THE TUSCANY CASE STUDY: A BACKGROUND REPORT

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PREFACE

This report presents a brief survey of the regional development process and socioeconomic problems of Tuscany. The purpose is to define the main issues that should be addressed by regional planners, with special reference to those items that can be analyzed with the use of models. Thus, the report lays the foundations for the applied modeling activity of the Tuscany case study.

The main aim of this case study is to use systems-analytical methods and models already developed at IIASA and elsewhere, and to create new methodologies for studying this region, in order to be able to solve existing and future development problems.

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1. INTRODUCTION

Tuscany is a hilly region criss-crossed by an intricate network of river basins. Bounded by the Tirrenian Sea to the West, it lies between the Appennines to the North and East, and Mt Amiata to the South. The settlement system in the region is polycentric in character. There is a dense allocation of production and residential units following the pattern of historical routes along the Arno valley and the Tirrenian coast (Figure 1). Administratively, Tuscany is split into 9 provinces and 287 municipalities, which are grouped into 32 Intermunicipality Associations (Figure 2). Some important features of contemporary Tuscany and its position within a national context are presented in Table 1.

2. HISTORICAL BACKGROUND

Tuscany, being well endowed with natural resources (iron, geothermic energy, mercury, lignite) and having a financial infrastructure as well as a long tradition of domestic and

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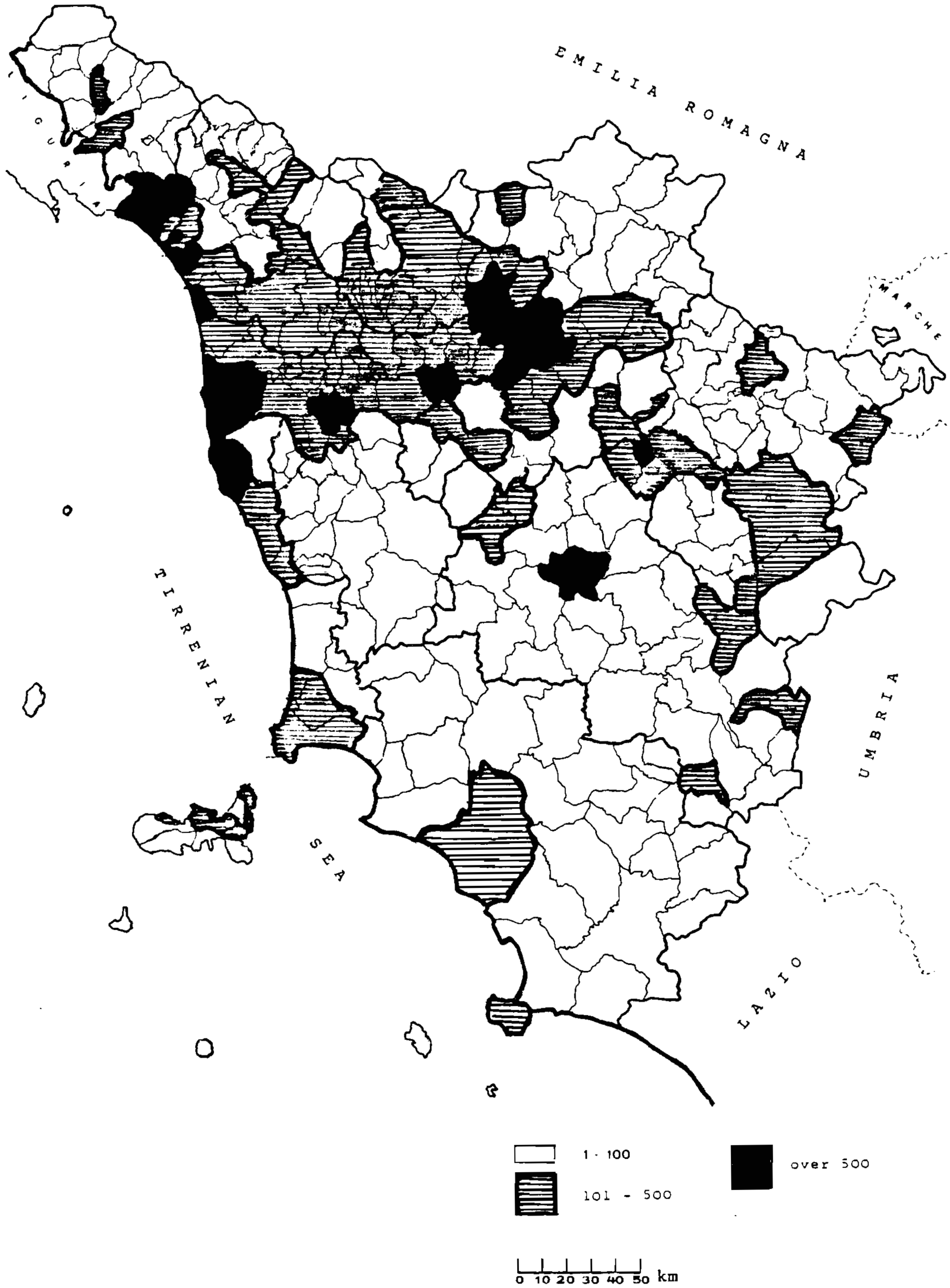

Figure 1. Population density in Tuscany, inhabitants per km^2.
(Source: IRPET 1975.)

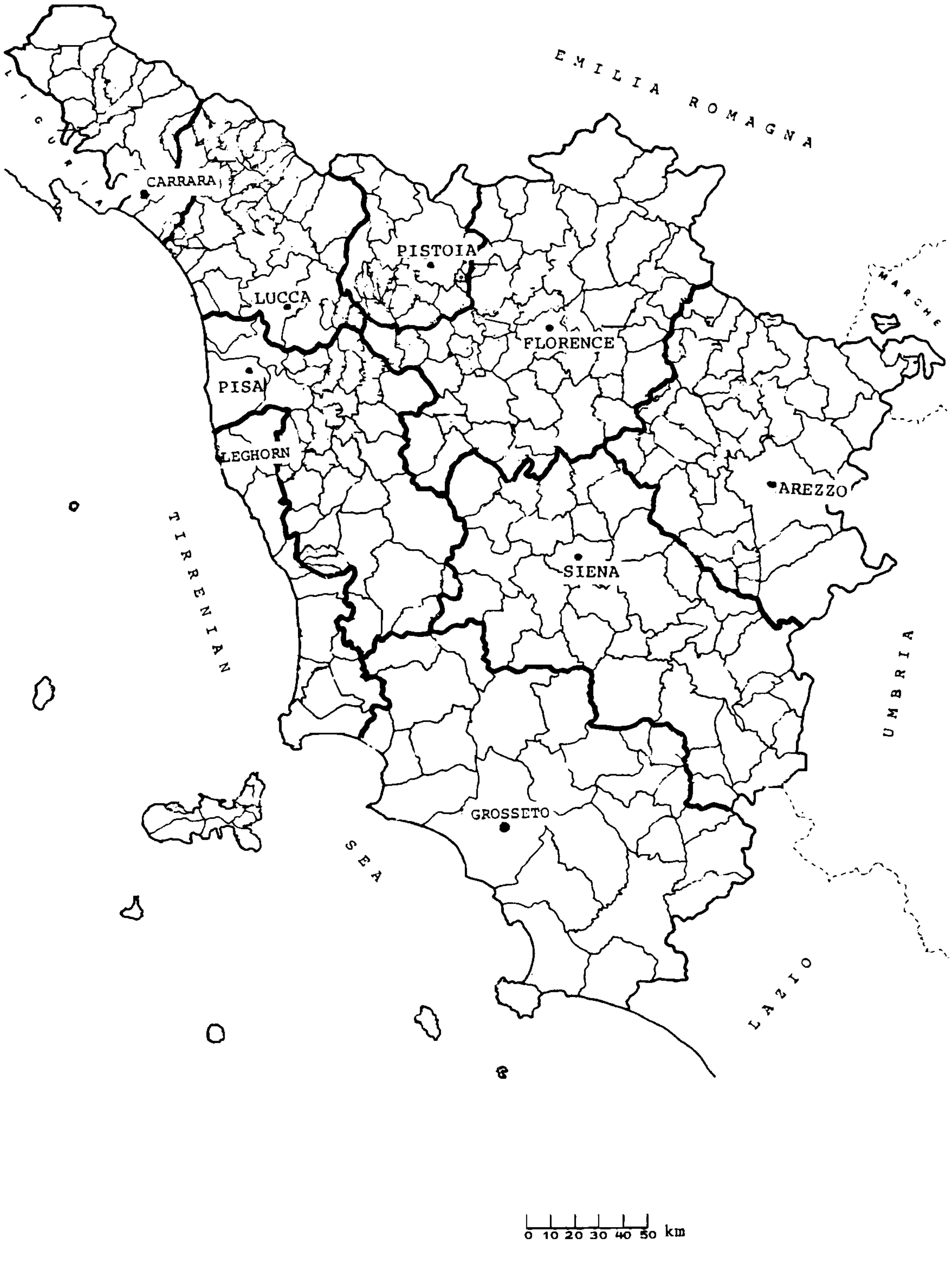

Figure 2. Administrative map of Tuscany: the nine provinces. (Source: IRPET 1975.)

Table 1. Some features of contemporary Tuscany, 1980.

	Tuscany	$\%\frac{\text{Tuscany}}{\text{Italy}}$
Territory (km^2):		
Mountains	5,700	5.4
Hills	15,300	12.2
Plains	2,000	2.8
Total	23,000	7.6
Population (10^3 inhabitants)	3,500	6.4
Employment (10^3 inhabitants):		
Agriculture	130	4.6
Industry	480	7.3
Services	640	6.4
Total	1,250	6.7
Unemployment (10^3 inhabitants)	100	5.0
International imports (10^6 \$)[a]	2,100	3.5
International exports (10^6 \$)[a]	4,500	8.0
Tourism (10^3 tourist days)[a]	2,800	8.6
Gross regional product (10^6 \$)[a]	16,500	7.0

[a]Data estimated on the basis of the first six months of 1980.

international trade, appeared to have all the prerequisites for industrialization such as that which occurred in Piedmont, Lombardy, and Liguria (the 'industrial triangle' of Italy). However, because of various exogenous (the policies of the new unified kingdom of Italy bypassed--or damaged--Tuscany) and endogenous factors, this potential was not realized.

In the late nineteenth century the ruling class of Tuscany ('the moderates') played a crucial role in discouraging the spread of industrialization to the region. They attempted, by means of an anti-industrial plan, to remove Tuscany from the social unrest that was then shaking Europe. Their plan was designed to avoid a too rapid growth in the number and concentration of factory workers as well as to guarantee a stable rent to landowners leasing their land under the old sharecropping system.

This strategy isolated Tuscany from the Italian industrialization process and, to some extent, continued during the Fascist period (1921-1943) when all economic efforts were concentrated on tourism and handicrafts in order to market the historical and artistic heritage of the region. In fact, the establishment and growth of several large industrial plants (engineering, metal, and chemical) along the coast (most of them introduced by extraregional entrepreneurs) altered neither the structure of Tuscany's economy nor its place within the interregional division of labor in Italy. The signs of its historical heritage were still dominant.

The economic framework of Tuscany at the beginning of the 1940s exhibited several noteworthy features (Figure 3). Several large industrial plants, most of which were established with extra-regional capital and management, were located in the vicinity of Florence and along the coast. In addition many small plants operating in clothing, textiles, leather products, footwear*, furniture, glass, and pottery concentrated in the Florence-Prato area and in the lower Arno Valley. This network of specialized handicraft areas was usually organized around one (or more) small urban center(s), shaping the polycentric urban system of Tuscany, which is a specific regional feature today.

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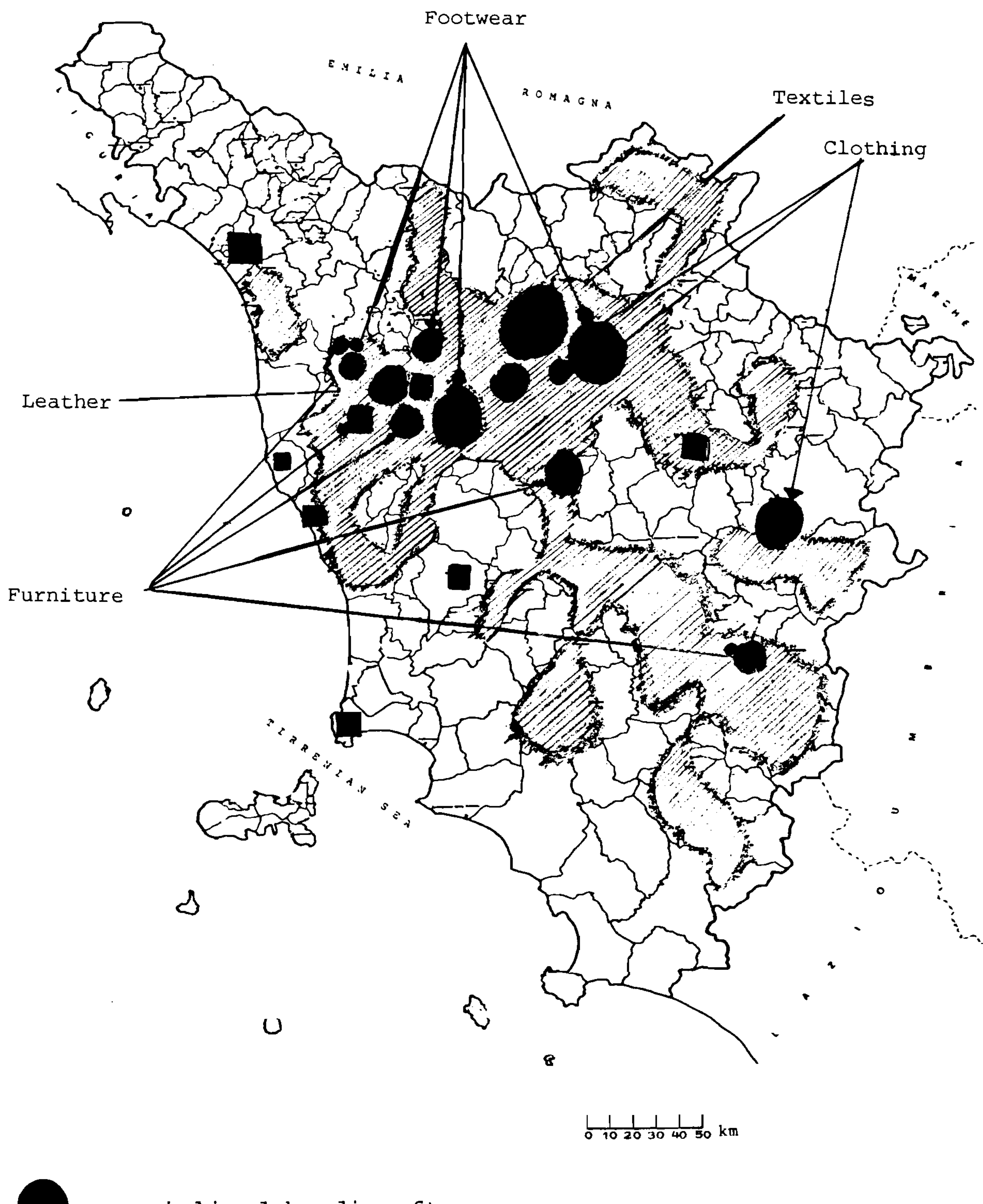
*The footwear branch is so large that it is not included in the leather goods sector but is considered as a separate sector.



specialized handicraft areas

large industrial plants

sharecropping agricultural system

Figure 3. Industrial and handicraft areas in Tuscany, 1940.

Along the northern coast and in the major cities a tradition of tourism was already established. Yet, at the same time a large share of regional income depended on agriculture and was still based on the sharecropping system, which bound rural families to agricultural activity.

This combination of characteristics may be regarded as the prerequisite for the industrial 'take-off', i.e. initial development in the 1950s (Becattini 1975). It led to the specialization of Tuscany in light industry, highly oriented towards external markets.

3. THE DEVELOPMENT PROCESS IN THE 1950s AND 1960s

At first, the development process was checked only by the lack of opportunities for rural familes to fit into the existing industrial communities.

Reconstruction during the postwar period was concentrated in the northwest regions of Italy, where heavy industry, such as chemical, steel, car and machinery production plants, was located. Furthermore, these plants had not been so severely damaged during the war as those in Tuscany.

Tuscany could rely only on its widespread handicraft industry and on its traditional ties to foreign markets, at that time rapidly growing. An export-led demand developed, and it was met by the large low-wage labor force coming from the rural areas, in which a considerable slice of the population lived. This labor-supply phenomenon can be explained by the fact that the sharecropping system had started to crumble, both for social and economic reasons. The sharecroppers were endowed with wide-ranging skills (producing most of the goods for their own consumption and the tools for their own use), and 'latent' entrepreneurship (being accustomed to deciding on the most effective use of the available family labor force, to selling their products in the market, and to bargaining with landowners on financial agreements, and so on).

Population mobility increased very rapidly, although it encompassed only intraregional and short-range movements and did not include the large cities such as Florence. As a result the social problems encountered both in the southern regions of Italy (because of the outmigration of the most efficient labor force towards the North) and in northern regions (because of the social impact of large immigration flows on the urbanization process in metropolitan areas such as Turin and Milan) were avoided.

Initially, intraregional mobility did not imply residential migrations because the family remained as a unit in rural housing, even though the younger family members were commuting to the industrial areas.

The existence of both the handicraft industry, which was an attractive force to former agricultural workers, and a number of small plants engaged in the production of light durable goods served to catalyze the process of rapid industrial expansion in the footwear, leather goods, clothing, textile, and furniture sectors. Thus, Tuscany was able to take advantage of the increasing extraregional demand for these goods. The small plants emerging in this period exhibit some common behavioral features:

1. They show a preference to rely on cheap labor with high flexibility (such as home workers, moonlighters, second job workers) rather than on fixed capital.
2. They make maximum use of a small number of fixed investments through the specialization of each unit in a single product in a single phase of the production cycle; these units are located in specific areas (industrial districts).
3. In these areas, there is a local social environment that strongly binds family units to production through time allocation choices involving all the components of the family (work at home, or in the factory, leisure-time or moonlight jobs, and so on).
4. Most producers do not market their goods directly, rather they sell to larger firms or trade intermediaries (such as 'buying offices'), which tie the fragmented and competitive regional supply to the external oligopsonic demand (IRPET 1980a).

The remarkable development of tourism, which spread during the 1960s to the southern coastal area, more or less follows the same path of growth.

This kind of development process places a heavy burden on local public services, since it requires a high level of expenditure to provide a widespread allocation of small plants with infrastructural services connecting them to residential units.

The development of light industry, which forms the core of industrialization in Tuscany, continued along the course described above until the early 1970s. It was interrupted only by two short crises in 1963-65 and 1968-69, which have reinforced these characteristics (Figure 4).

The main outcome of the region's development after this twenty-year period can be seen as the spatial division of the region into four areas: 'urbanized countryside', tourist-industrial areas, urban and rural areas. They differ from each other in their economic, social, and environmental features (Figure 5).

Urbanized countryside (campagna urbanizzata) is an area in which a network of relationships has been established between family units and small light-industry plants. Industrial and residential areas are adjacently located or even overlap. These areas are linked by an intricate transport network, corresponding to the multidirectional flows of passengers (commuters) and goods (intermediate products). The social structure in this area consists entirely of people directly engaged in production and their social attitudes still retain an element of the entrepreneurial spirit of their forebears, despite the influence of left-wing class solidarity typical of an industrial community.

In the 'tourist-industrial areas' (aree turistico-industriali), several large industrial plants are located near the natural and tourist resource areas that have developed haphazardly along the coast. The flows of passengers and goods are primarily one-way, i.e. towards the urban centers, to large plants near the coast, and from the rural areas. The social structure is dominated by people engaged in production and a sharp divergence in attitudes is evident between these workers from large, mostly state-financed, enterprises and the tourist-industry workers, often seasonally employed and partially engaged in agricultural activities.

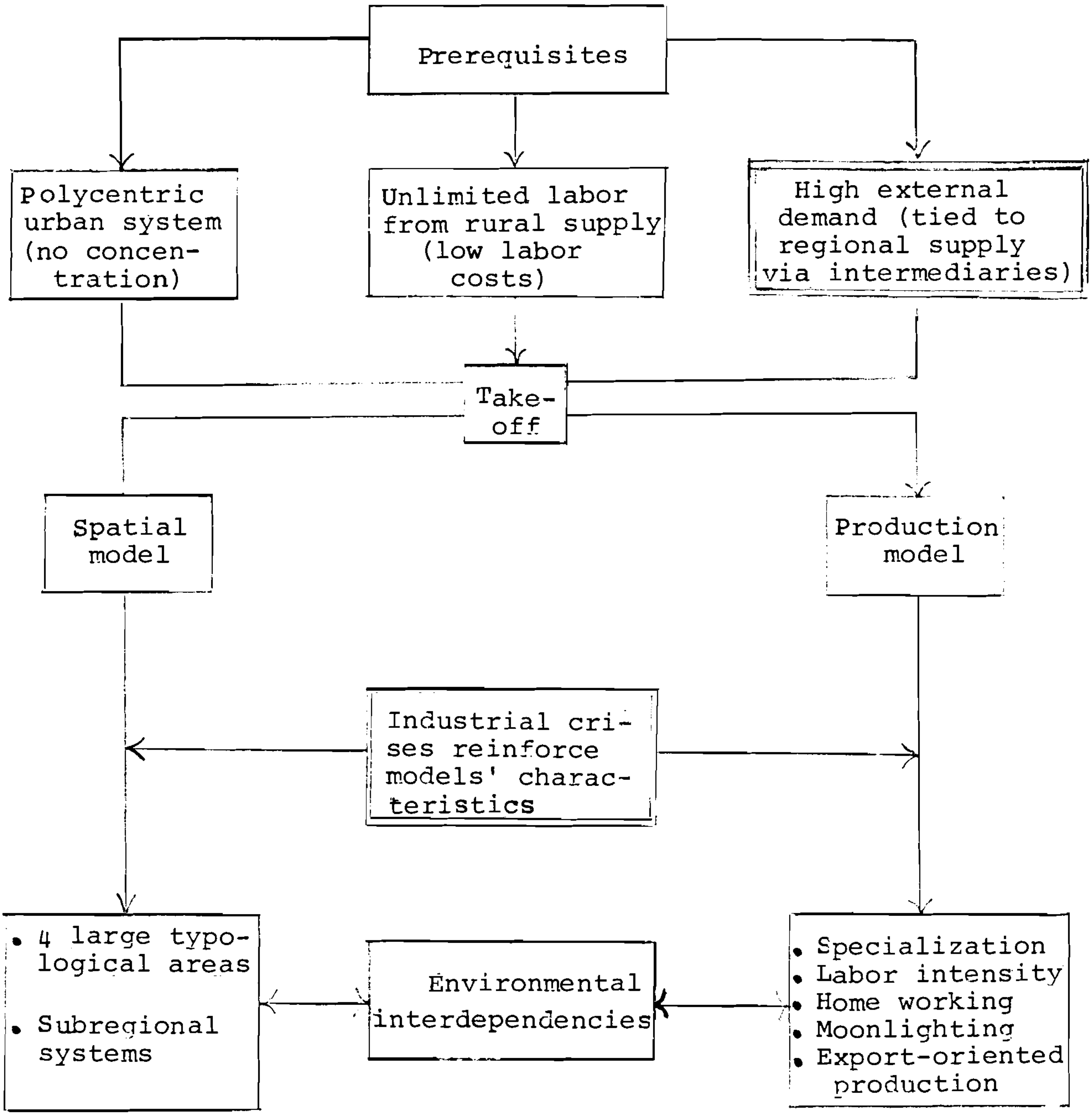


Figure 4. A scheme for analyzing the development of Tuscany.

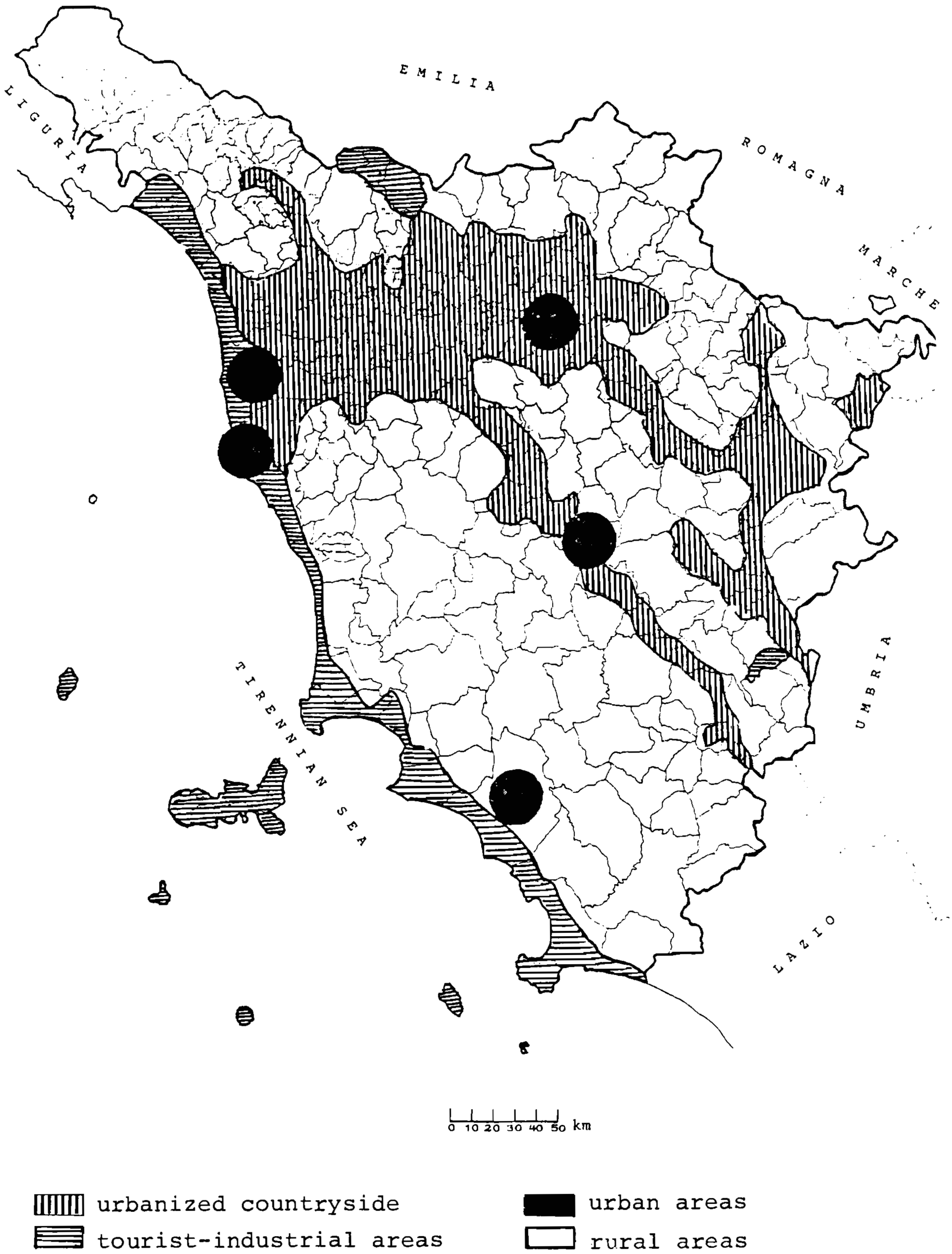


Figure 5. Economic, social, and territorial areas in Tuscany. (Source: Becattini 1975.)

In the urban areas (aree urbane), commercial, administrative, and high-level educational services are prevalent and commuting is polarized towards inner-city districts. The social structure and lifestyle patterns reflect the predominance of white-collar workers, who are not directly involved in industrial production. The population is stable and the provision of housing, urban transport, and social services constitutes the main problem of these areas.

The rural areas (campagna) are territorially characterized by small sparsely located villages and isolated farmhouses or clusters of houses. They are mostly populated by workers commuting towards the industrial cities or employed in farming enterprises. Sharecropping has dwindled considerably, while up until now direct farming has not spread (it is undertaken only in the upper North West and in the South). Many old rural houses have been renovated as weekend houses by city dwellers.

4. TUSCANY IN THE 1970s

During the 1970s, there were changes in the development process in Tuscany with regard to the take-off period. Whereas the 1950s and 1960s could be defined as periods of large-scale modification, the 1970s are characterized by a smooth qualitative and structural consolidation. Some comments on population, employment, production, international trade, tourism, and the local public sector can help to clarify this statement.

4.1. Population and Employment

In the last decade, the regional population has converged to stability because of a decline in the rate of natural increase, despite a relatively high net positive migration rate (Table 2). Internal mobility, one of the major features of the take-off period, has rapidly decreased, while, especially in the last five years, the average age of the regional population has risen (Table 3).

Table 2. Demographic flows in Tuscany, 1970-1980 (10^3 persons).

Year	Natural increase	Migration flows	Total growth
1970	9.3	13.4	22.7
1971	9.8	15.3	25.1
1972	9.9	18.0	27.9
1973	6.6	18.3	24.9
1974	6.4	18.6	25.0
1975	2.7	11.7	14.4
1976	0.3	11.5	11.8
1977	- 3.3	12.0	8.7
1978	- 4.3	11.6	7.3
1979	- 7.3	12.9	5.6
1980	-13.5	13.0	- 0.5
PERIOD TOTAL	16.6	156.3	172.9

Table 3. Population by age in Tuscany and Italy, 1975 and 1980.

	Tuscany		Italy	
Age classes	1975	1980	1975	1980
0-14	19.5	18.2	23.9	22.3
15-29	19.4	19.1	21.9	22.0
30-44	19.9	20.7	19.6	20.0
45-64	25.5	25.0	22.3	22.4
over 65	15.7	17.0	12.3	13.3
T O T A L	100.0	100.0	100.0	100.0

In a regional/national context of decreasing intraregional/ interregional migrations, the figures on the steady high positive net migration flow in Tuscany (spread over all the regional provinces) could be explained both by the efficient performance of the Tuscan economy and by an internal labor demand not satisfied by the residential labor supply because of a mismatch of skills. In fact, the regional development structure seems to exhibit the characteristics of a 'mature' post-industrial economy, in which the employment share in the industrial sector falls but increases in the service sectors (Figure 6).

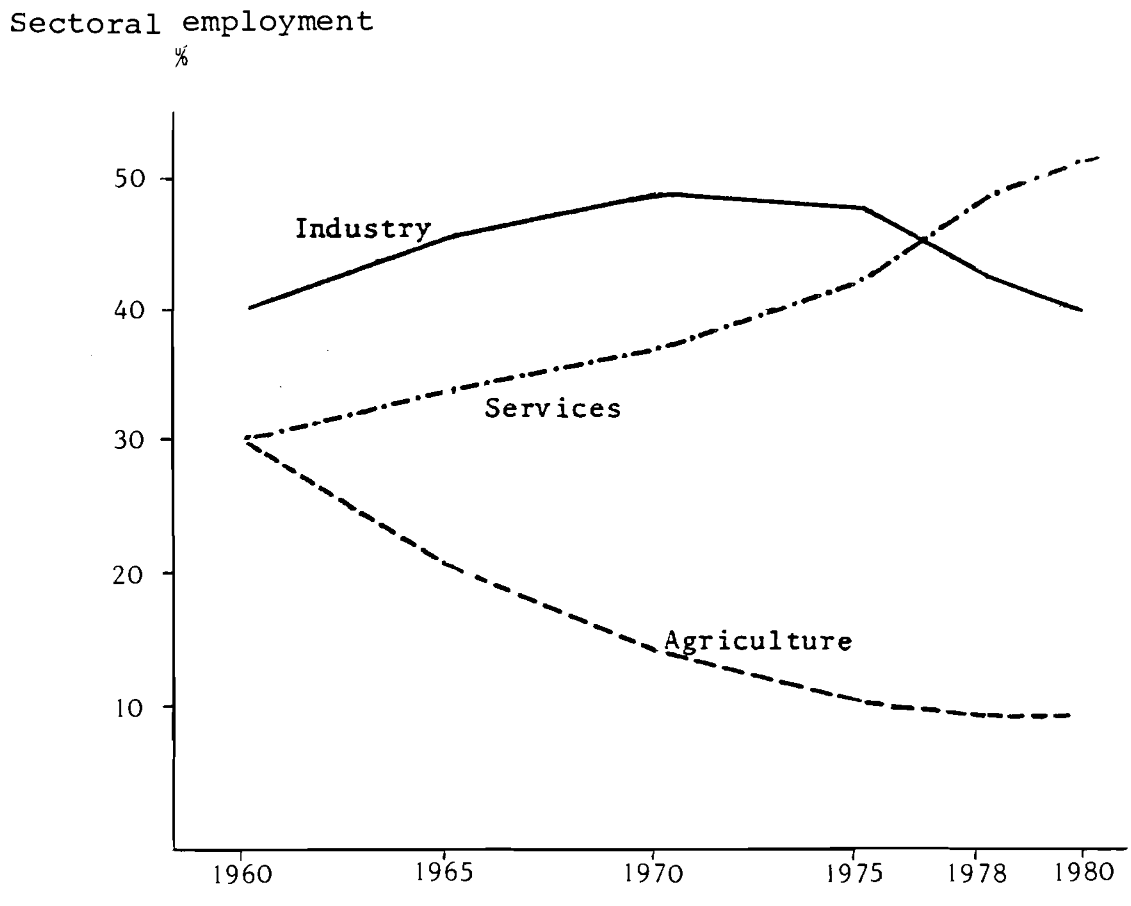


Figure 6. Percentage share of employment in the three main sectors of Tuscany, 1960-1980.

Nevertheless, employment data shows that this process is not sufficiently extensive to absorb qualified professionals looking for first jobs (this group accounts for more than 50% of total employment) mainly in the service sectors.

Involuntary unemployment, excluding persons just entering the labor force, is less than 3% of the population. It mostly consists of women, who are more likely to enter and remain in the labor market than in the past.

4.2. Economic Sector

4.2.1. Agriculture

In the last five years, employment in agriculture has reached an equilibrium point at a level of 10% of total regional employment, although the value added in this sector is only 6% of the regional product. The low productivity can be explained by the inability to develop modern methods for agriculture in Italy as a whole, and by the fact that the average age of agricultural workers in Tuscany is over 50 years.

Agricultural specialization is based on wine and olive oil production, for which supply is greater than demand. Price levels are therefore not sufficiently high to cover increasing costs (especially for labor and chemicals). The main problem in this economic sector is to stress its commercial structure and to develop a local food-processing industry; in this way, it might be possible to attract young people into agriculture.

4.2.2. Industry

During the 1970s, there was consolidation of the industrial sector in Tuscany through investments mainly aimed at increasing productivity. The regional value added in 1978 was 7.7% of the national figure (7.2% in 1971), and regional investments in this sector have, in the last five years, been higher than those in the developed areas of northern and central Italy. Most of them have been oriented towards restructuring the capital stock rather than extending it. In fact, total industrial employment decreased most in those sectors, such as the textile sector, in which there was greater investment (Table 4).

Table 4. Industrial employment in Tuscany and Italy, 1970-1978.

	TUSCANY		ITALY	
	Number of employees per 10^3 inhabitants	$\frac{1978-1970}{1970} \times 100$	Number of employees per 10^3 inhabitants	$\frac{1978-1970}{1970} \times 100$
Mining and iron	5.5	16.7	4.5	23.4
Nonmetallic minerals	14.7	- 3.9	8.0	- 3.4
Chemicals	4.5	17.7	5.3	11.3
Mechanical engineering	13.4	12.4	22.1	9.3
Transport equipment	4.3	27.0	6.2	16.1
Food	7.8	3.7	8.9	3.5
Textiles and leather goods	53.7	-13.0	28.7	-12.7
Paper	4.5	21.2	4.5	16.1
Others	16.8	- 3.6	14.1	3.1
INDUSTRY TOTAL	125.2	- 1.9	102.3	2.2

Although the sectoral structure has been modified, the traditional sectors (textiles, clothing, footwear, leather goods) still form the core of the regional production system, despite a loss of over 20,000 employees. This occurred as a result of a rationalization program aimed at lowering the labor intensity in these sectors. However, in the 1970s, some new industrial sectors, which we call 'intermediate industries', developed in Tuscany (Bianchi and Cavalieri 1980, Bianchi and Falorni 1980). They include mechanical engineering*, chemicals, plastics, and others. The definition of intermediate industries derives both from their place within the sectoral interdependency matrix and from the technological level of the productive process.

*The sector 'mechanical engineering' is used throughout this report to denote a broad range of industries such as the machine tool, machine building, and automobile branches.

The development of these industries has followed specific paths (Figure 4), which differ from those indicated by the well-known regional model of light industry development. The main differences relate to the labor market (the large number of skilled workers in Tuscany), the market areas (other Italian regions and developing countries), the spatial allocation (concentration around the major cities), and so on.

4.2.3. Service Sector and Tourism

The private sector's share within the service sector has increased (in employment by 12.5% during the 1970s), whereas the public administration's share has remained constant. It is the private service sector to which the labor supply is principally oriented. Nowadays, this private sector covers more than 35% of regional employment and about 45% of regional value added. There is a trend towards specialization in high-level services such as research, marketing services, consulting, and computing.

Tourism constitutes an important part of the service sector since it involves not only people directly employed in tourist services but also those indirectly linked to tourism such as employees in shops, restaurants, leisure-time activities, transportation, etc. It has been estimated through a regional input-output matrix (Biggeri et al. 1980) that tourist consumption constitutes approximately 8% of total internal regional consumption, although the economic and social impact also has some negative aspects (high price levels, traffic congestion, import of goods, inner city change).

Of the Italian regions, Tuscany claims the third highest number of tourist days (Table 5) even though development in the last year has been slower than in the southern regions. At an

Table 5. Tourist days in Tuscany, 1970-1975-1980 (10^6 days).

Year	National component	Foreign component	Total
1970	15.2	5.8	21.0
1975	18.0	6.1	24.1
1980	21.3	6.7	28.0

intraregional level, the North coast (Versilia), traditionally the main coastal tourist area, is losing popularity at the expense of the South coast and the Island of Elba (IRPET 1980b). Florence, because of its cultural and artistic heritage, is the major attraction to foreign tourists (Figure 7) and a base for excursions to other cities such as Pisa and Siena.

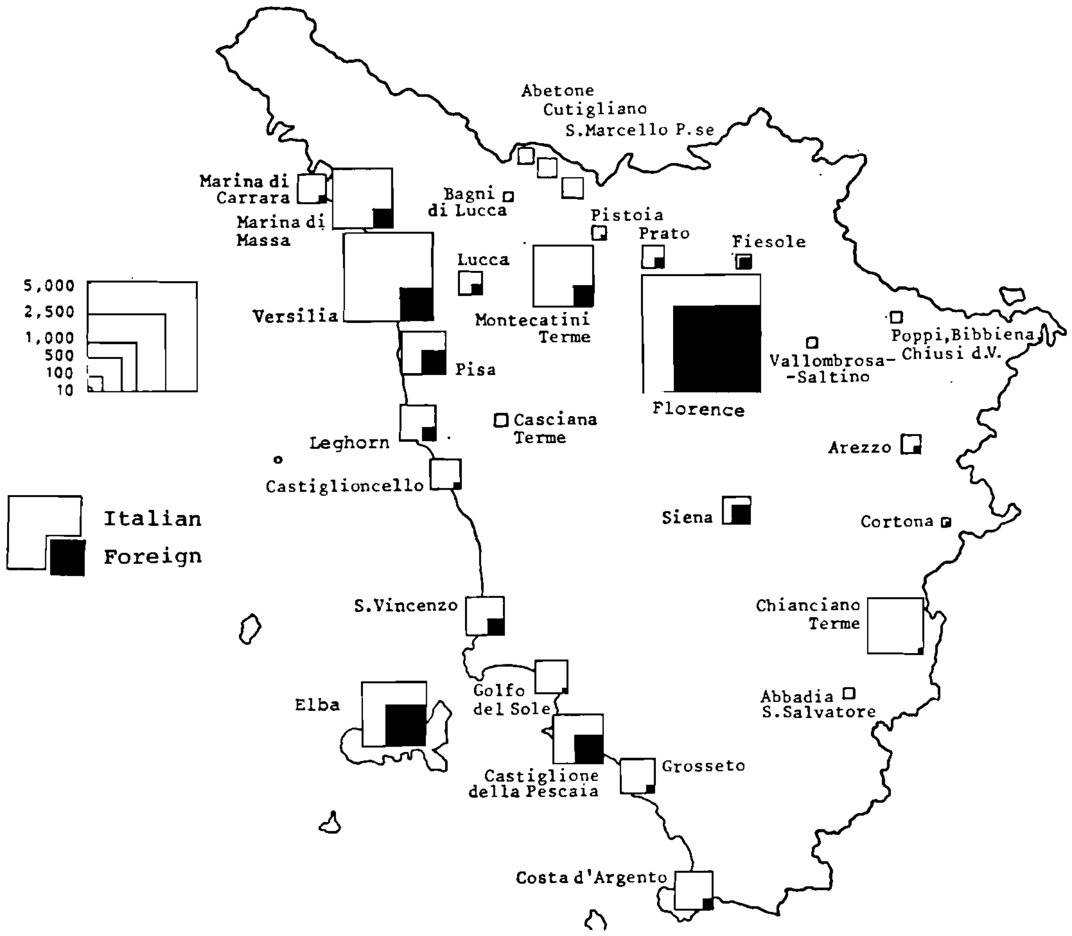


Figure 7. Tourist days in Tuscany: intraregional allocation. (Source: IRPET 1980b.)

4.3. Local Public Financial Flows

At the municipality level, Tuscany has one of the highest levels of current public per-capita expenditure among the Italian regions (Table 6). Within an intranational context, regional expenditure differentials grew rapidly in the 1970s and today differentials on current expenditures are high.

Table 6. Local public per-capita expenditures in the main Italian regions and the national average, 1977 (10^3 Lire).

Region	Expenditure	Region	Expenditure
Lazio	291.8	Veneto	133.8
Campania	236.5	Piedmont	130.0
Tuscany	193.4	Calabria	122.3
Liguria	189.8	Sicily	111.3
Emilia Romagna	184.5	Sardinia	102.1
Lombardy	177.6	ITALY	169.9

Whereas the high values of Lazio and Campania are explained by the existence of the two large metropolitan areas Rome and Naples, the Tuscan figure can be attributed to the polycentric economic system in the region. In addition, within Tuscany there are also strong differentials according to municipality size and socio-economic environment (Figure 8). Both the interregional and intra-

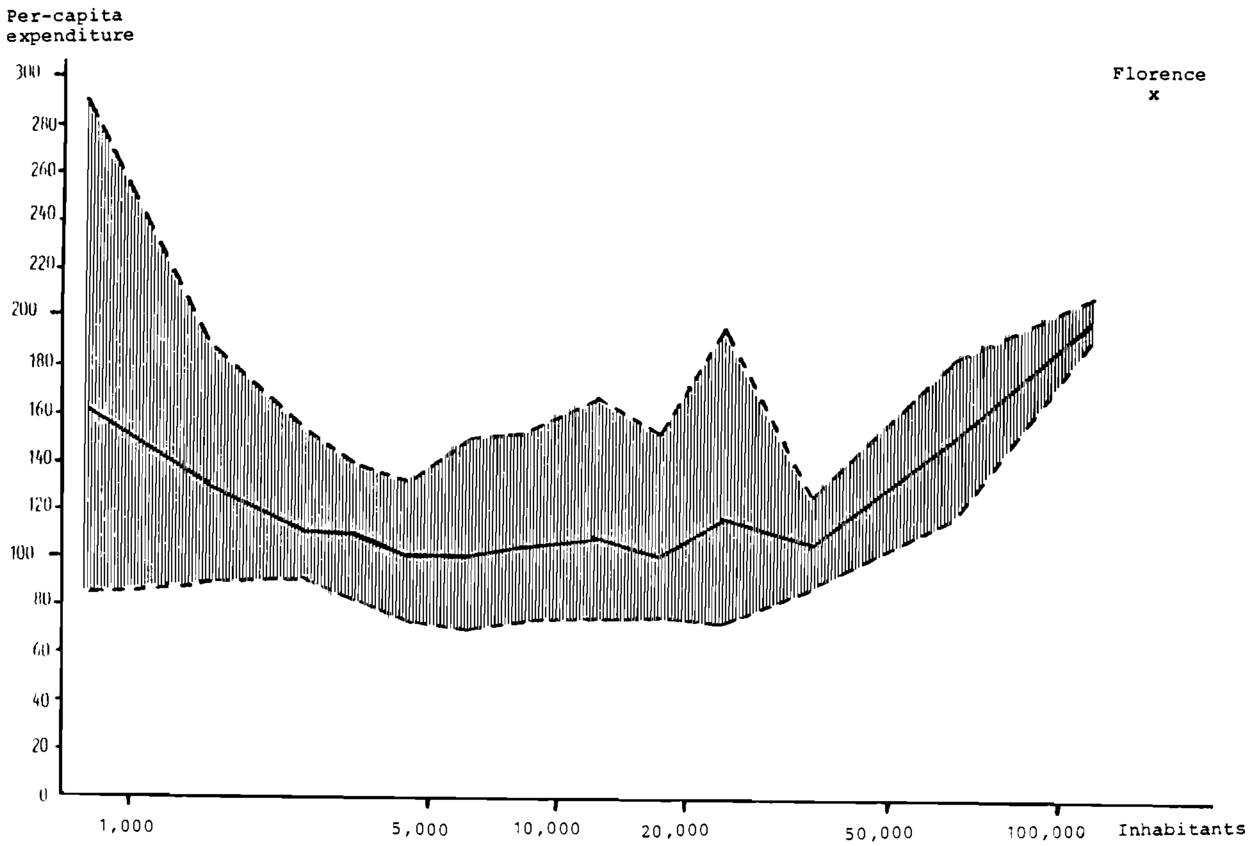


Figure 8. Variance in current per-capita expenditure differentials in the municipalities of Tuscany. (Source: Maltinti and Petretto 1981.)

regional differentials can also partially be explained by certain characteristics of the regional development process based on the polycentric network of production and residential units (Maltinti and Petretto 1981).

Because of the relationship between public and private sectors (household and production), determination of the underlying causes for such differentials is the first step towards the formation of a regional policy in which public financial flows are used as a means of balancing interregional spatial inequalities and improving services. At the same time, analyses of the physical level of public services supplied and the technological conditions under which they are produced (public service production and cost function) are also important.

4.4. International Placement

Foreign demand has provided one of the main stimuli for regional development and the industrialization process. Tuscany has achieved significant international market shares in some typical 'mature' products (Figure 9), and competition from developing countries has not reduced these shares to any noteworthy extent (Cavalieri 1980, IRPET 1981).

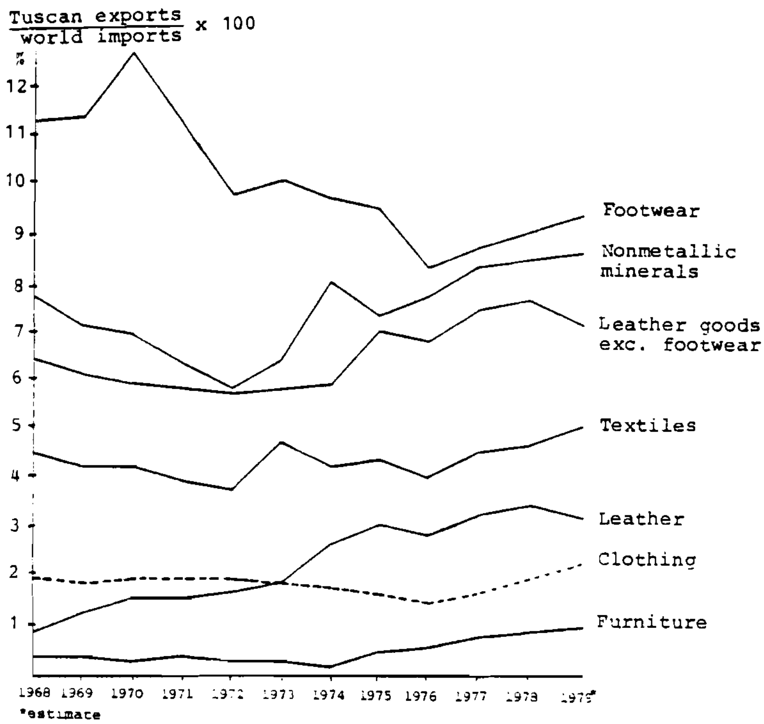


Figure 9. Shares of mature products of Tuscany on the international market, 1968-1979. (Source: Cavalieri 1980.)

During the 1970s the shift from regionally typical products to new ones (Table 7) was not as extensive as could have been expected according to international trade theory (product life theory, for instance). At the beginning of the 1980s the regional export structure is not substantially different from that of the 1960s, whereas the geographical market structure has undergone significant changes.

Table 7. The export structure of Tuscany, 1970-1980.

Products	1970	1972	1974	1976	1978	1980
Footwear	24.3	22.0	19.3	18.9	17.2	16.3
Textiles	19.0	17.4	17.4	15.0	15.0	14.9
Clothing	12.3	15.0	13.1	12.6	11.4	12.1
Glass/Pottery	3.0	3.2	3.7	3.6	3.4	3.5
Leather/Leather products	3.8	4.9	4.9	6.7	7.8	7.4
Furniture	0.5	0.6	0.7	1.2	1.8	2.0
TOTAL typical products	62.9	63.1	59.1	58.0	56.6	56.2
Mechanical engineering	8.6	8.5	9.3	9.9	7.7	8.6
Iron/Steel	1.3	2.8	2.2	3.0	3.5	2.0
Nonmetallic minerals	2.8	2.3	2.9	2.3	2.1	2.3
Plastics	1.1	1.0	1.3	1.4	1.9	2.0
Others	23.3	22.9	25.2	25.4	28.5	28.9
TOTAL non-typical products	37.1	37.5	40.9	42.0	43.7	43.8

One of Tuscany's traditional export markets, North America, currently accounts for 20% of the regional export total, while 10 years ago its share was about 40%. Exports to EEC countries have increased to 50%, and since 1973-1974 the Arab OPEC countries have also become a market for Tuscany's exports.

As far as the international placement is concerned, the share of Tuscany's exports in the national total has shown a high elasticity in accordance with international demand cycles (Figure 10). In fact, variations in consumption demand in developed western countries are the main reason for short-term fluctuations in the export performance of Tuscany, which has a high degree of special-

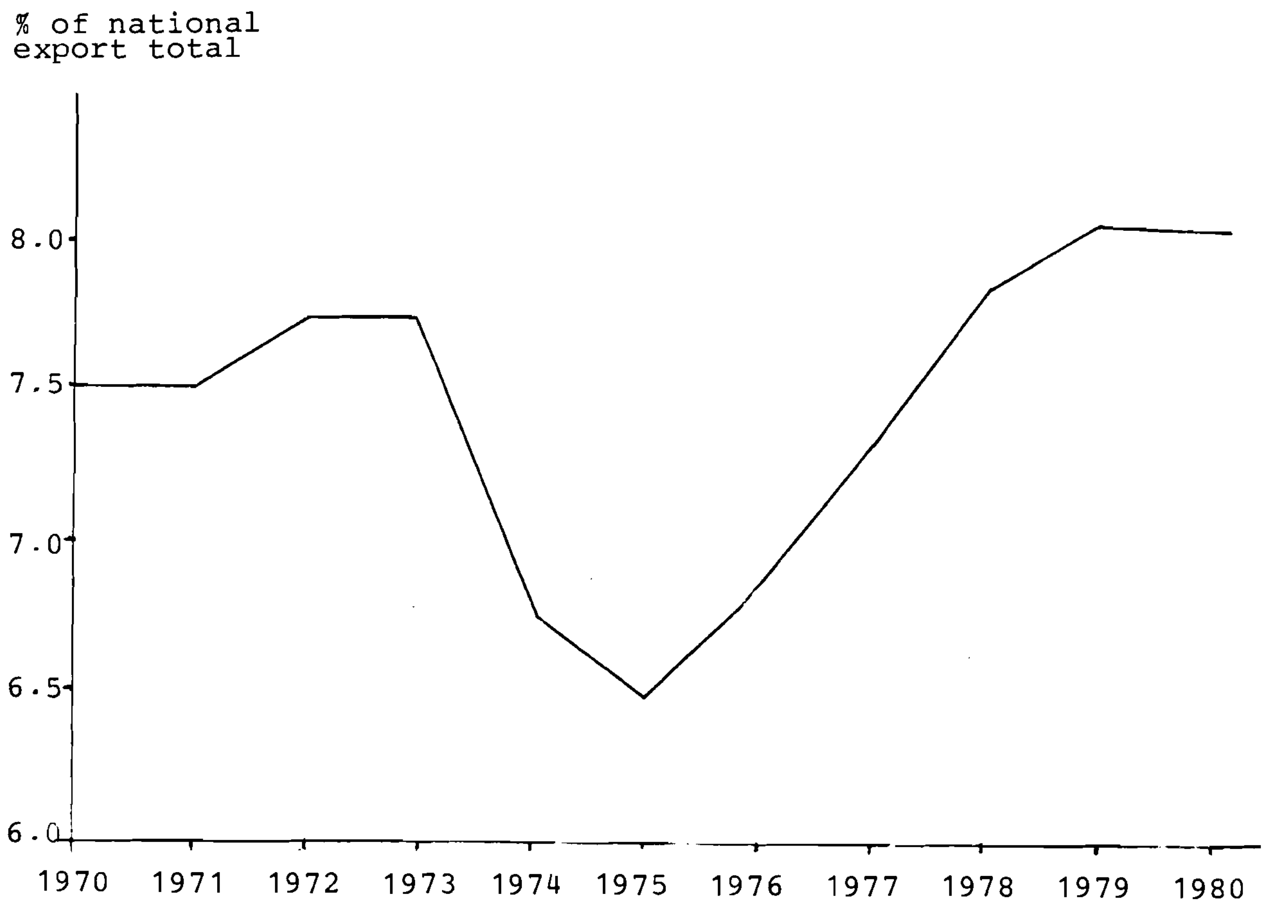


Figure 10. Percentage share of Tuscany's exports in the national total, 1970-1980. (Source: Cavalieri 1980.)

ization in mature products. One of the problems facing economic planning bodies is how to minimize these sharp fluctuations by changing the product and market mix and by enforcing distribution control.

5. DEVELOPMENT PROBLEMS OF TUSCANY IN THE 1980s

If we look at the possible futures for the development of Tuscany in a medium-term perspective, we can identify the mixture of problems and policies to be handled by the regional planning authorities in order to deal with the phenomena that occurred in the 1970s. In the field of production the most important problems to be dealt with are to achieve a growth of intermediate industry, to improve the quality of regionally typical goods, to establish and develop those services directly tied to industry, and to maintain international and interregional markets for exports.

A slow but steady growth of intermediate industry (especially mechanical engineering) should be encouraged and sustained. This can be effected through more efficient links between the existing technological research centers in the region (universities and large enterprises), and through training programs for specific skills.

The quality of regionally typical production should be improved, while production and employment levels should be decreased. This implies the need to restructure both production and commerce, and to control employment mobility.

Specialization in the service sector should be concentrated on the development of those services directly tied to industry. Such services consist in trading agencies, computer facilities, research and development, promotion and marketing services, and transportation.

International and interregional trade positions should be maintained, even though the export structure is still specialized in mature products and such a situation is contrary to the usual trade pattern. A better understanding of Tuscany's trade performance could help the regional planning authorities to initiate the appropriate action and to evaluate the impact of international and national modifications.

In the social field two principal changes are evident. First there has been a trend towards stability and aging of the regional population. This is coupled with a positive migration rate, even though it has been at a low level up until now. In the future this could increase because of the discrepancies between the labor skills demanded and the qualifications of the residential labor supply. Thus, Tuscany might face inmigration problems unknown in the past. The emergence of a need for basic services such as housing, transportation, and environmental protection is the second principal change. During the take-off period, the provision of such services was neglected because of a concentration on production and earning issues. This fact will force the local authorities to pay more attention to improving financial flows allocation, so that existing inequalities may be reduced.

From the territorial point of view, certain structural modifications in the region are taking place. A metropolitan area between Florence and Prato is coming into being and giving rise to problems of urban concentration and congestion. The coastal area, where the basic infrastructure for long-distance transport (Pisa airport, Leghorn port), as well as the most important steel and energy plants (geothermal resources), and agricultural land are located, is being developed. This zone, which has already been linked to Genoa, Turin, and Milan, will be connected to Rome by a highway.

The production, social, and territorial features described above would seem to indicate the beginning of a new phase in the development of Tuscany. This should be carefully examined and development of Tuscany. The current situation should be carefully examined and handled by the regional planning authorities. A comprehensive formal analysis achieved through the use of a regional model system may play an important role in such an examination. Work on designing the model system for the Tuscany case study is underway.

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