact.

Thus, we must reduce the negative effects that have come about in the former and enhance the positive ones that have been maintained in the

latter. If the industrialization process left an evident mark on the territory through the spread of industrial areas and the direct impact on businesses, it is also true that the overall impact produced by the typical system of small and medium size enterprises was - and still is - with but few sectorial exceptions, still less drastic than what we see in other industrialized areas of the country.

On the other hand, landscape conservation that characterizes areas excluded from the industrial environmental deterioration due to gradual depopulation has often been flanked by a gradual depopulation of those places.

This statement is aimed at enhancing all efforts at integrating environmental policies. Only an integrated overview of the problems can make it possible to correctly assess the effects. The Tuscan industrial districts are an important example of relatively self-contained systems, with interchanges among families, businesses, institutions and the area within which we can develop an integrated eco-industrial approach. Light industry, versatile specializations, product diversification, local participation, concertation with the various institutional actors and technological innovation should be the ingredients for promoting the quest for greater efficiency and competitiveness under economically sustainable conditions.

The CLOS D Project provides a first opportunity for explaining the goal of sustainability through the reproduction of the district model's strong

points. The Project aims at verifying the opportunities for eco-industrial integration within the context of the local systems.

The routes towards integration were designed by envisioning consistent material flows. Specifically, we identified three possible scenarios for material reutilization and interchange:

1. reutilization of textile flock and paper pulper to produce sludge that can be used as corrective fertilizer in Pistoia's plant-flower growing district;
2. reutilization of plastics to make pots and dishes (under pots) for the plant-flower growing sector;
3. recovering energy from textile flock and paper pulper in the Prato and Lucca districts.

e look forward to developing this project further and then having it implemented.