Regional development in Greece: an evaluation of the effectiveness of the Industrial Areas Programme

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Abstract

This Thesis is concerned with the broad area of the evaluation of regional development policy. The Thesis provides the theoretical context and contributes to evaluation of policies based on provision of organised industrial infrastructure and support systems to national peripheries. It mainly focuses on the Industrial Areas Programme in Greece. The purpose of the research is to measure the effectiveness of the Programme as a lever for regional economic development. Specific interest is paid to the effects of the policy on the regional productivity and the necessity for technological advancement.

Basic characteristics, the administrative structure of the country and the setting for the regional development problem are presented early in the Thesis. The institutional and legal framework for development and the emergence of the Industrial Areas Programme follow. In the theoretical part an analysis of the range of regional development theories and their connection with the Industrial Areas Programme is made. This is followed by more recent theories of development based on the implementation of modern technology and the conditions needed for this.

An analysis of regional productivity is undertaken utilising the total factor productivity methodology. A productivity typology emerges and first linkages are made to the Industrial Areas Programme. The typology then becomes the base for a field study that surveyed the administration of the Industrial Areas of Greece and firms established therein. Information collected includes the range, infrastructure and facilities of these projects, the technological levels of the participant firms and the efforts made to advance such levels. The survey provides a most useful attitudinal framework for the evaluation of the Programme's effectiveness. Finally, a multi-faceted evaluation is made based first on analysis of employment growth and second on monetary flows in the form of a cost-benefit analysis. The latter provides a generalised methodology, utilising both a pay-back and a full-life evaluation procedure. Analyses in general ascribe some positive effects of the policy but of variable intensity across the projects.

The final part resumes the theoretical evaluation, outlines the empirical measurements and findings and proceeds to discuss the policy implications of the Thesis.

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Chapter 1: The Greek State and the setting for the regional development problem

1.0 Introduction

European peripheries, such as Greece, have suffered from problems of centralisation and dualism. The former takes the form of concentration of economic activity and power in few major cities or the capital; the latter may prove a distinct diversity in productivity between the traditional and modern clusters of the economy, together with a spatial polarisation of such clusters. The fundamental question of this thesis is to what extent can regional development policies with emphasis on new technology, innovation, infrastructure and support systems be fruitful in restoring the situation.

After examining the theoretical underpinnings of such development policies, this study proceeds to the effects of such policies in Greece focusing more specifically on the Industrial Areas Programme. The Programme is in operation in several, mainly peripheral, geographical departments of the country and can be thought of as an integrated state - driven regional economic development support system. The aim of this research is to evaluate the effectiveness of the Programme and further to understand the conditions under which these Industrial Areas, and the new ones that are planned, can effectively provide the stimuli and prove an important lever for economic development and well being of their respective regions.

In this first chapter, basic geographical, historical, economic and population aspects of the Greek State will be outlined, which provide the reasons for the necessity of regional development in Greece. Given this framework, the regional development efforts shall be presented in the following second chapter of this thesis, to set the frame of operation of the Industrial Areas Programme. In chapter three the theoretical underpinning of the Programme is layed out. In addition other theories of development are presented aiming to show the necessity of orientation

of the Industrial Areas Programme to one of new technology utilisation and promotion.

Evaluation of the Industrial Areas starts with the analysis in chapter four. There, a shift share analysis is used to show the importance of manufacturing in the competitive effect of the various regions of Greece. Relation is also found between increased rates of employment in manufacturing and existence of Industrial Areas. Given that, a total factor productivity analysis shows the varying effects of the Industrial Areas Programme to the productivity of the recipient regions. Consequently in chapter five the design of the field research in five Industrial Areas is given and also the profiles of these regions. The results are analysed in chapter six, where signs of better technology utilisation are found within the Industrial Areas, but also, in cases serious infrastructure deficiencies and operational complications are found. A further evaluation of the Industrial Areas Programme is undertaken in chapter seven based on classic time series methodology utilising policy 'on' and 'off' periods. This is followed by a more specific cross-sectional employment analysis focusing on the Industrial Areas. In the same chapter an application of a cost-benefit analysis is made on six projects of the Programme. The CBA analysis is twofold, one of a pay-back type and one of a full life type. The method gives an evaluation of the projects that is consistent to the employment, the productivity and the field survey findings as regards their impact.

Finally, in the conclusive chapter eight an overview of the theoretical issues tied to the operation of the Industrial Areas Programme is made. A synopsis of the results of evaluations on regional productivity, on site conditions and on cost-effectiveness of the projects allows for conclusions and suggestions on the orientation of the Programme.

1.1 The physical characteristics of Greece

Greece is strategically situated in the southeastern part of Europe, neighbouring with the continents of Asia and Africa. The northern border of the country from west to east is with Albania, with the southern provinces of former Yugoslavia and with Bulgaria. The country also has a short border in the east with Turkey. The total length of the land border is 1,181 km. Additionally Greece has a 15,021 km coastline. This is spread among the western, southern and eastern parts of the mainland and among over 1,000 islands. Some two hundred of these islands are permanently inhabited. The country's area is 131,957 sq.km, and of this some 25,042 sq.km or 19% of the national territory is made up of the islands. Some 80% of the land can be classified as mountainous. The fragmentation of the land and its mountainous morphology are traditionally considered as characteristics which make the comprehensive provision of infrastructure more difficult.

In land use terms, the National Statistical Service of Greece (ΕΣΥΕ-1, 1989) estimates that 29,800 sq.km or 22.6% of the national territory is covered by forests; 52,157 sq.km or 39.5% is made up of pasture; other agricultural land amounts to 39,340 sq.km or 29.8%; and the rest which includes developed land comprises 10,660 sq.km or 8.1% of the country.

The total population of Greece according to the General Census of 1981 (ΕΣΥΕ-2) was 9,740,417 producing a density of 74 persons per sq.km. The highest density is found in Greater Athens, where over the 427 sq.km a density of 7,090 inhabitants per sq.km is recorded. The minimum density is found in the geographical department of Evritania, with 14 people per sq.km. Provisional, unpublished yet (1993) data of the 1991 General Census bring the population of the country to 10,256,000 , that rises the average density to 78 inhabitants per sq.km.

1.2 The administrative structure of the country

Greece is a republic according to the current Constitution of 1975/1986 and current legislation provides for a four tier administrative structure. Central government authority is delegated by laws as regards many of its functions to the regional and prefectural level. The Constitution also provides for an administratively independent local government. A synopsis of the administrative structure of the

country, that will be analysed in this part, is given in Table 1-1.

In Greece, as provided for in the Constitution, the political authority stems from the people. Thus the people of Greece elect their 300 representatives for the Parliament by direct, compulsory, secret ballot elections, held every four years. The head of the state is the President of the Democracy, elected every five years. The elections for the President are by secret ballot and held among the members of the Parliament. The National Government is formed by one or more of the groups of the members of the Parliament, the political parties or alliances. A new Government has to be approved by the President and consequently to gain support via a vote of confidence within the Parliament. The authority of the central government is exercised through a structure of some twenty ministries, eighteen of which are based in Athens.

Under the provisions of Law 1622/1986, with the Presidential Decree 51 of 6.3.1987, Greece is divided in thirteen Regions (Figure 1-1). The Regions were created for the planning, the programming and coordination of regional development (Athanassopoulos 1987,1992a; Vagionis 1987). The main elements of the regional government are the General Secretary of the region and the Regional Council. The General Secretary of the region is head of all political government departments and the police at the regional level. Regional elections for the establishment of directly elected regional governments were provided for by the law, but to the present date this provision has not been activated.

At the moment, each region has its own Regional Government that consists of a mixture of centrally appointed and indirectly elected members. The General Secretary is appointed by the central government. The decision is made by the Council of Ministers and the person appointed is responsible for the application of the central government's policies. The Regional Council consists of a. the General Secretary of the Region, as president; b. the centrally appointed Prefects of the geographical departments making up the region; c. the Presidents of the Prefectural Governments (councils) of the geographical departments; and d. one delegate of the local Union of Communes and Municipalities from each geographical department of the region. Exceptionally, the Regional Council of Attiki (the region of Athens) is enlarged by more delegates of interested parties. The degree of political autonomy of these regional governments from the central government is low as currently practiced.

Greece is divided into some 51 geographical departments or prefectures. Government at prefectural level is also termed as local government of second degree. Under the provisions of regionalisation Law 1622/1986, the elements of

Table 1-1: The four-tier administrative structure in Greece

Tier	Territory	Number of Entities	Government	Number of Seats
1	Greek State	1	President of Democracy Parliament Central Government	1 300 Seats 20 Ministries
2	Regions	13	General Secretary Regional Council	1 7-22 seats
3	Prefectures	51	Prefect Prefectural Council	1 27-51 seats
4	Municipalities	304	Mayor & Municipal Council	variable
	Communities	5696	President & Community Council	variable

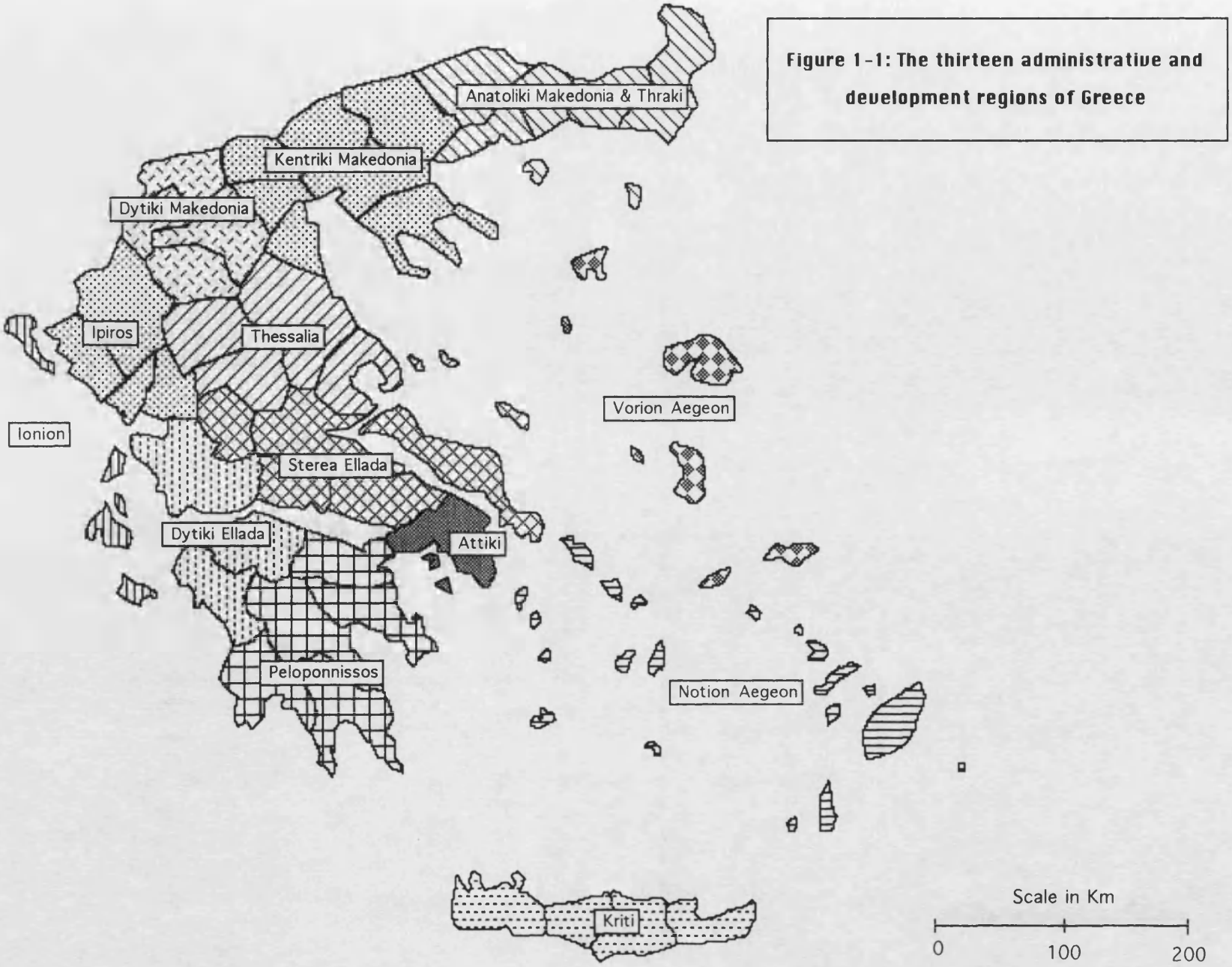


Figure 1-1: The thirteen administrative and development regions of Greece

the Prefectural Government are the Prefectural Council, the Prefect, as president of the Prefectural Council and the Commission of the Prefecture. The Prefectural Governments are entities of public law and their name and territory are those of their geographical department. Prefects are appointed by the central government. The Prefectural Council should consist of majority of directly elected members (25 to 46) and joined by a smaller number of centrally designated members (2 to 5). The direct election of the members of the prefectural council has not yet been activated. The Prefectural Governments have responsibilities over a broad spectrum of areas such as democratic planning (Athanassopoulos 1989), social welfare, health, transportation, urban and regional planning, economic activity, education, tourism and issues of the 'new generation'. The latter include cultural events, sports and vocational training.

Greece includes a total of 304 municipalities and some 5,696 communities (ΕΣΥΕ-1, 1989). According to the current Constitution (1975/1986), article 102, the local government of first degree consisting of the municipalities and communities is responsible for local affairs. This tier of government is provided by the constitution and has administrative independence. Communities directly elect their presidents and municipalities their mayors, every four years, in simultaneous, compulsory, direct, secret ballot elections, organised nationwide. The central government is responsible for allocating funds to the local government of first degree to facilitate its purposes. Other laws provide for the participation of members of the local government of first degree in the higher tiers governments (prefectural or regional).

All tiers of government, that is local, prefectural, regional and central, are involved with the policy for development as shall be described in detail in chapter two of this thesis.

1.3 A historical synopsis of the modern Greek State

The purpose of this short presentation is to highlight the main causes of centralisation in the government functions in the country. It will be shown that the prolonged periods of unrest and instability that characterised even recent years were the main causes for the reluctance of governments to deconcentrate power. The above reasons led to a centralisation of the economic activity with serious consequences for contemporary Greece.

1.3.1 From the formation of Greek State to World War II

Greece exists as a free country in modern history from March 25th, 1821, when the national War of Independence against the Ottoman occupation commenced. The exceptional cultural, linguistic and religious coherence of the Greek nation has kept the historical ties with the Byzantium and Ancient Greece alive and strong. Modern Greece was first organised as a State at the First National Congress at Astros (Peloponnissos), on 30.4.1822. The sequence of regaining the occupied territories that today comprise the Greek State lasted well over one hundred years until 1947, and went through much conflict and subsequent political treaties (Finlay 1861, Dontas 1966, Vasdravelis 1968).

A synopsis of the territorial annexations of modern Greece is as follows. By 1832 Central Greece, the Peloponnissos and the Kyclades islands were free and united. In 1864 the Ionian islands joined Greece, after a period of being independent, following their previous dominance by Venice. By 1881 Greece regained Thessalia. In 1913 Greece once again included Macedonia and the northern Aegean islands. In the same year the newly formed independent state of Crete (Kriti), after being liberated by the Ottomans, joined Greece. In 1922 Greece gained western Thrace (Thraki) and in the same year was forced to retreat from the previously (1920) liberated Ionian coast of Asia minor. Eventually the bo rders were settled by the international Treaty of Lausanne in 1923. Finally in 1947 the Dodecanissos islands, previously dominated by Italy, become part of the Greek State.

1.3.2 The period 1944 - 1974

Towards the end of the Nazi occupation of Greece the country portrayed a complicated political situation. Such complications led in fact to a four - year civil war, which was responsible in large measure for the subsequent development. The National Liberation Front, (EAM), with other cooperating forces formed on the freed territories, in March 1944 a Provisional Government, (PEEA). Consequently the marionette government supported by the Nazi occupants collapsed (Byford-Jones 1945). In September 1944, the PEEA in the meeting of Kazerta, Lebanon, was compelled to accept a presence of the British army in Athens, under General Scobie, as a stabilising force. The result was that Greek Popular Liberative Army (ELAS) the army of EAM, victorious against the Germans and having control on most provinces, invaded Athens. British ministers Churchill and Eden visited Athens on Christmas Day 1944 in an attempt to stop these developments (Alexander 1982).

Eventually ELAS retreated according to the arrangements of the Varkiza treaty, February 1945, and disarmed. As a result of the escalation of right wing para-military terrorism, the democratic parties abstained in the elections of March 1946, and a referendum in September 1946 made it possible for the king to re-establish in Greece, form a government, and raise the National Army.

National government made EAM and ELAS illegal and the latter established the Democratic Army in October 1946, to start a civil war (Leeper 1950, O'Ballance 1966). In February 1947, the British terminated their intervention and withdrew, allowing US president Truman to undertake the situation in March 1947 (Truman Doctrine) (Stavrianos 1952, Xydis 1963a, 1963b). By December 1947 the Democratic Army had re-established the 'Provisional Government of Free Greece' in most provinces. But the civil war ended in December 1949, in fact with the retreat of the Democratic Army. Retribution was then taken by the National Army and the paramilitary organisations against the remains of the socio-political framework of the Democratic Army. The social and economic results of this war are still reflected in the conditions of contemporary Greece (Svoronos 1972).

The situation of instability after the civil war was not conducive for the development of the devastated country. There was a dominance of governments that maintained the climate of war. More than 2% of the population became political refugees in the East. Political trials and executions continued during the fifties. Over 100,000 were sent to concentration camps, set up on several islands of the country (Margaris 1966). People that were thought to be in the past supporters of EAM, were seriously discriminated against as regards jobs, unemployment benefits, or even marriage licenses. The murder of the socialist M.P. G. Lambrakis, in May 1963, resurrected unrest and the popular demand was for the resignation of the government. The king was forced to hold elections. In February 1964, the liberal G. Papandreou collected 52.7% of the votes and 171 of the 300 parliamentary seats to form the first liberal government since 1928.

The G. Papandreou government tried to redistribute the national income, to challenge the privileges of foreign capital in Greece, to restructure the education system and protect individual freedom. But being accused by the US of following the Nasher's paradigm in Egypt, G. Papandreou was forced in December 1966 to form a coalition government with the right. New unrest emerged under these pressures. The king decided to dissolve this government in April 1967, intending in a palace controlled coup based on the army leaders. Instead, for a variety of reasons a military dictatorship based on colonels was established on April 21st, 1967. (Rousseas 1968, Papandreou 1970, Clogg 1972)

The military regime, carried out a neo-fascist and nationalist ideology, and actively served the US military and economic interests in the area. The financial programming was tailored to the necessities of capital and the military elites that spent the tax revenues and the american financial support without any control, as there was no Parliament. Nepotism was the rule for the military and civil service positions. The regime was never accepted in the conscience of Greeks but the army and the police controlled everything but the people's thoughts. (Williams 1967, Theodorakis 1971, Nikolinakos 1975)

In 1973 resistance to the regime increased to such an extent that the army and police were forced to quell student demonstrations in Athens on 17th November, 1973 resulting in many deaths. The regime fell. Power then fell to another military regime, that led to July 1974, when Turkey invaded Cyprus.

On December 8th, 1974 a referendum in Greece decided that the state would be Democracy, thus ending the period of intervention and unrest that started with the biased referendum of March 1946. Dictatorship proved to be costly in many respects other than those of regional development.

1.3.3 The period after 1975

From 1975 on, democracy was established and Greece has enjoyed its longest period of stability in modern history. It has become a safe European country and tries to develop and overcome the handicap of so many past social and political misfortunes. Eventually on 1.1.1981 Greece joined the European Communities (EC) and since then has made making efforts to establish itself in the European forum.

In 1981-1982 comprehensive legislation providing for financial incentives for industrial development was produced. Subsequently in 1986-1987, in order to meet the necessities of development for its lagging peripheral regions, a regionalisation of the country and legislation for government deconcentration was produced. In the main, as stated before, the legislation provides for a four tier governmental structure but its full implementation is still incomplete. The Industrial Areas Programme, the major regional development project related to industrial policy having produced three Industrial Areas from 1965 to 1974, added a further fourteen by 1983 and reached twenty by 1988.

Hence, deconcentration, in conjunction with the development efforts such as the Industrial Areas, have only recently started producing tangible results. These will be discussed in detail in the following chapters.

1.3.4 Conclusion of the historical synopsis

Overall, this historical synopsis shows first, that the annexations of occupied Greek territories during the nineteenth and the first half of the twentieth century retarded economic development and created a need for a strong centralised government. Trade was the main national economic activity rather than manufacturing or services. Second, that the unstable political situation and the economic mishandlings of the period 1945-74 had serious negative economic and social consequences and also maintained and favoured centralisation. Finally, that regional development efforts were only put forward after 1974 and relevant legislation emerged in 1982 and 1987. It is a gigantic task for modern Greece to restore the past situation and set the bases for a new development.

1.4 The economic and population background

1.4.1 The patterns of economic development

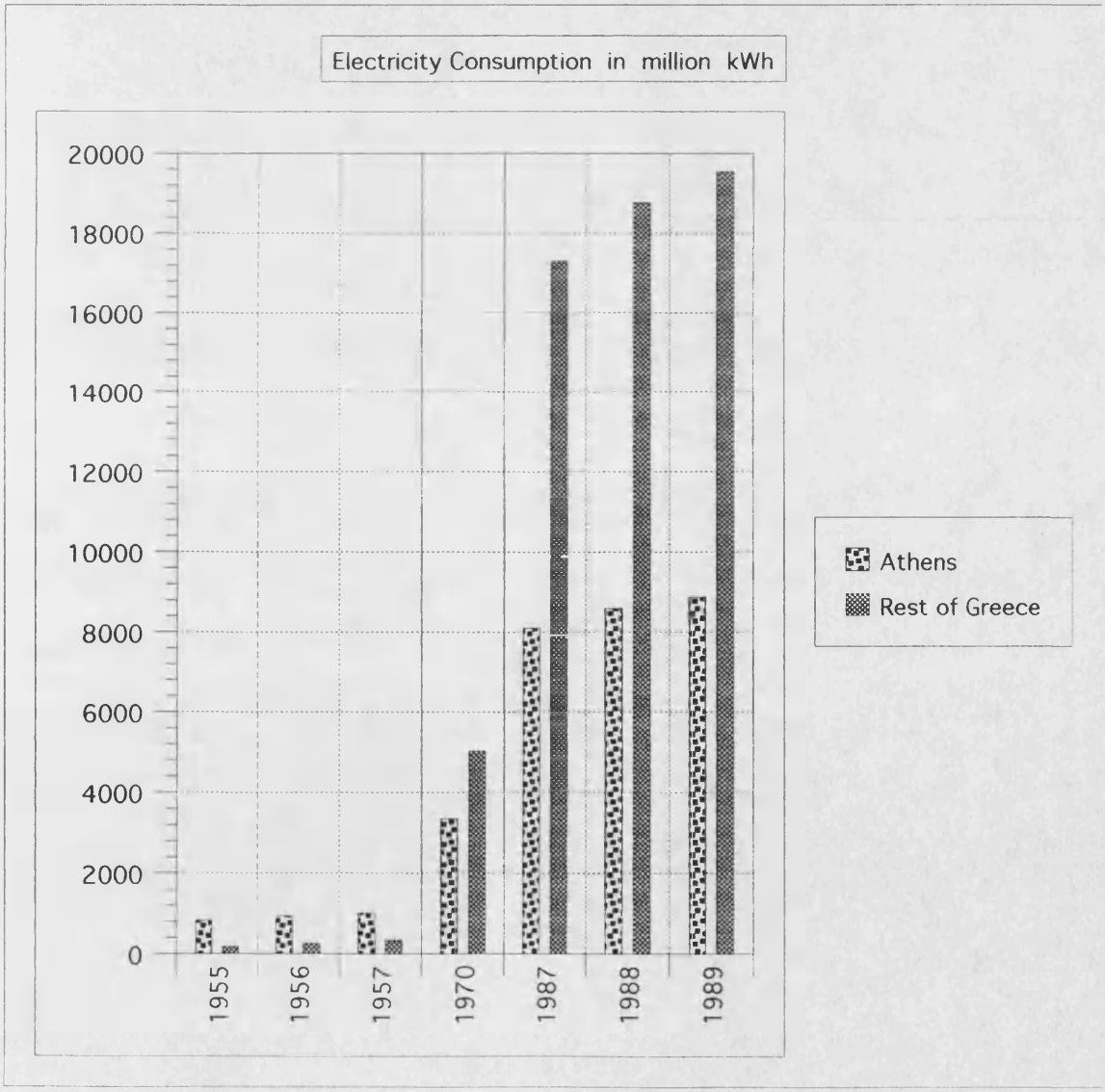
A first fact characterising the period 1950 - 1970 was the low levels of provision of the physical infrastructure in the country and its almost total centralisation around Athens. The fifties found the Greek provinces and especially the rural populations in unsatisfactory built environment. Housing conditions were poor, road and railways conditions were worse and many bridges had been destroyed, all to some extent due to the damages caused by the occupation and the civil war. Telecommunication facilities in rural areas were almost non-existent even until the eighties; remote villages had just a single telephone for common use, and certain islands were without any. For example by 1968 Athens alone had double the telephones than in the rest of the country. Even in 1985 Athens still had half the telephone lines of all Greece (Table 1-2). Electricity production was very low in the fifties and sixties and consumption was mainly a privilege of Athens and much less of few other cities. There was no nationwide electricity supply network until the seventies and remote areas and certain islands did not have electricity until the eighties. Illustration of the relevant consumption patterns and magnitudes are given in Figure 1-2.

The second characteristic of the economy in the period 1950 - 1970 was that Greece was seriously short of capital. Strategic industries were especially deficient in capital investment. These were industries that should have created national specialisation, agglomeration economies and long run positive effects. Given

Table 1-2: Telephone lines in operation in Greece, 1968 - 1988

	ATHENS		REST OF GREECE		ALL GREECE	
Years		%		%		%
1968	406000	64.8%	221000	35.2%	627000	100%
1978	1070000	53.5%	930000	46.5%	2000000	100%
1988	1600000	44.4%	2000000	55.6%	3600000	100%

Figure 1-2: Electricity consumption in Greece, 1955 - 1989



the above infrastructure conditions reflecting a shortage of public capital, private capital in the period injected only small amounts of investments into manufacturing (some 10% of all investment) (Figure 1-3). Greek capital instead sought enterprises producing a fast return, such as in speculative housing (Emmanuel 1981), and in trade and services provision such as tourism and shipping. As regards the latter, as shown in Table 1-3, in the sixties the Greek flag already accounted for the third largest merchant shipping volume in Europe, after UK and Norway. Greek interests in general had managed to command much larger tonnage, but this volume was only in part under the Greek flag, besides a variety of convenience flags. Thus, and also due to the global character of this type of business, returns of this noteworthy enterprise only to a modest extent entered the Greek economy.

After 1974 though, and for most part of the eighties Greek-flag shipping became the largest worldwide (Table 1-3). Also, investment in manufacturing increased its share a lot (Figure 1-3).

Any manufacturing enterprises which did find the capital to start or expand in 1950-1970, did enjoy serious tax reliefs, low wage payments, and fiscal protection from foreign competitors. Thus some Greek owned manufacturing enterprises grew and became rapidly large ones. For example cement companies (Iraklis, Titan), oil refineries (Aspropirgos refinery), steel industry (Chalivourgiki), aluminium (Aluminium of Greece) food processing companies (Elais, Ion), tobacco (Papastratos) and other companies.

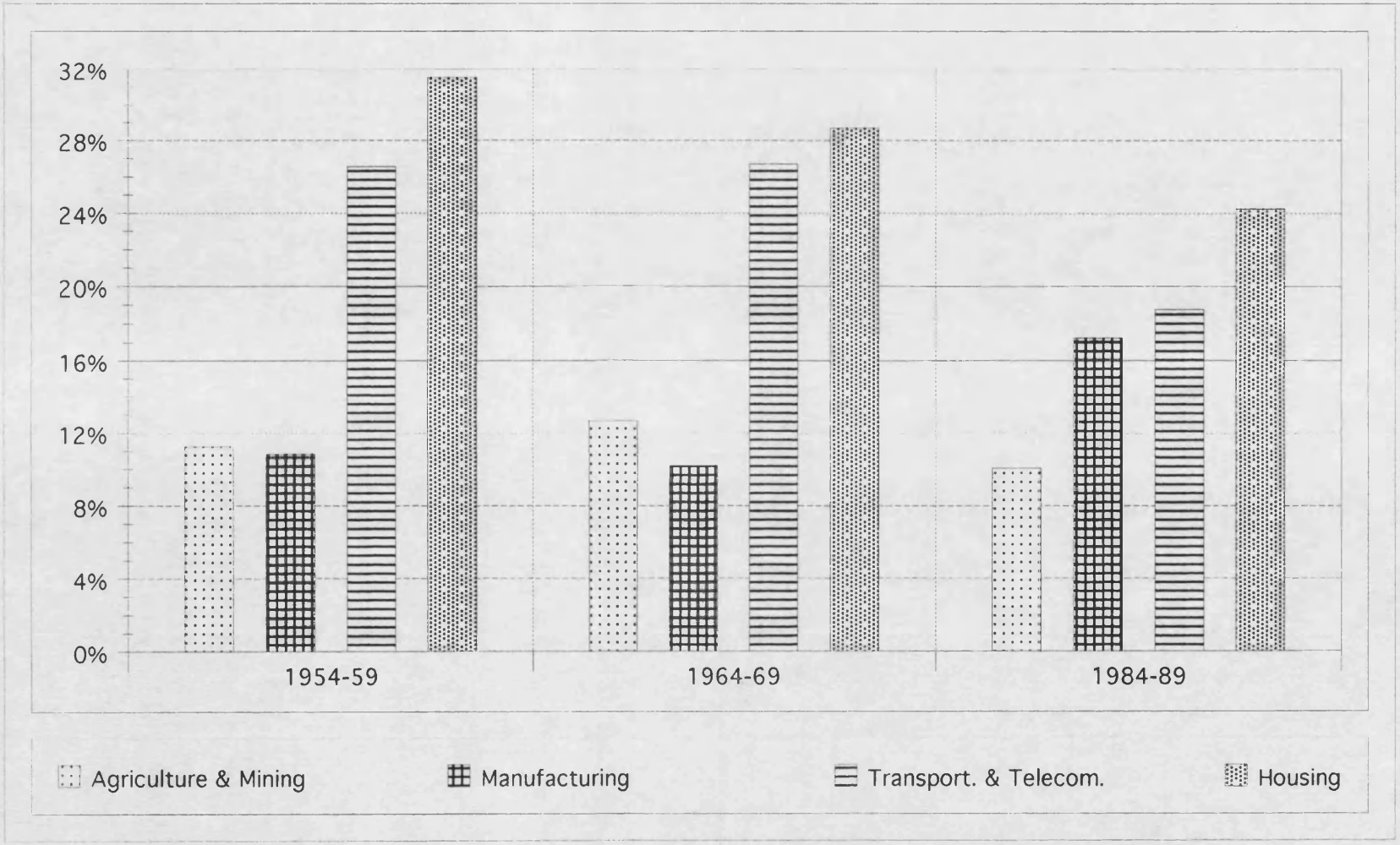
The government's economic activity mainly concentrated on the provision of electricity, telecommunications, the largest part of public transportation, as well as other infrastructure with the creation of relevant national enterprises. They used the very limited tax revenues which were available and some of the external financial help. It should be noted that from the large foreign capital transfers of the Marshall Plan in the fifties, Greece received from the US over 4 billion dollars as financial support. But from this, some 53% was used to satisfy military goals with only 21% going towards national public investments (Svoronos 1972). It was beyond the government's abilities and aspirations to expand in further entrepreneurial activities. Instead, the various governments of the period were keen to attract inward foreign investments into the country in productive sectors. Regional development was a non-issue at the above period.

As regards foreign private capital, the socio-political situation was such, at least during the early period, that would not inspire international capital to invest. The physical infrastructure conditions were not satisfactory as described and additionally skilled labour was not up to the standard required to attract

Table 1-3 : Merchant shipping volume of Greece and other selected countries
(in thousand Gross Registered Tons)

	1964	1968	1972	1976	1980	1984	1988
Greece	*6888*	*7416*	*15239*	*25035*	*39472*	*35059*	*21979*
U.K.	21490	21921	28625	32923	27135	15874	8260
U.S.S.R.	n/a	12062	16774	20668	23444	24492	25784
Norway	14447	19667	23507	27944	22007	17663	9350
U.S.A.	22430	19668	15024	14908	18464	19292	20832
France	5116	5796	7420	11278	11925	8945	4506
F.R. Germany	5159	6528	8516	9265	8536	6242	3917
Spain	2048	2821	4300	6028	8112	7005	4415
Sweden	4308	4865	5632	7971	4234	3520	2116
Cyprus	n/a	653	2015	3114	2091	6728	18390

Figure 1-3 : Greece: The shares of selected economic activities in Gross National Investment



international investments. The limited interest of international capital made the governments of the period to resort to desperate measures. Often foreign capital was given 'colonial' privileges in order to invest in heavy industrial sectors.

These agreements with foreign capital resulted in some employment creation, but it was quite often that the domestically occurring added value was kept to a minimum. Associated with such developments, uncontrolled exploitation of non renewable resources and the export of raw materials also took place. But perhaps most important such agreements in fact eliminated any later opportunity for domestic investments in these fields, due to either lack of the resources themselves, or to unfair competition created by the privileges that were offered by the agreements. To a lesser extent valuable land in tourist resorts was sold, and not leased as it might have been, to foreign capital for development at prices even below those of pasture land. The local factor missed relevant future development opportunities. In addition, the non-tourist development prospects for these local economies were bound to be constrained in the long term.

It is important to note that all economic activity, except that which is raw materials oriented would naturally want to establish in and around the Capital to take advantage of the existing, even though limited, infrastructure. The other urban centres proved less attractive for investments, also due to a centralised government pattern. During the sixties, industry was also attracted to the Capital to take advantage of the large pools of unemployed people concentrating there. Besides, due to these circumstances, and to the political situation described earlier, workers unions were either non-existent or non - effective, or controlled by the industrialists. As a consequence conditions of work were poor and the wages low. The state at the time offered the industrial sector substantial tax reliefs, but unfortunately there was no regulation or regional policy or any other financial or infrastructural incentives that would effectively go with them.

The third characteristic of the economy of Greece in the period 1950 to 1970 was the lack of industrial specialisations and the associated unemployment. In the provinces the main specialisation was agriculture and stock farming. But after over ten years of war and unrest, much of the older cultivated land was unproductive and the stocks exhausted. Additionally, since trade of relevant products was either prohibited during the occupation period, or carried out under extremely difficult conditions during the civil war, most family enterprises ran serious economic risks and worked merely to serve their debts to the Agricultural Bank. A common characteristic was the underemployment of rural populations, the undercapitalisation of the enterprises and the extremely low wages for the

workers of land. In the larger peripheral urban centres, the reconstruction of the bombed or damaged areas and public infrastructure created some jobs for construction workers and related activities, but lack of manufacturing and services enterprises did not provide for other normal industrial specialisations. Of course, the attraction of these cities, compared to Athens, was many times smaller.

Unemployment in the whole country was in 1951 over 20% of the economically active. Even so, the GDP per capita grew from $ 112 in 1951 to $ 250 in 1956. During the short period of 1963-1965, under the G.Papandreou reforms, the GDP per capita rose in 1964 in excess of $ 600 and for the first time in 1965 the value of the industrial production became greater than the agricultural (Table 1-4). On this base, production and the GDP per capita in fact doubled within the seventies to top the $4000 mark in 1980, but it was reduced below this in the eighties (Figure 1-4). The lack of international competitiveness became apparent in the eighties during which time the country ceased to be 'industrial paradise' for many local unproductive industries after Greece joined EEC in 1981.

Given the above characteristics of the national economy a growing national debt was formed. One reason was the poor handling of the large external financial support as mentioned. The other was the lack of adequate taxation. The growing manufacturing and other sectors of the period enjoyed large tax allowances, and the suffering agricultural populations did not pay income tax. The tax system, based by 75% on indirect taxes, hit mainly the economically weak and the unemployed and did not provide enough revenues for the state.

The effects of this growth in social well-being were limited, since within the described power structures the salaries did not follow the increases in productivity. Under these conditions, profitability of manufacturing was viable, without any necessity for technological advance or skilling of workforce. Economic activity was concentrated in and around Athens and much of the country was backward. The development that did occur in and around Athens was substantial, but almost totally uncontrolled. It will be shown in chapter two that the first regional development efforts were designed in the mid-sixties but in fact only really began to be effective in the eighties.

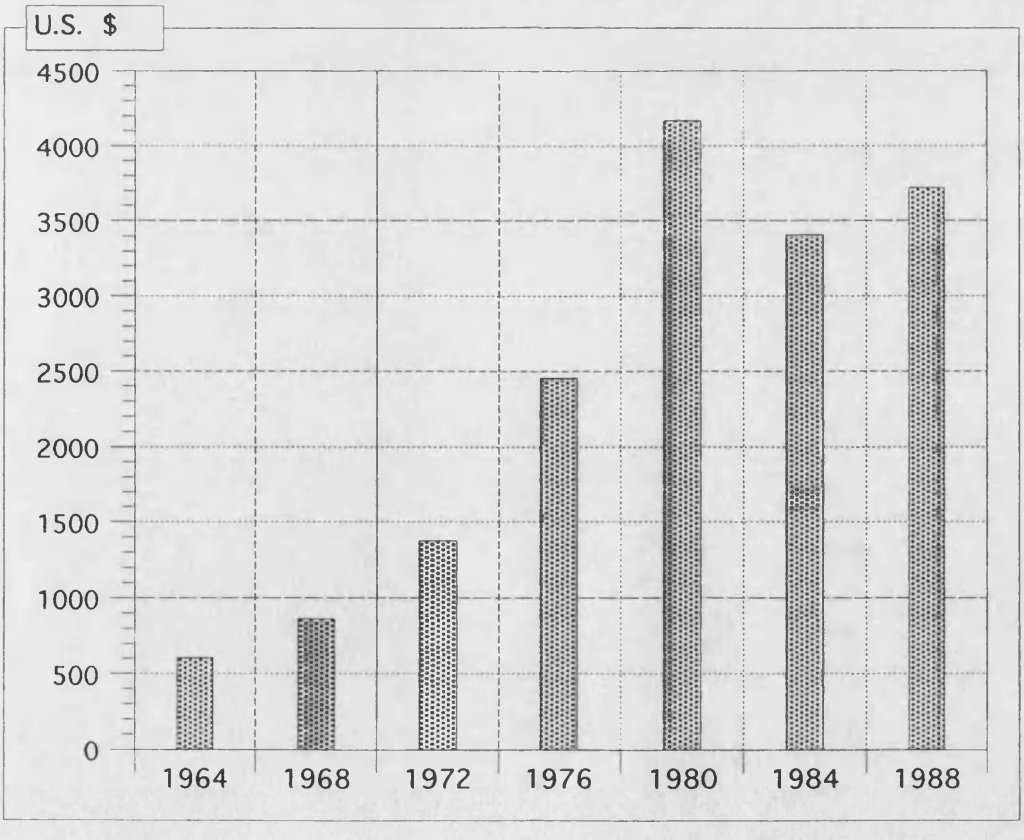
1.4.2 Population trends and cumulative centralisation

Rural populations in the fifties preferred not to stay in their villages where often political and social discriminations affected their ability to work. Besides, urban centres and especially Athens attracted the young population. However there were several important differences between Athens and the other urban

Table 1-4: Gross Domestic Product per economic sector in Greece, 1964 - 1988
(in million drachmas at 1970 constant prices)

Years / Sectors	1964	1968	1972	1976	1980	1984	1988
Agriculture-Fishing	44620	44817	51543	55971	60499	59394	63152
Mining	1976	2969	4495	5242	6245	7827	8790
Manufacturing	32590	48614	58892	78029	89125	86475	91206
Electric.Gas.Water	3136	5171	7389	9753	13724	16022	19543
Construction	13131	18983	31179	24576	26392	21890	22528
Transport.Telecom	13144	19495	24447	31270	39898	45936	51054
Trade Tourism	36689	48417	60383	75606	88730	96868	108644
Financial Services	3478	4982	7372	9714	11037	12074	13960
Other Services	30482	41648	58273	70238	81860	88210	95049
T O T A L	179245	235098	303973	360399	417510	434696	473926

Figure 1-4: Gross Domestic Product per capita in Greece, 1964 - 1988
(in current U.S. dollars)



centres. Athens was not bombed during the war, and the subsequent civil war was mainly carried out in the provinces. Thus the housing conditions in Athens were not unsatisfactory, and capacity was growing rapidly. This, together with the hope of finding a regular job, and the cultural life and entertainment, so much missed over previous years, were the main attractions of Athens for the disadvantaged rural population, especially the young.

The above situation stimulated a secondary migration movement towards Athens in the sixties. Eventually the young migrants brought other members of their families to Athens or received guests from their villages and kept them until they could find some job of their own.

Every fifth person not living in Athens in 1956, was in Athens by 1981 (Figure 1-5). If Thessaloniki is added to this type of calculation every two out of seven people living anywhere but in these cities in 1956, eventually were there by 1981. This simply means that almost all young males of rural families were attracted to the urban centres, in addition to other categories of migrants (Table 1-5 and Figure 1-6).

Of course Athens, however fast it grew, could not offer jobs and amenities to all of this incoming population. Thus, incidentally a large out-migration stream to international destinations formulated from 1955 to 1974. Target countries were, in order of importance, West Germany, US, Canada, Australia, Rest of Europe, Central Africa and South America. Greece lost, during this time, a large part of the most dynamic and productive population. This population and brain drain had serious negative effects for the development of the society and the economy (Figure 1-7). With the political stability after 1974 the trend diminished.

The effects of the urbanisation trends outlined, initiated a circular process of development. The more housing was demanded, the more construction related jobs were created; the more job opportunities were created, the more young rural people decided to come in Athens and eventually needed more housing. Developers re-invested their profits in housing and some 50% of what is Athens today was built from 1950 to 1970 (Table 1-6). Agglomeration economies and the plentiful supply of labour attracted large industries to Athens during the fifties and sixties in a circular and cumulative way. The inherent entrepreneurial spirit stimulated by the increasing demand acted in a way that many hundreds of new small manufacturing and services provision enterprises were also created seeking for space in and around Athens.

The massive urbanisation trend which occurred from 1951 to 1971 meant that Athens' share of the total country's population rose from one sixth to one

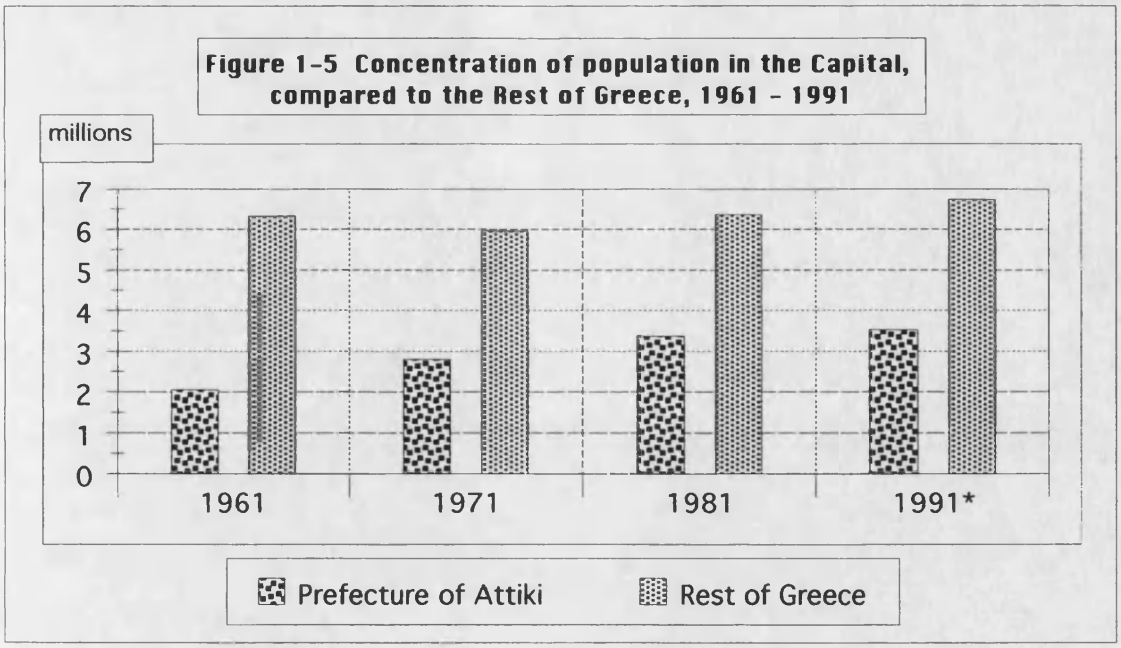
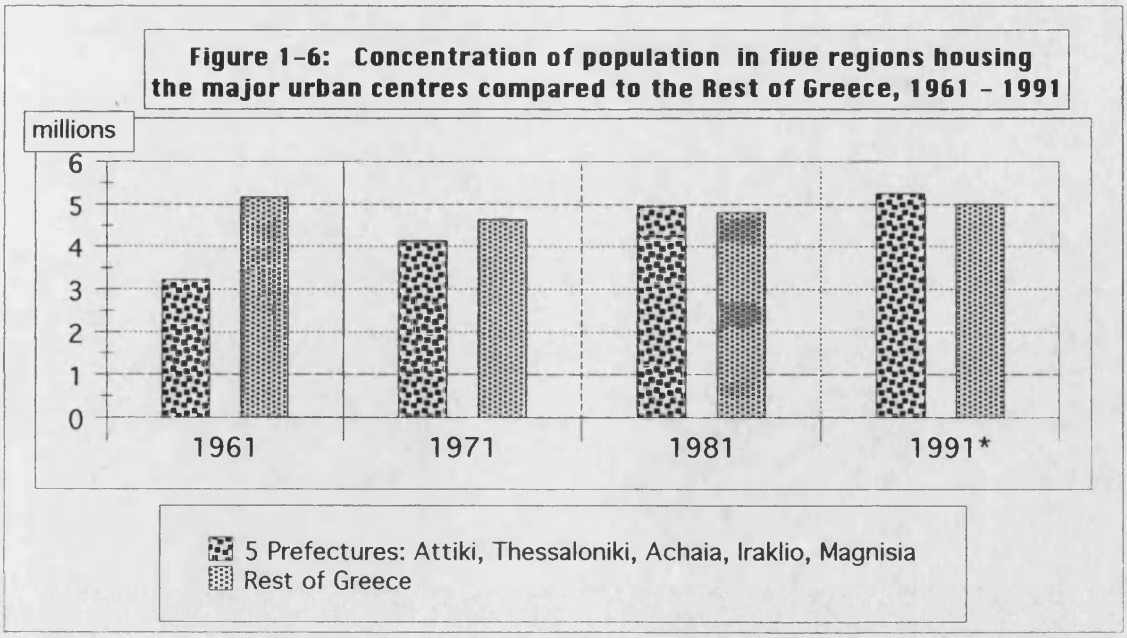


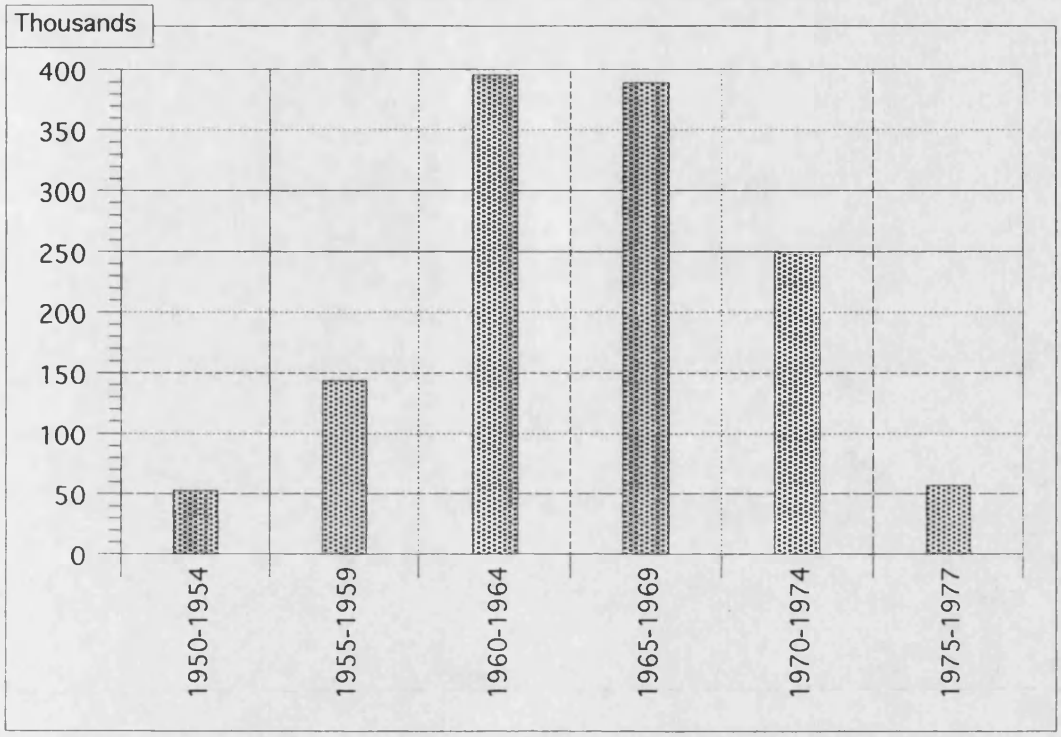
Table 1-5: Evolution of population in regions housing the major urban centres in Greece, 1961 - 1991

Regions / Years	Attiki	Thessaloniki	Achaia	Iraklio	Magnisia	Rest of Greece	Greece
	(in thousands)						
1961	2057	546	240	208	163	5171	8385
1971	2797	711	240	209	161	4646	8764
1981	3369	871	275	243	162	4798	9718
1991*	3523	969	297	264	198	5005	10256



* Figures for 1991 are provisional, unpublished; Source: National Statistical Service of Greece

Figure 1-7: Out migration from Greece, 1950 - 1977



Note: Greek authorities do not collect migration information for Greek citizens after 1977 (Ministerial Decision 9768/1977, Government Gazette 391/1977)

Table 1-6: Quantity and age of stock of buildings in Athens, 1946-1989

Years		1946	1965	1980	1989*
Number of existing buildings		77754	247022	419064	449430
Increase %	from 1946	-	+ 218%	+ 438%	+ 478%
	from 1965	-	-	+ 70 %	+ 82%
	from 1980	-	-	-	+ 7%

* Figures for 1989 are estimations.

third. This was but only one manifestation of the of the problems that these developments would cause.

1.5 Centralisation problems and the need for regional development

1.5.1 Over-concentration in Athens

Athens was built up quickly in the fifties and sixties, without any land use master plan. Inner city development legislation was minimal. Every privately owned patch of land was developed with detached blocks of flats following practically a full land coverage. Speculation on housing was such, (Emmanuel 1981) that not only was non-developed land built upon, but also already built-up areas with one or two storey houses were redeveloped. Under a special agreement typical for tens of thousands cases in Athens (antiparochi), developers were building usually five or six floor, full coverage blocks of flats, offering the owners footage equal to or larger than the old. This way, most of the traditional and neo-classical housing was demolished and Athens lost much of its precious architectural character.

The lack of a land use master plan resulted in excessive population densities in residential areas, often above 50,000 and in some clusters above 100,000 inhabitants per sq.km. These districts were without recreation spaces, parks, or purpose built buildings such as hospitals, supermarkets, car-repair shops, filling stations and schools. The blocks of flats of that period in their vast majority did not provide car parking places, instead flats were allocated on the ground floors as well as in the basements as a result of the large demand for housing. Only in the mid-sixties, when demand for professional-use space was rising, as described earlier, were block of flats designed to have shop or workshop space in the ground floor, without any other change in the blocks' typical characteristics.

The consequences of this last type of development were, and still are, reducing the quality of life in central Athens, with car-repairs and filling stations under blocks of flats, with clinics and even schools in the same ubiquitous blocks of flats. Parking spaces along the streets became totally inadequate for the rising car ownership of the seventies and eighties and in too many cases the viability of the narrow streets of the residential areas is obstructed. Many of these inadequacies were given drastic solutions, such as huge schools with morning and evening shifts serving the large compacted residential areas that had been created. The

important issues of transportation, sewage treatment, waste disposal and the aftermath of increased water consumption and lack of green recreational space are still largely unsolved.

As mentioned, much of private capital was speculating in housing provision during the period to 1970. Even so , small manufacturing enterprises were created by the new comers. These enterprises were initially home-based, and when their size could not be accommodated within the urban area they relocated to the urban fringe. But this in turn was of course moving outwards fast, year by year. When less capital was re-invested in housing from 1970 onwards the small manufacture began to attract the attention of capital. Thus these companies expanded and created growth and employment which was reflected in the more than doubling of the GDP within the seventies. But by that time, the urban fringe of the late sixties, had already become clearly inner city.

This lack of a land use plan and the lack of an industrial decentralisation policy during this crucial expansion seems to be one of the most serious causes of pollution, transportational inadequacies and the low quality of life of the capital's population. It is the very same infrastructural inadequacy, together with the lack of space and related problems, that has plagued the further expansion of these companies. In economic terms this meant that often such firms' competitiveness fell further behind year after year as a result of the generated diseconomies. Thus it led to a considerable slowdown in economic activity in the eighties.

But why did these agglomeration diseconomies of Athens not lead to a spontaneous relocation of economic activity to the periphery? This did not occur for two main reasons. First, because the physical infrastructure in the periphery and the available skilled labour were even more unsatisfactory there, due to the lack of a consistent regional development programme. Second, because the existing political centralisation strongly attracted in practice, though not in words, the centralisation of the economic life.

1.5.2 The desertion of the periphery

The most serious problem of the periphery has been the population loss and drain of skills. Indeed it can be said that the main cause of the decreased migration trend towards Athens after the mid seventies was the lack of available young, dynamic and ambitious population in the periphery. The rural areas experienced in the sixties and seventies a dramatic decrease in their population, especially the active, in some cases directly towards foreign countries but mainly towards Athens and other large urban centers. The effects on the agricultural sector can be seen

in Figure 1-8.

The mechanisation of agriculture slowly but constantly made the former land-workers redundant, in turn migrating to Athens after any construction jobs available. Even the large land owners moved to urban areas and administered their holdings from there. Whole villages were abandoned. For small landowners it was not so economical to live in the nearby cities and to mechanise their production. Many sold up and moved to settle in Athens and few more large cities, becoming entrepreneurs, or the younger perhaps white collar workers.

In relevance to the above, it can be seen that during the period from 1964 to 1988 the sector that experienced the main decrease in its share in national GDP was agriculture, while gains were mainly experienced in transportation-telecommunication, tourism, financial and other services and manufacturing (Figure 1-8).

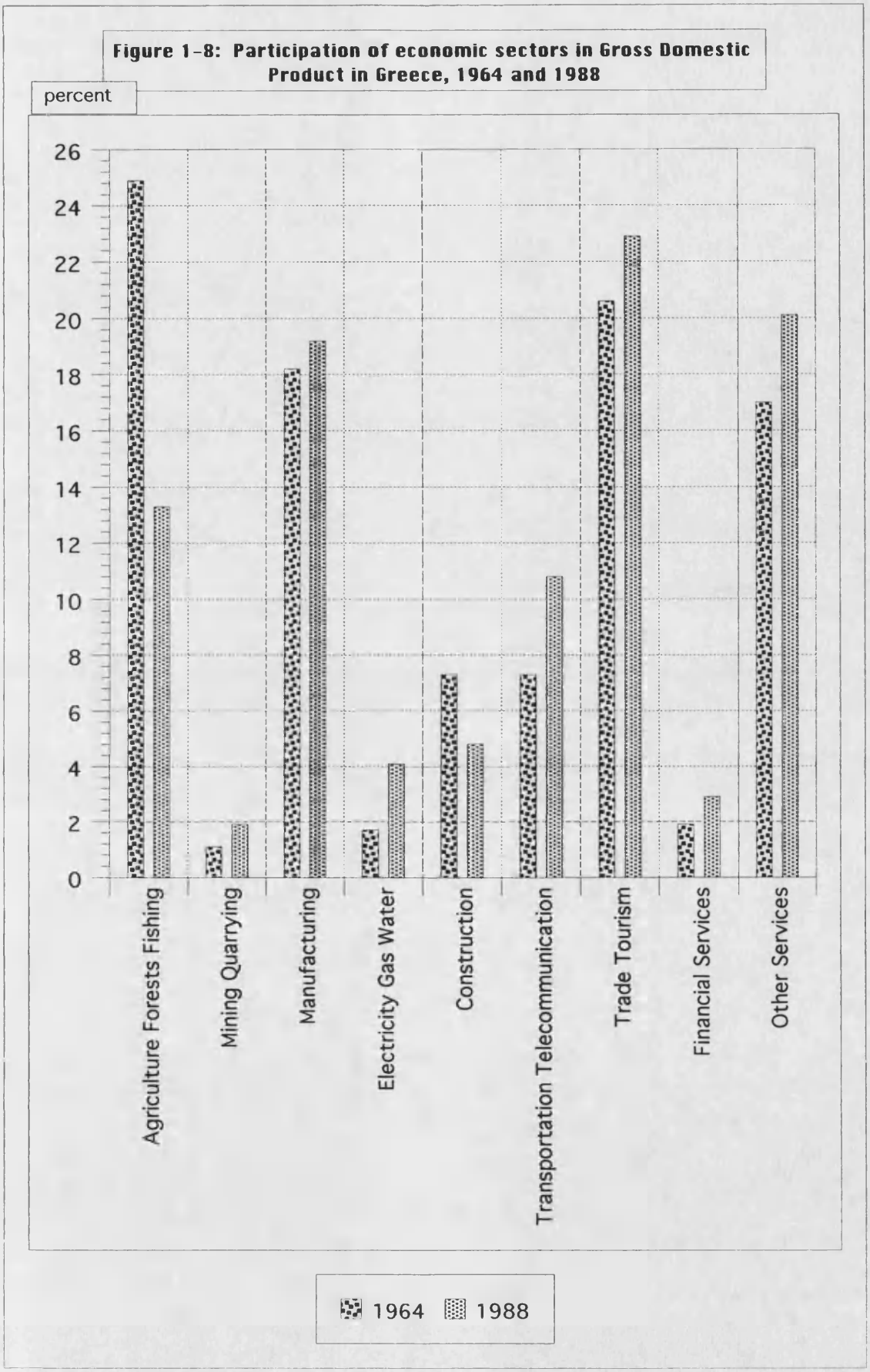
In this climate of lack of infrastructure and human resources minimal industrial investments were made in the peripheries. Desertification of peripheral land was taking place pushing land values ever lower and communities and social structure to dissolve. By the mid-seventies the need of some effective regional development policy dynamically emerged. The young Industrial Areas Programme in Greece was perceived as one which would provide such much needed scarce industrial infrastructure to the peripheries. In the eighties capital support and transfer policies were also developed and consequently the long awaited first steps towards deconcentration of political power were made as will be further discussed in the next chapter.

1.6 Conclusion

The fragmentation of the Greek territory and its mountainous character makes adequate provision of infrastructure difficult and naturally leads to centralisation in convenient locations. The prolonged periods of the territorial annexations of the country was a further important force maintaining centralisation of the administration and also made capital reluctant to invest in peripheral regions. The occupation of 1941 - 1944, the civil war that followed and the political instability during the subsequent period played decisive role in the concentration of political and economic power in the capital, Athens.

The lack of an integrated development regulation also played a critical role in

Figure 1-8: Participation of economic sectors in Gross Domestic Product in Greece, 1964 and 1988



the centralised development pattern. It created two large problems undermining the future economic development of the country. First, the over-centralisation of economic activity mainly around the capital city and the desertification of the peripheries. Second the inadequate technological levels achieved in manufacturing.

The massive urbanisation trend leading to the concentration of most of the young and dynamic population in Athens, together with the industrial concentration, caused a series of problems in both the peripheral regions and Athens itself. This centralised growth gave to the country an unhelpful and over optimistic understanding of fast development. Economic power was established in Athens, and economic development decisions were taken almost exclusively in Athens, where the government, the headquarters of most national and all international firms and financial institutions are still established. Information flows towards the regions were also all via Athens. Political decisions and power were strictly centralised and before 1987 there was practically no development decision making power outside Athens.

The industrial base created this way was not technologically advanced enough, to be ready to cope with international competition. The policy of fast, almost tax free, industrial development and protection (1955-1974), in addition to the lack of any land use or regional development plans, was one of the main causes of the industrial over-concentration in Athens (and to a lesser extend in Thessaloniki). This undermined the future functionality and competitiveness of manufacturing clustered in the central areas and diminished the attractiveness of the peripheral areas in the later years.

After 1975, and especially towards 1981, the year of Greek entrance to EEC, the regional development issue was much more seriously considered. Firms were offered wider locational choice combined with financial support. By 1982 a regional development legislation based on financial incentives had emerged, the Industrial Areas Programme was accelerated and an administrative deconcentration was attempted in 1987. Several new multi-national and trans-national companies began to establish in Greece. As regards manufacturing these specialised in electrical engineering (AEG, Siemens), car assembly (Nissan, Mercedes), metal products (Pechiney, Alcatel), chemicals (Lever, Ciba-Geigy, Hoechst, Henkel), foods (Shuchard, Nestle, Coca-Cola, Pepsi-Cola), printing and photographic products, among others, and they have created some growth and income. Some of the domestic competing firms were forced to decline and fail, some merged with the newcomers and some have survived competition and expanded.

In this chapter a description of the political and economic conditions in

Greece revealed the centralisation and dualistic characteristics that were mentioned in the introduction and the problems related to them,and made the need for a regional development policy obvious. The emergence of regional development policy, especially in manufacturing related aspects, and its subsequent effects will be analysed in various ways in the consequent chapters. The integral and important part of this policy is the Industrial Areas Programme of Greece - the prime focus of this Thesis.

Chapter 2: The institutional and legal framework for development in Greece and the formation of the Industrial Areas

2.1 The general regional development policies

2.1.1 The regional development agencies

The first efforts to promote regional development in Greece started after the second world war. These attempts were small in scale and were of an experimental character. Several 'Regional Conferences for Restoration of the Country' were held in 1949-1950 in main peripheral cities. These were coupled with the 'Programme of Works for Agricultural Mobilisation', 1952-1953. All these efforts lacked continuity and had limited results (Athanasopoulos 1992b).

The first more serious effort that took place was the 'Programme for Development of the Region of Ipiros', in 1958. It was undertaken in cooperation with the European Productivity Agency of the Organisation for European Economic Co-operation, and the Organisation of Economic Cooperation and Development (OECD). This programme resulted in the establishment of the Regional Development Agency of Ipiros, the first of its kind in Greece. In 1961 the Regional Development Agency of Peloponnissos was established in a programme with cooperation of Food and Agriculture Organisation (FAO). The same year saw the start of the Regional Development Agency of Kriti, with the cooperation of private consultants (Agridev and Frank Basil).

By year 1965 regional development agencies were founded in all regions of Greece. In the years between 1967 and 1974 they were all merged in the Ministry of Interior. In 1977 they were transferred to the Ministry of Coordination which is now called Ministry of National Economy. The thirteen regional development agencies in Greece are to the present date operating within the frame of this ministry, implementing the central and regional development programmes.

2.1.2 The development programmes

The former Ministry of Coordination undertook immediately after the second world war the task of restructuring of the economy. The funds used were from various sources, such as the Marshall Plan, internal and international loans, but at least in the fifties funds were spent without any programming or master plan, and quite ineffectively as described earlier.

The first academic organisation on subjects of regional development was the 'Association for Research of Regional Economy' founded in 1962 under professor I. Pintos. In this frame of efforts, the state supported Centre of Planning and Economic Research (KEPE) produced the first 'Five-year Programme of Economic Development, 1960 - 1964' and other that followed (MOC, various). The important words of that first development programme were the following: "Provision is to be taken so that the national investments be allocated to the various regions according to their needs..". The government was requested by KEPE to show its interest, beyond infrastructure provision, by either reinforcing the private initiatives, or by undertaking state investments in the sectors of industry and tourism. The programme concluded that the results of the process of economic development would only begin to appear after a long period of time.

The first development programme was followed by another, for the period 1966-1970, aiming mainly at the "acceleration of the development of the economically lagging regions of the country". This programme also recognised the problem of the lack of a suitable institutional framework in the regions for the efficient implementation of the national policies. The range and effectiveness of these programmes was mainly exhausted in their wording. The overlapping programme for the period 1968-1972 comes to the conclusion that "the size of the regional problem is reflected in the largely differential population evolution within the country". The capital at the period was growing three times faster than the whole country, and most peripheral regions had absolute population losses. Regional Development programmes were subsequently produced quite often by KEPE Institute. Thus, programmes for 1973-1977, 1976-1980, 1981-1985, 1983-1987 and 1987-1992 have been produced. Nevertheless, none of them became a Law mainly because of the inadequacy of governments of the period and their unwillingness to proceed to a full scale regional development policy and the decentralised administrative structure that this required. The only exception was the 1983-1987 initiative.

The 'Five-year Economic and Social Development Programme 1983-1987' became a Law after acceptance by the Parliament. Basic to that programme were

a decentralised administrative structure and increased public participation. This necessitated democratic programming and the transfer of initiatives to the local government. Decentralisation in a four-tier governmental framework - national, regional, prefectural and local - was proposed and adopted. Additionally the basis for a long-awaited national land registry was formulated.

2.1.3 The current administrative structure for development

Within the provisions of the 'Five-year Economic and Social Development Programme 1983-1987' came the Law 1622/1986 under the title 'Local Government, Regional Development and Democratic Planning'. It was created to structure any previous not well organised and administered bodies concerned with the task of regional development into four above mentioned tiers of government in Greece. With laws that followed, each of the four tiers of government has relevant tasks for planning for development.

For development at the national level the Ministry of National Economy formulates the 'Long Term National Development Programme' (equivalent to the five-year programmes of KEPE) . This refers to the national territory, the regions, the prefectures and the local level. This programme is made more specific by the 'Annual National Development Programme'. Each of the latter is accompanied by its 'Finance Programme', allocating funds from the 'National Investments Programme', and from other state sources and also utilising the funds of the lower tier governments. All above programmes are centrally formulated, considering though the suggestions of the lower tiers of government and other agents of the administrative sector.

As it was stated in chapter one, Greece is divided into 13 regions each having its own regional government consisting of the 'General Secretary' of the region and the 'Regional Council'. The regional councils have various tasks as regards regional development. Activity regarding planning for development includes the formation and submission at an early stage to the central government of suggestions for works and projects of importance to the region. These are to be included in the long term national development programme. Additionally within the framework of the current national development programme, the regional councils create the 'Regional Development Programmes'. Consequently they create the conditions in which the lower tier prefectural development programmes are to be formulated.

As regards other development activities, the regional councils allocate the regional allowance from the National Investments Programme to projects of

prefectural or local importance and also cooperate with other central government departments, established at regional level, such as the regional development agencies for any of the other development programmes. The regional development programmes are constructed on annual, medium and long term bases. The degree of freedom in the planning of the regional councils is constrained by their composition, consisting of non-directly elected and centrally appointed members.

Development at prefectural level is administered by the local government of second degree. As was seen, this government is aiming for the economic and social development of its territory with the active participation of the citizens of the local area.

The prefectural government planning is operationalised through the 'Prefectural Development Programme'. This is undertaken in consideration of the suggestions of the local government of first degree (municipalities and communities), and other interest groups. Planning includes economic activity of all kinds but also involves social issues. The prefectural development programmes are constructed within the framework of their respective regional development programme. Such development programmes are planned for every year and for the medium term. Prefectural governments are still to a considerable extent centrally controlled; the responsibilities of the prefectural governments do not interfere with the responsibilities of local governments.

The development at the local level is administered by the local government of first degree, that is the level of municipalities and communities. It is provided by the constitution, has administrative independence and is responsible for all local affairs. The central government is responsible for allocating funds for the local government of first degree to facilitate its purposes.

The local councils plan and finance most projects of local importance. To the extent they get support by central agencies they jointly finance investments that belong to the local development programmes. As regards planning for development, they formulate the 'Local Development Programmes' within the frame of their respective prefectural programmes. Feedback on the latter is maintained by suggestions flowing from the local to prefectural councils, regarding investments or policy measures of local importance.

As it was mentioned, the local government of first degree do possess administrative autonomy. They have their own budgets and they get central financial support provided for in the constitution. Elements from the local government budgets are given in Table 2-1, for the years 1984 to 1988, representative of the eighties. It can be seen that on average the budget of this

Table 2-1: The basic components of the budgets of local government in Greece, 1984-1988

In Billion Drachmas, at constant 1984 prices

Years :	1984	1985	1986	1987	1988	Average 1984-88
Total Revenues	118.2	120.5	105.3	97.8	114.1	**111.2**
Drachmas per capita..	*12184*	*12418*	*10852*	*10086*	*11760*	*11460*
of which,						
Central Government Aid	25.0	28.3	22.8	21.1	25.2	**24.5**
Drachmas per capita..	*2576*	*2917*	*2352*	*2180*	*2598*	*2525*
Central Government Aid %	21%	23%	22%	22%	22%	**22%**
Total Expenditures	102.9	106.5	92.5	86.0	100.3	**97.6**
Drachmas per capita..	*10612*	*10979*	*9540*	*8862*	*10338*	*10066*
of which, new Investment	37.9	39.1	31.5	22.6	26.6	**31.5**
Drachmas per capita..	*3903*	*4035*	*3246*	*2333*	*2745*	*3252*
Investment as % in Local Expenditure Budgets	37%	37%	34%	26%	27%	**32%**
Central Government Investments Budget	182.2	191.6	181.3	165.5	171.5	**178.4**
Drachmas per capita..	*18780*	*19756*	*18686*	*17058*	*17680*	*18392*
Aid to Local Government as % of the Central Government Investments Budget	14%	15%	13%	13%	15%	**14%**
Local Investment as % of Central Government Investment	21%	20%	17%	14%	16%	**18%**
Deflators :	1.00	1.20	1.47	1.71	1.94	

One billion drachmas = £ 6.7 million (1984)

Source : Public Funds

tier of government is some 111 billion drachmas annually at 1984 constant prices. This is equivalent to about 11.5 thousand drachmas, per capita of population annually. The local government spends on average some 31.5 billions annually on new investment, excluding maintenance costs. This is some 3.2 thousand drachmas per capita annually, which may appear little but it is some 32% of their budget. Finances come from the property of the local government, from municipal enterprises, from local dues and fines, from loans and from the central support.

As apparent from the budgets, the local government receives support from the central that on average amounts to some 24.5 billions, equivalent to 2.5 thousand drachmas per capita annually. It works out that it is 22% of the local government revenues. It proves that local government invests more funds than it receives from central government, thus being efficient in this respect. But the income of this government tier is low and its importance in development is high as it is the only truly decentralised development agent. The low central support is not enough to change the underfinancing of this tier of government.

To make a comparison, the state budget provides in its investments component some 178.4 billion drachmas on average per annum for such purposes, from which only 24.5 reach the local governments, that is about 14%. The rest is administered by the state controlled upper tiers. The investments though, that are made through the local government would amount to some 18% if compared to all investments in the state budget. A more development oriented attitude can be found in the local government of first degree (Vagionis 1991).

2.1.4 Legislation for development based on private activity

As mentioned in chapter one, private investments were keenly wanted by the post war governments. A multiplicity of laws for the protection and expansion of industry were issued before 1981, but with little or if any late attention to the spatial planning of development. Briefly, the following laws can be mentioned.

The Law 942/1949 provided accelerated depreciation and tax allowances for large scale manufacturing. The Law 2176/1952 was the first to offer preferential taxing and depreciation treatment to the manufacturing in the periphery. The Law 4171/1961 defined the term 'productive investment' as one that would seriously increase production and employment, or one that would bring into the country a large amount (150 million drachmas) of foreign exchange; these would be assisted by the state. The Law 4458/1965 was important because it gave the Hellenic Bank of Industrial Development (ETBA) the right to establish and operate the Industrial Areas in regions of Greece. The Law 89/1967 offered

protection to foreign trading and manufacturing enterprises established in the country. The Laws 997 and 1078/1971 restructured the preferential treatment of peripheral manufacturing. The Law 1313/1972 was the first to divide the country in three types of assistance classes, A, for central areas, B for developed and C for the rest of Greece. But it also introduced decreased employer's contribution to the employee's insurance boards according to area assistance. Law 159/1975 restructured preferential treatment by the state to enterprises that brought into the country more than 2 million US dollars, or equivalent foreign currency, annually. The Law 289/1976 introduced enhanced incentives for six specified borderline prefectures. The same Law made the various regional development agencies created become part of the Ministry of Coordination (now Ministry of National Economy), under a 'Central Agency for Regional Development'.

Eventually, the Law 1116/1981 attempted a comprehensive arrangement of industrial incentives, in the three assistance groups of regions, aiming to promote regional development. The incentives include grants, that is money that firms receive from the state that is not returnable; subsidised interest rates, that is money that the state pays to banks to cover part of the firms' loans interest; tax redemptions, that is allowance from the tax obligation of the firm of amounts relevant to the investments carried out, and accelerated depreciation rates. The above was the legislative background for Law 1262/1982.

Law 1262/1982 was the basic development Law for the eighties. Under this law some 11,024 investment projects amounting to 593 billion drachmas have been completed by 1993 in all sectors of the economy, of which 218 billions has been direct state support in the form of grants. (MNE 1993). This Law comprehensively administered regional development and its basic lines remained unchanged, with the addition of Law 1892/1990, until the present date.

Law 1262/1982 defines the parts of the investments to be covered, called 'productive', as the ones being orientated to new and permanent premises construction and use of new machinery. The economic activities covered are as follows: manufacturing of all kinds; agriculture using modern technology; mining; technical and scientific support to manufacturing; refuse treatment; shipbuilding and maintenance; liquid fuels (safety); conversion to soft energy sources; tourism; community or local government enterprises; services of high technology. The country is divided into four assistance classes. The central regions belong to Class A which generally involves no assistance, except specified high-technology projects; Class B consists of developed regions and has limited assistance; Class C consists of most other regions, while Class D is designed for lagging or peripheral regions and

provides maximum assistance. Regions are assigned to these groups by 'geographical department' or prefecture units. An exception to the use of the above spatial scheme is made by a clause giving D status to all borderline areas to a depth of twenty kilometers from the border, but with some exceptions (city of Rhodes, city of Corfu, etc.). Additionally some more deviations exist as regards tourist investments.

The Law maintains the basic assistance schemes introduced by 1116/1981, namely grants, interest rates subsidies for loans and tax redemptions in the form of accelerated depreciation. Special provision is made for firms establishing in the Industrial Areas, offering enhanced incentives, above the ones that are provided from the assistance class of each area. For large projects (above £40 million) state participation is an option offered to the project. To safeguard public money the Law gives its support only after expenses have been incurred by the investor. The Ministry of National Economy that administers this Law has central and prefectural bodies auditing the progress of the assisted investments, but reports are kept internal. The ministry also has a central appeal committee for cases that create implications. The Law 1892/1990 mainly introduced regional quotas in the amounts of regional assistance of the basic Law 1262/1982.

2.1.5 The role of the European Communities in development

Greece entered the European Communities (now European Union) as a full member on 1st January 1981. From then on, Greece, tried to align its administrative structure as regards the issue of regional development to that of the Community. In addition the country has been bidding for the community support through the various funds and programmes that it operates.

All Funds of the European Communities (EC) relate to some extent to development in Greece. The European Agricultural Guidance and Guarantee Fund supports private or public projects in remote and lagging areas. Its main aim is to support regions that are hit by the application of the common agricultural policy. The fund plays a role in agriculture, that in Greece is lately decreasing in importance. The European Social Fund finances projects that aim to improve vocational training, reduce unemployment, and to increase mobility of labour. In Greece, this fund is gaining importance of late. Greece has received limited finances from the European Coal and Steel Community. The steel industry in Greece is comparatively small, while the coal industry is much state controlled through the National Electricity Enterprise and no closures are recorded.

The European Investment Bank (EIB), is an important community institution

for Greece. It provides loans complementing to support received from other EC funds for the development programmes of lagging regions. These may be for manufacturing, new technology projects, or infrastructure projects that have economic importance for lagging regions, or for the cohesion of the european states. These loans have low interest and are negotiated on favourable terms. The new Community Instrument is one that provides the Commission with the power to offer such loans to integrated regional efforts through the EIB. For Greece, the largest loans have been dealt for infrastructure projects and more specifically in the fields of transportation and energy.

But the most important fund for regional development in Greece is the European Regional Development Fund (ERDF) . This supports private investments that are also integrated and supported through various national support schemes. It also supports state or regional government investments, mainly in the form of infrastructure. Support through ERDF is provided through grants, and not tax allowances.

The payments of the ERDF to Greece started from the first year that Greece joined the EC. Table 2-2 shows in its first part that Greece received some 122 millions ECU in 1981, rising to a maximum of 309 millions in 1985, and a little under 300 millions for the following years to 1988. In these eight years Greece managed to over-double the support that it receives annually from ERDF. Still, though, if it is seen as a percentage of the ERDF capacity, the percentage of Greece started at some 15% of the ERDF capacity, to rise to 19% in 1985 and falling sharply during the following years to reach 10% in 1988. Figure 2-1 illustrates the situation. This effect shows certain deficiencies of the investing entities in Greece, involving a lack of continuity and longer term planning.

It is possible to have information on the separate activities that are supported by the ERDF in Greece (EC 1989). For example, detailed sums are given in part b. of Table 2-2, for the years 1986, 1987 and 1988. The main categories of support are first the 'programmes', Community or national programmes of Community interest, second the 'projects', in industry or in services, in infrastructure, or in internal development, and third the 'studies'. It can be seen that in Greece only 0.12 million ECU were forwarded for studies, showing the low levels of such undertakings in the country. Similarly, the support for industry and services projects seem to be minimal, with 3.55 million ECU over the three years which is less than 1% of the Fund's support. This means low levels of private investments, but also a persisting lack of information for the possibilities of support by the Community. From the 952 million ECU of the total ERDF support over the

Table 2-2: a. The European Regional Development Fund support payments, 1978 - 1988; b. patterns of support for Greece, 1986-1988

a. Payments of ERDF to EC Member-States, and Greece, in current prices

	To Greece		To all Members	Greece %
	million Drachmas	million E C U		
1978	0	0.00	254.89	0%
1979	0	0.00	513.10	0%
1980	0	0.00	726.70	0%
1981	7531	122.00	791.41	15%
1982	9939	152.35	950.67	16%
1983	16770	214.59	1246.60	17%
1984	18824	212.63	1325.98	16%
1985	32669	309.04	1590.65	19%
1986	41636	302.87	2394.16	13%
1987	44883	287.40	2444.59	12%
1988	48069	286.84	2903.18	10%

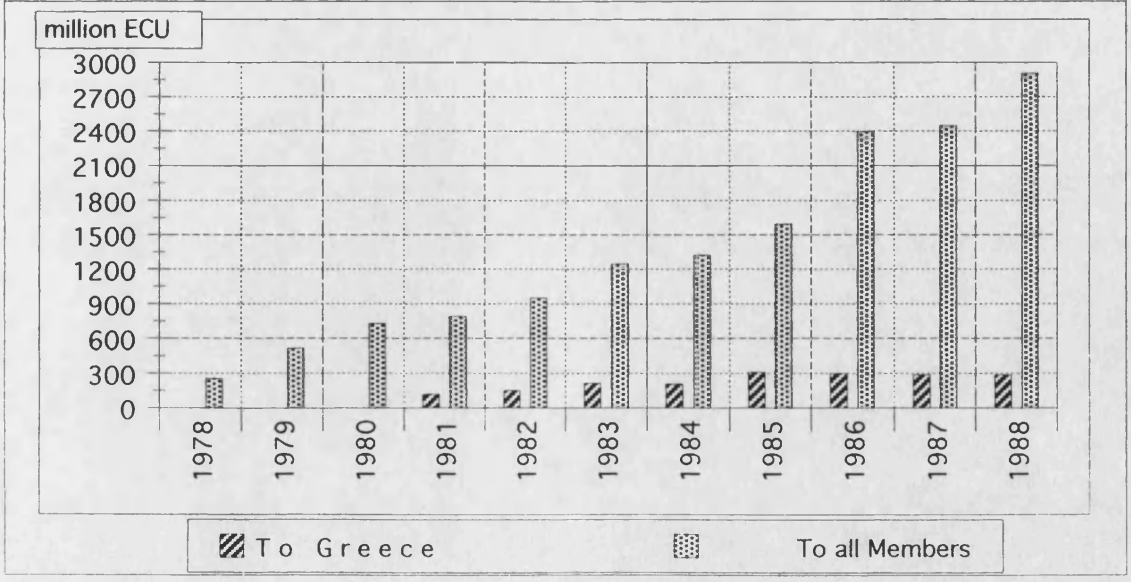
b. The patterns of ERDF support for Greece, 1986-1988

In millions of current ECU

	PROGRAMMES			PROJECTS				STUDIES	TOTAL
	C P	NPCI	TOTAL	Industry & Services	Infra-structure	Internal Development	TOTAL		ERDF
1986	0.0	17.6	17.6	1.7	290.4	0.0	292.1	0.0	309.7
1987	13.0	94.8	107.8	1.5	192.5	0.0	194.0	0.0	301.7
1988	0.0	138.0	138.0	0.4	202.1	0.0	202.5	0.1	340.6
TOTAL 1986-88	13.0	250.4	263.4	3.6	684.9	0.0	688.5	0.1	952.0
%	1%	26%	*28%*	0%	72%	0%	*72%*	*0%*	*100%*

CP = Community Programmes NPCI = National Programmes of Community Interest

Figure 2-1: Comparison of payments by ERDF to Greece and all EC members 1978-88



three years, some 98% is channelled through central or local government infrastructure projects and programmes. The serious lack of infrastructure in the country, also described in chapter one, absorbed the greatest part of the Community support in the period.

To what extent have the above Funds promoted the development effort in Greece in the eighties? From the money flows presented next, it appears that it was more the economic conditions in the early eighties and the political orientation in the country that really led to intensive regional development measures. The actual money transfers from the EC however were at the time low. When they did increase towards the end of the period total investment did not. The levels of national investments budget of the country and the support from the EC are given in Table 2-3, for 1980 to 1990 in constant 1984 prices, and the trends are illustrated in Figure 2-2. Public investment in 1980 was some 103 billion drachmas, or about 10.6 thousands per capita of population. This was gradually increased, and almost doubled by the year 1985 when it reached the 192 billion drachmas level, or 19.8 thousands per capita. This remained below this level, at around 175 billion drachmas annually, to 1990. During the first half of the period (1981-1985) the receipts from the various funds of the EC for investments, were at about 7 billion drachmas annually, or about 7 thousands per capita, representing a coverage of around 5% of the actual government investments plan. During the second half of the period though, (1986-1990), the EC support rose to above 20 billion drachmas annually to peak to a 31 billion level in 1990. This covered an increasing range from 11% to 18% of the government investments programme.

It can be said that, immediately after joining in 1981 the governments although taking regional development more seriously, they were unprepared and slow to explore the EC potential. The delegations to the various bodies of the EC were perhaps too inexperienced to have had serious leverage in the european regional competition. Eventually, the financial flows from the EC to Greece were higher in the second half of the period examined, but as shown, the total investments stagnated and did not manage to exceed the 1984-1985 level.

Overall, the EC support percentages were not high in the period from 1981 to 1990, but the incentives were there. On average, the EC support covered some 9% of the investments the government undertook. The role of the EC support in the eighties was small, but increasing and of course not negligible.

The recent five year support structure for the years 1989-1993 shows that Greece has managed increased receipts from multiple EC instruments. This can be seen in detail in Table 2-4. The total Community support for the five years

Table 2-3 : The national investments' budget expenditures in Greece and the support from the EC, 1980-1990

Years:	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	'81-90
In billion Drachmas, at 1984 constant prices												
Investments Budget	102.78	125.66	118.66	152.74	182.17	191.64	181.25	165.46	171.50	185.86	168.81	1643.7
of which EC support	0.00	10.05	6.42	6.60	7.43	6.48	20.37	19.73	22.15	21.75	30.79	151.8
% EC coverage	0%	8%	5%	4%	4%	3%	11%	12%	13%	12%	18%	9%
In Drachmas per capita, 1984 constant prices												
Investment per capita	10596	12954	12233	15746	18780	19756	18686	17058	17680	19161	17403	169458
EC support per capita	0	1036	662	680	766	668	2100	2035	2283	2242	3174	15646

Source: State Budgets 1980 - 1990

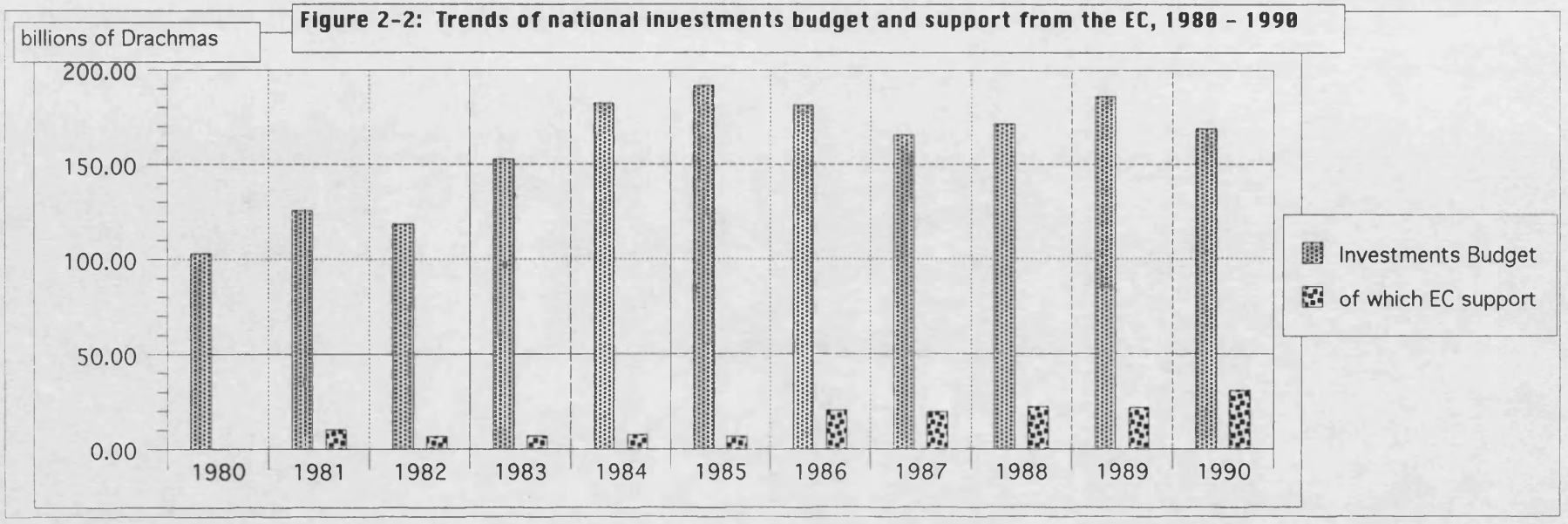


Figure 2-2: Trends of national investments budget and support from the EC, 1980 - 1990

Table 2-4: The five-year European Community support structure for Greece, for 1989-1993

In million ECU (1989 prices)

	Regional Development Fund	Social Fund	Agricultural Fund	Main TOTAL	Extra (I.M.P. (*1))
Objective 1					
1. Basic Infrastructure	1562.0	40.3	0.0	1602.3	28.3 (*2)
2. Primary Sector	50.0	0.0	289.4	339.4	0.0
3. Indusrty and Services	254.0	178.8	0.0	432.8	40.0 (*3)
4. Tourism	40.0	45.0	0.0	85.0	0.0
5. Human Potential	43.0	460.5	0.0	503.5	0.0
6. Technical Support	15.0	10.0	0.0	25.0	0.0
Sub-Total 1 (National Level)	1964.0	734.6	289.4	2988.0	68.3
Sub-Total 2 (Regional Level)	1698.0	363.5	310.6	2372.1	458.0 (*4)
Total Objective 1	3662.0	1098.0	600.0	5360.0	526.3
Objectives 3 and 4 (Vocational Trainning, Mobility)	0.0	630.0	0.0	630.0	0.0
Objective 5a (Agricultural)	0.0	0.0	677.0	677.0	0.0
Total E.C. Support 1989-93	3662.0	1728.0	1277.0	6667.0	526.3
Commitments 1989:	648.0	290.0	225.0	1163.0	annual
1990:	600.0	330.0	290.0	1220.0	commitments
1991:	726.0	339.0	262.0	1327.0	not
1992:	792.0	364.0	263.0	1419.0	published
1993:	896.0	405.0	237.0	1538.0	

(*1): Integrated Mediterannean Programmes, (*2):IMP Informatics, (*3):IMP Competitiveness, (*4): Six Regional IMP

Source: Community Support Structure 1989-93, Greece.

amounts to over 7 billion ECU, ranging from some 1.16 billion in 1989 to 1.54 billion in 1993. The annual support from the ERDF ranges around 700 million ECU annually for 1989 to 1993, that is more than two times the relevant 1984-1988 levels. It is important that in the recent period the aid in basic infrastructure is only a part of the total support, while a variety of other programmes have been developed in the country. Still, steps to further decentralisation of the recipient bodies of this aid need to be done. One third of the total support to the country is directed to the regional level, while the six current regional Integrated Mediterranean Programmes account for only some 6.5% of the total support by the EC.

2.2 The case for the Industrial Areas: objectives and studies

2.2.1 The initial conceptualisation

For a long period, the situation in the country as a whole, even with the social problems of migration, political discrimination and some loss of cultural identity, was quite favourable to industrial development. But the overcrowding of Athens set limitations on further development and the deserted hinterlands were not at all attractive for new investments by the domestic private capital. The investments on basic infrastructure through the National Investments Programme alone were not enough to stimulate and sustain growth in peripheries. The efforts for restoration of the economic, political and demographic postwar conditions that were analysed earlier, throw some light on the reasoning upon which the strategy of the Industrial Areas was based in Greece.

The Industrial Areas were conceived at the period as the only possible, feasible and comprehensive policy to stimulate and simultaneously control growth in the lagging regions, mainly based on private capital. N.Konsolas a leading academic of spatial economics and one helping to formulate the theoretical framework for the Industrial Areas in Greece, describes them as follows: "An Industrial Area is a space acquired by a developing agent, organised according to a land use plan, provided with all infrastructural networks and being available in form of delimited industrial spaces, and/or buildings, to manufacturing firms; the Industrial Area also provides additional services and location incentives" (Konsolas 1970). Thus, the state was intending to allocate money to few peripheral regions, with the provision

of space with adequate industrial infrastructure, in the anticipation of having some fast and substantial economic results.

2.2.2 The aims of the Industrial Areas

The Industrial Areas were ambitiously planned to fullfil all of the following: provision of the physical, social and economic infrastructure, needed by manufacturing for its development. Both urban and regional physical and economic development were to be promoted by the Industrial Areas.

The following aims and objectives stem from a wide ranging review of research. As regards industrial space, the Industrial Areas should help regional development by means of provision of space and infrastructure for manufacturing. Industrialists should be provided with 'affordable' land in proximity to urban complexes. The Industrial Areas are planned to offer facilitation of scale and agglomeration economies, better use of raw materials and reduced transportation costs. Economies of scale were expected to occur with the concentration of industries. Sharing of costs for certain services would lower the cost per unit produced by the concentrated industries. The Industrial Areas would stimulate external economies due to proximity, due to information spread among firms, trade possibilities, possible common research or cooperation in certain production stages. As regards state intervention, the Industrial Areas enable the state to provide infrastructure more economically, when industries were spatially concentrated within the Industrial Areas, rather than when they were dispersed. The State can more easily offer enhanced incentives for industry within the Industrial Areas.

In later literature, (Kottis 1980, Konsolas,et.al.1985) the Industrial Areas are set to work for industrial deconcentration. It is stressed that to the extent that these Areas would be spread in the country, they would help in the demographic balance, since they would attract population to the recipient regions and counterbalance the trend for internal and external migration. National defence reasons were also put forward. If national industry is spread into many different regions, it would be less vulnerable and total loss would be more difficult to occur. But also, since it would be locally concentrated it would be more easily protected. The natural resources of any region would also be expected to receive value added within the region, and thus the area's income would increase. The reorientation of the Industrial Areas project from a growth poles oriented to an integrated development plan Industrial Areas was about to emerge.

In recent literature, the Industrial Areas are considered to help innovation, specialisation and development of the various manufacturing branches. The

suggested measures though to achieve such important targets have not been clearly described and of course little information is given on this context by the current set-up of the Programme (ETBA 1992). However, it is suggested by the Industrial Areas administration that the Industrial Areas target on employment and productivity increases and also on the augmentation of profits of established firms. Later in their development, the Industrial Areas are also expected to preserve the natural and improve the urban environment.

A distinct contribution to the above -late- conceptualisation is a reorientation of the objectives of the Industrial Areas, attempted by Vliamos (1988). His perception is based on the Presidential Decree 136/1986, by which any of the 51 geographical departments may have its own Industrial Area. The new perception suggests that these projects should be constructed nationwide and help the regional spatial planning and the protection of environment, serving as a "nationwide network of spatial receivers of industry" (Vliamos 1988).

This proposal for a nationwide expansion of the Industrial Areas Programme may have serious implications on its impact and cost effectiveness as a regional development policy instrument, especially under their present organisational structure as shall be discussed at a later stage. It is usefull, though, that an integral part of the suggested reorientation is the provision of variable sizes of Industrial Areas to address to variable regional capacities and objectives.

Finally, on social grounds the Industrial Areas are supposed to improve the employment conditions of the employees and provide them with more adequate services. In regions where local specialisations exist but are carried out in local workshops, they would have the chance with these zones to concentrate into larger more modern units. The control of land uses would be achieved more efficiently if new industries were established, and old ones offered the incentives to relocate to them. Changes in the master plan it was anticipated would be more flexible.

2.2.3 The institutional framework of the Industrial Areas in Greece

The establishment of Industrial Areas in Greece was the plan of the pioneering Industrial Development Organisation in 1962. The agency in cooperation with Stanford Research Institute, under W. Bredo, made the first feasibility study

suggesting an Industrial Area in Thessaloniki. The rationale was based on the development orientations of the period (Bredo 1960) and the absolute necessity to counterbalance the industrial centralisation around Athens.

Consequently, in 1963 the Ministry of Coordination (now Ministry of National Economy), within an international technical assistance programme assigned the French agency SCET (Societe Centrale pour l' Equipment du Territoire) to carry out a study for a development framework of Industrial Areas in Greece. SCET later suggested the establishment of Industrial Areas in the five cities of Thessaloniki, Volos, Patra, Iraklio and Kavala.

In 1964, the above mentioned Industrial Development Organisation merged with two other credit institutions (Finance Organisation for Economic Development and the Tourist Credit Organisation) and formed, under Law 4366/1964 the Hellenic Industrial Development Bank, ETBA, as a public enterprise. In 1973 ETBA became a banking public limited company belonging to the state and operating under the banking and plc legislation. The main aim of ETBA is to support industrial, shipping and tourist investment projects (ETBA 1992).

The Law 4458/1965 marked the commencement and set the legal framework for the Industrial Areas Programme. ETBA was to be the sole agent for provision of the Industrial Areas. In 1966 there was cooperation with UNIDO in training of specialist personnel and in formulating and organising the project. In 1979 ETBA founded VIP-ETBA, an affiliated company that undertakes the carrying out of the technical studies and the infrastructure works for the Industrial Areas.

2.3 The legal framework for the Industrial Areas

The main Laws that refer to the foundation, organisation and operation of the Industrial Areas and financial incentives to establishing firms are the following: a. Law 4458/1965, for the Industrial Areas; b. Law 1078/1971 for the regional development; c. Law 742/1977 amending the Law 4458/1965; d. Law 1116/1981 for regional development incentives, e. Law 1262/1982 for integrated development incentives, f. Presidential Decree 136/1986 for Industrial Areas foundation, and g. Law 1892/1990 amending the Law 1262/1982.

2.3.1 Foundation and organisation of the Industrial Areas

As regards the justification of the Industrial Areas, the Law 742/1977

states that "target of the Industrial Areas is the support of the industrial and economic development of the country" (article 1). For the foundation of any new Industrial Area a Presidential Decree was needed, after suggestion by the Ministers of National Economy, of Industry and Energy. But in 1986, the Presidential Decree 136/1986, under the provisions of the 'Development Programme of 1983-1987' that became a Law, gives ETBA the right to organise Industrial Areas in every geographical department (prefecture).

The agent of the Industrial Areas Programme is set by Law 4458/1965 stating that "the right for the organisation and running of the Industrial Areas in Greece is held by ETBA; at its discretion ETBA can cede this right to other entities of public Law, bearing adequate qualifications, and to municipalities or communities". For this concession of right an approval by the Ministry of National Economy has to be obtained. In the existing legislation there is no definition of any precise type of industrial area, thus ETBA has the freedom to organise any type that "supports the industrial and economic development of the country" (Law 742/1977, article 1).

The planning of the Industrial Areas is founded on the following two stage theoretical framework of procedures. At the first stage studies are to be carried out as regards the physical planning and economic feasibility of the Industrial Areas, these set their location and size, and indicate the relevant costs. The establishment procedures include the land selection, delimitation and acquisition. These have to be followed by technical studies of soil and hydrodynamics besides the infrastructure provision studies.

The Presidential Decree 851/1978 under the provisions of Law 742/1977 regulates the procedures regarding the assignment, carrying out and delivery of the mentioned studies regarding Industrial Areas. The assignment procedure can be either through public announcement, or with selection among five researchers. The studies can be assigned to foreign researchers if, at the discretion of ETBA, there are no suitable domestic researchers able to undertake the study required. The researcher should normally not concede part(s) of the study to other researchers.

The procedures for the delimitation of an Industrial Area are set by Law 742/1977 stating that the precise location, area and limits, are settled by decision of the Ministers of National Economy, Industry and Energy, and Public Works, after suggestion by ETBA. The land so designated is excluded from any existing town plans or green belts. Regarding the acquisition of land, Law 4458/1965 provides that ETBA can acquire land that belongs to the state on the basis of a common decision of the Ministers of Economics, of Industry and Energy and of the Minister

who is involved with the ownership of the specific land. Where this is not feasible there is the option of expropriation. For this, after the proposal of ETBA, the Ministers of Economics and Industry and Energy declare the land to be expropriated, but ETBA have to provide the expenses. ETBA is excluded from any local or state taxes on this matter.

At a second phase, given the above studies and assessments the construction takes place, where speed, efficacy and quality levels have to be audited. The operational stage includes creation of the Industrial Areas administration, maintenance programmes, and of course the linking with any other development programmes and local social processes for the more efficient supply of the industrial spaces and fulfillment of the Areas' aims.

Infrastructure provision in the Industrial Areas is set by Law 4458/1965 stating that these Areas have internal streets, water supply, sewage, electricity supply, telecommunications and other facilities. It was also provided for that the Industrial Areas should offer specially built premises for manufacturing companies, upon request by the latter; the premises could either be bought or rented by the applicant company. But Law 742/1977 amended the above, in that for such premises provision a presidential decree was also needed. No such presidential decree has been issued to date. As regards other infrastructure, Law 1116/1981 states that all maintenance and all rights of operation of infrastructure systems in the Industrial Areas are held by ETBA, to the extent they are independent of those of local municipalities.

The firms that are eligible to establish in these Areas are all manufacturing, small craft industry and agricultural processing companies, and additionally companies providing certain services such as personnel training, research, banks and post offices. Firms can establish in the Industrial Areas either by buying land or by, either renting or buying standard buildings, where they are provided. ETBA also has the right to lease pieces of Industrial Areas land to third parties, but further sublet is not allowed without the bank's concession. ETBA has the right to set the prices for land of all or parts of the Industrial Areas, at levels below or above its cost of acquisition and development.

2.3.2 Special incentives for establishment in the Industrial Areas

Several Laws have made provisions that make it more attractive for firms to establish or relocate in the Industrial Areas.

Initially incentives were rather low key. The Law 4458/1965 provided that

firms relocating to these Areas do not have to pay taxes for the amount they received from the sale of their old premises, provided they use the full amount for their new establishment.

But later incentives became stronger; the Law 1312/1972 provides 2 to 2.5 percent interest support to be paid by the state to Industrial Areas established firms having issued bonds for their finance, 3.5% for their bank loans and 4 to 5 percent for bond loans with public subscription. Later the Law 1377/1973 increased the above percentages by one percent. Law 849/1978 introduced loans by the state to establishing companies, covering 25 percent of their relocation costs, under certain conditions. Law 1116/1981 gave the right to firms to be exempt from taxation by an amount equivalent to the 60% of their relocation cost, again under certain conditions.

Finally, the comprehensive Law 1262/1982 that provides grants, interest rates subsidies, tax redemptions and accelerated depreciation of investments, to four distinct assistance classes of regions, (A,B,C or D), makes special provision for the Industrial Areas offering the established firms higher assistance than the respective regional assistance status.

2.3.3 Regulations for the administration of the Industrial Areas

The Industrial Areas, whether established by ETBA or by other entities of public Law after concession of the right by ETBA, have to operate according to an internal code of operation as Law 1116/1981 provides. This is submitted by ETBA to the Ministry of National Economy, is approved by the Minister, and published in the Government Gazette. If another entity has created the code, it is first submitted to, and approved by, ETBA and then the above procedure is followed.

The code of operation has to include the terms and conditions for supply of land, the modes of administration and finance of the Industrial Areas, an account of the rights and obligations of the established firms, and the auditing and control procedures by the administration (Laws 4458/1965, 1116/1981, 1262/1982). As mentioned before, all Industrial Areas to the present date are organised by ETBA, thus the code of operation is similar for all the Areas.

The main features of the code are the following: As regards establishment, the firms have to make an application to ETBA, together with a feasibility and technical study. ETBA is bound to answer within three months. Later, and provided the firm has all relevant licenses needed by Law for operation, a contract leasing or selling the land is made. Subletting is only allowed after permission by ETBA. Retailing is forbidden (articles 1 and 2 of the code). The land coverage terms for built

premises and green spaces within the sold lots are also defined, for both industrial premises and supporting services, but architectural style and orientation is unrestricted (articles 3 and 4).

The administration of each Industrial Area is undertaken through an office, inside or out of the site, having economic and technical staff and an administrator who belongs to ETBA and is accountable to the bank for the good operation of the Area. The administration of the Industrial Areas may have contacts with the local chambers of commerce or manufacturing for attracting new industry and optimising land allocation (articles 5 to 7). According to Law 4458/1965 ETBA has to carry out an annual inspection to the firms to check if all contractual obligations are being fulfilled (article 8). Some special arrangements are made for especially large firms (article 15).

The established firms have to accept the provided services of lighting, cleaning, land care, etc., provided within the Industrial Areas and pay their share. Maintenance expenses for the infrastructure are covered by the established firms and ETBA. Firms pay their own bills for water and energy, (articles 9 to 14). Arbitration between firms and the Industrial Areas administration is provided by articles 16 and 17 of the code, but this does not replace any current obligations of the firms.

2.4 The Industrial Areas created

As it was described above, the allocation of Industrial Areas among the geographical departments took place within changing legal framework and perception of planning for regional development. The process of the creation of the twenty Industrial Areas in operation today lasted over twenty years.

In year 1969 the Industrial Areas of Thessaloniki and Volos started to operate. Iraklio followed in 1971. The Industrial Area of Ioannina was ready by 1974. These of Drama, Preveza and Komotini (in the region of Rothopi) have operated since 1978. The ones at Patra and Kavala started in 1979. In Xanthi, Serres, Tripolis (in Arcadia), Larissa and Lamia (in Fthiotis) the Industrial Areas were ready by 1981. In Florina, Kilkis and Alexandroupolis (in Evros) they began operations in 1983. Finally in Kalamata, Rhodos (in Dodecanissos) and Pella were all started before 1988. Thus, by 1974 there were four Industrial Areas in operation, by 1983 there were seventeen and by 1988 there were twenty in operation. The

Table 2-5: Industrial Areas and their area, by date of operation

Geographical department	Capital city, and Industrial Area	Year of operation	Gross area in sq.km	Net industrial space (sq.km)
Thessaloniki	Thessaloniki	1969	9.69	6.27
Magnissia	Volos	1969	4.44	3.00
Iraklio	Iraklio	1971	1.47	1.10
Ioannina	Ioannina	1974	2.04	1.51
Industrial Areas Programme by 1974 :			*17.64*	*11.88*
Rothopi	Komotini	1978	4.33	2.84
Preveza	Preveza	1978	2.14	1.56
Drama	Drama	1978	2.23	1.71
Kavala	Kavala	1979	2.08	1.49
Achaia	Patra	1979	4.05	2.80
Fthiotis	Lamia	1981	1.60	1.18
Xanthi	Xanthi	1981	2.00	1.20
Serres	Serres	1981	1.20	0.88
Larissa	Larissa	1981	2.50	1.78
Arcadia	Tripolis	1981	1.62	1.06
Florina	Florina	1983	1.09	0.75
Kilkis	Kilkis	1983	0.96	0.69
Evros	Alexandrupolis	1983	2.10	1.46
Subtotal: New Industrial Areas 1975 -1983 :			*27.90*	*19.40*
Industrial Areas Programme by 1983 :			*45.54*	*31.27*
Messinia	Kalamata	1986	1.09	0.80
Pella	Edessa	1987	1.67	1.04
Dodecanissos	Rhodos	1987	0.02	0.19
Subtotal: New Industrial Areas 1983 -1987 :			*2.78*	*2.03*
Full Industrial Areas Programme by 1987 :			*48.32*	*33.30*

Figure 2-3: Evolution of gross space in the Industrial Areas Programme

names, area and dates of operation of the Industrial Areas are summarised in Table 2-5. These dates vary from 1969 for Thessaloniki and Volos, to 1987 for Rhodos. What should be noted is that this date is only indicative of the first firms' establishment, rather than the completion of the infrastructure works by ETBA. The net industrial space of the Industrial Areas generally varies from over six square kilometers (Thessaloniki) to less than one (Florina, Kilkis, Serres). It is understood that sizes vary according to the size of the regional manufacturing and the expectations for firms' concentration. The evolution of space in the Full Industrial Areas Programme is illustrated in Figure 2-3. The geographical locations of the Industrial Areas in Greece are illustrated in Figure 2-4. Detailed data and measurements of the performance of the Industrial Areas are given in the analytical parts, later in this Thesis.

It is remarkable that the 'national threat from north' obsession that typified the period of dictatorship between 1967 and 1974, cost Patra a delay of ten years as regards the setting up of its Industrial Area, compared with Thessaloniki and Volos. This was some 17 years from the early suggestions by Stanford in 1962 and SCEP in 1963. Drama, Komotini and Preveza with a total population smaller than Patra also operated earlier. For similar reasons, Kalamata, the largest city on the south of the Athens-Patra axis mainland, had to wait until 1986 and Rhodos to 1987. From this development pattern it can be seen that the initial theoretical frame of the growth poles development, to be discussed in the following chapter, was not followed in practice. Instead, a dispersion - oriented policy focusing on the north, of a rather opportune nature, was attempted, and did not follow any accredited national master plan. This had various effects on national productivity and patterns of development as will be discussed further in this research.

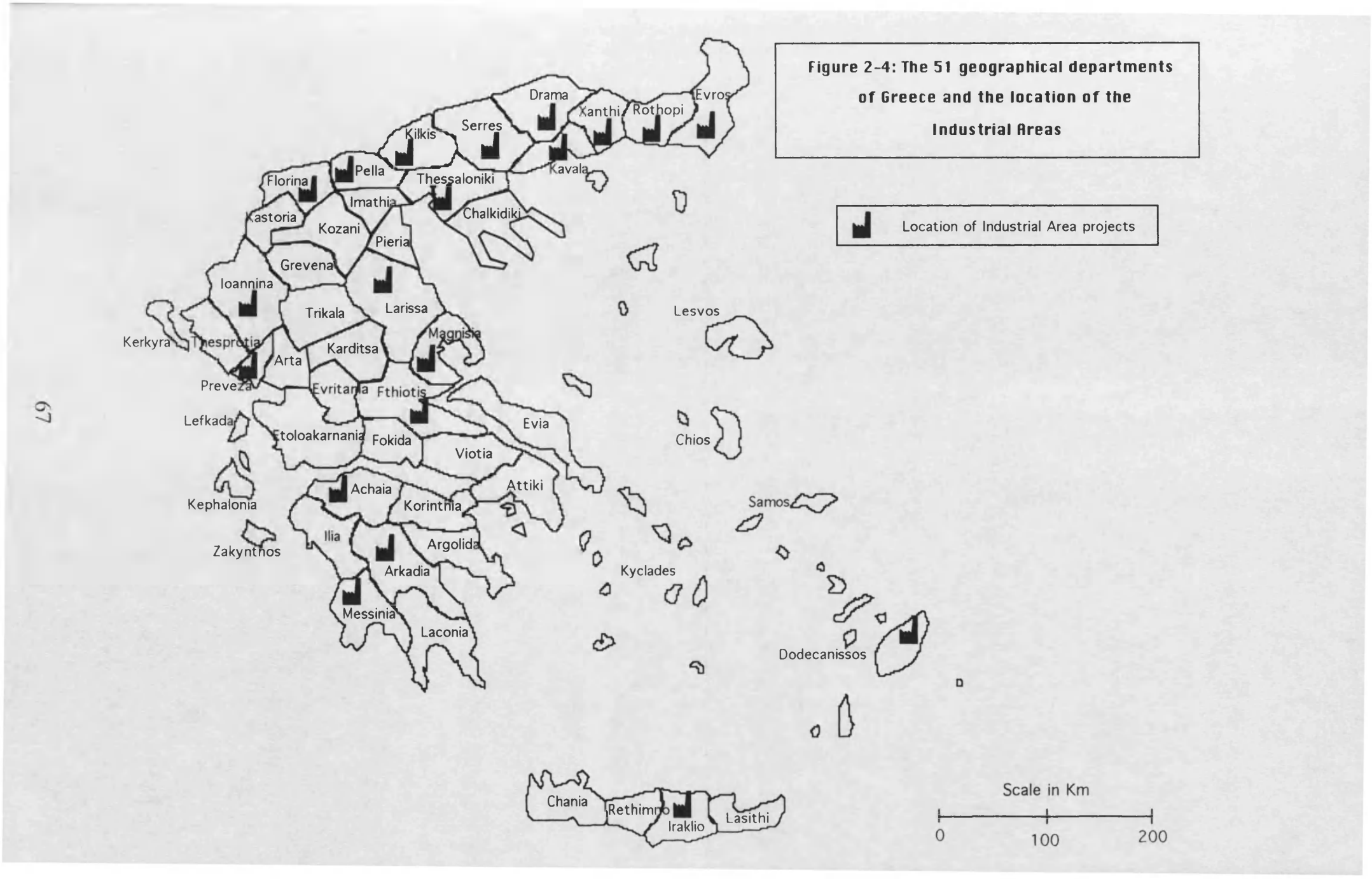


Figure 2-4: The 51 geographical departments of Greece and the location of the Industrial Areas
Location of Industrial Area projects
Drama
Evros
Xanthi
Rothopi
Serres
Kilkis
Kavala
Pella
Florina
Thessaloniki
Imathia
Chalkidiki
Kastoria
Kozani
Pieria
Grevena
Ioannina
Larissa
Trikala
Lesvos
Magnisia
Kerkyra
Thesprotia
Karditsa
Arta
Preveza
Evritania
Fthiotis
Evia
Lefkada
Etoloakarnania
Fokida
Chios
Viotia
Attiki
Achaia
Samos
Kephalonia
Korinthia
Ilia
Argolida
Zakynthos
Arkadia
Kyclades
Messinia
Laconia
Dodecanissos
Chania
Rethimno
Iraklio
Lasithi
Scale in Km
0
100
200

Chapter 3: Regional development: a conceptualisation of the processes

3.1 Some theoretical background to the Industrial Areas of Greece

In the fifties and early sixties the conceptual economic underpinning for development was based on the two sector neoclassical model. Subsequently, the foundation of the Industrial Areas Programme as a whole was based on the growth pole model of regional development. In order to discuss the theoretical context for the Industrial Areas of Greece, the above models have to be outlined. As pointed out earlier, (chapter one), Greece has suffered from extreme centralisation of economic and industrial activities. It was understood then, as it is now, that it was of vital importance to keep the peripheral areas economically alive.

Neo-classical economic theory was initially employed to serve this objective. The neo-classical model regards regions as areas making products according mainly to their disposal of labour (working population) and capital (total stock of capital goods). The central ideas of the neo-classical theory are the issues of utility, profits and equilibrium, (Schumpeter 1954, Henry 1990). Theory suggests that profits only exist temporarily in any industrial sector and after some period profits become non-existent. On spatial context, a basic principle in neo-classical economics is one suggested by Samuelson (1948), that based on the Factor Price Equalisation Theorem for the various trading regions.

According to the assumptions of the Two Sector Neo-classical Model, a region is considered to have two production sectors (Stolper and Samuelson 1941). The first is a 'domestic' one with low labour productivity. The second is a 'modern' one with higher labour productivity and export potential. The propensity to shift from the domestic sector to the modern one is regarded as determining a region's economic growth (Richardson 1979, Armstrong and Taylor 1985). According to the model, to the extent that the high productivity sector is capable of exporting, increased profits tend to be realised from capital invested in the sector. With the assumption of free mobility of capital, a net inflow of capital from other regions is

expected to take place. Increase of demand for labour in the modern sector will be experienced and higher wages will be paid. As a result a net inflow of labour into the region will take place, accompanied by an intra-regional labour shift towards the modern sector. The inflow of labour into the region will equalise wages to inter-regional wage levels, and these may or may not be higher than the initial regional ones. But still, the increased employment in the region itself will increase regional income and have positive effects on the domestic sector as well. This is a result of increased demand for its products, itself leading the domestic sector to demand more labour and/or capital.

Thus, before the innovation of the Industrial Areas Programme, regional development policy in Greece was instead based on the described two-sector neo-classical model. The assumption made for the Greek peripheral areas, was that the agricultural and stockfarming sector was beyond doubt the 'domestic' and low productivity sector in the model, while the manufacturing sector would be the 'modern', high productivity and exporting one. It was thought that what was needed was just support of the high productivity sector, for the development process to begin. Support to serve this development pattern was given by the state via incentives for regional industrial development, mainly tax free allowances and increased depreciation rates (Athanassopoulos 1990). Notwithstanding the policy, centralisation of economic activity continued at steady rates instead. Labrianidis and Papamichos (1990) suggest that policy simply facilitated the existing locational trends.

Since practice often did not justify the two-sector neoclassical model of development, a new school of economic thought emerged, through the theory of the Circular and Cumulative Causation, suggested by Myrdal (1957), and the Growth Poles strategy, described by Boudeville's work (1966) but having origins in Perroux's work (1955). Hirshman's writings (1958) also represent one phase of this conceptualisation which has been developed considerably by more recent researches (Klaassen 1972, Gokham et.al. 1972, Buttler 1975). The new model's critique of the neoclassical theory was that inequalities between regions tend to grow rather than diminish with free trade.

Three main reasons were advanced to account for this divergence. The first is the result of external economies. These are made up of localisation economies, which occur because of geographical concentration of plants and cooperation, especially between the same or complementary industries, and agglomeration economies (Kaldor 1970), which result from the supply of infrastructure and the availability pools of skilled labour (Pred 1965). The second is a consequence of

economies of scale which arise because of diminishing costs of mass production. Third, and last, are the internal economies due to endogenous technical progress. In the later theories introducing polarised growth it was also stressed and demonstrated (Friedman 1972, Berry 1974, Klaassen 1987) that the volume of innovations and inventions increased with the size of urban and economic agglomerations, and indeed were much more easily diffused.

The size of an urban / regional agglomeration that is required for full development potential was assessed after empirical studies by Clark (1945) to be some 200,000 inhabitants and to be somewhat larger, at 275,000 in a later 1961 study for West Germany (Klaassen 1972). These sizes offer a 'full grown' services sector, which is regarded an important precondition for the so-called 'take off', into the process of accelerated cumulative growth.

In this form of theorisation, the cumulative effect is based on the comparative advantage of an agglomeration, which once stimulated and started growing, develops its advantage cumulatively and becomes steadily more efficient, due to the above mentioned economies. The greater the number of the existing firms and production sectors, the higher the regional multiplier becomes and therefore the higher is the regional income. Consequently, the growth pole development policy suggests that after selected agglomerations or growth poles develop, the remaining intra-regional areas will benefit by the 'spread' effects from the pole, i.e. from income transfers or subcontracting, etc. But in the short run, while the pole is assisted and developing, 'backwash' effects of centripetal forces are also likely to be experienced and hinterlands would be deprived from a substantial part of their mobile factors of production, i.e. capital and skilled labour.

Considering the number of the agglomerations to be selected to serve as growth poles for a country, Klaassen (1972) suggests that from all possible potential 'nuclei' those should be selected which are most likely to react rapidly. However, the greater the number of centres selected the weaker will be the impact, for two main reasons. First, it is that the necessarily limited financial assistance from the centre has to be divided to more places. The second and more subtle reservation is that there are only a limited number of industries in search of a new location at any one time.

As a result of the perceived and supposed inefficiency of the two-sector neoclassical development model of regional development in Greece, the Industrial Areas Programme was conceived. It was based upon the described theoretical framework of the growth poles strategy. International consultants made the first study in 1963 (SCES) with an initial target of five Industrial Areas adjacent to

respective cities that would serve as growth poles. These were efficiently selected and according to the theory. Following designation the Greek state proceeded in providing land, infrastructure and locational and technological incentives to industry. However the actual implementation of the growth poles strategy through the designation of Industrial Areas was much different in practice from what was initially planned. Local and regional spin-offs were, and in some cases still are, a long time coming.

Contemporary economic thought has made a detailed critique of the growth pole strategy. Indeed a similarity of the growth pole theory and the two sector neoclassical model has been observed, in that the growth pole can be thought of as playing the role of the 'modern exporting sector'. In both cases, after the spatial or sectoral growth, equity or justice is expected in the region, either by spread effects from the pole, or by increased domestic demand for the domestic sector's products, respectively.

But Skott (1985), criticises the Myrdal-Kaldor model also of not leading to the neoclassical equalisation of factors incomes principle. The principle of cumulative causation, he argues, emphasises the existence of dual characteristics in the economy, producing endogenous tendencies for growth rates to diverge. The short-run sequential patterns followed in the model do not lead to long term stability or the relevant predictions. According to Skott a narrow economic analysis taking institutions and sociopolitical factors as given is misleading. The causes of stagnancy are the 'vicious cycles' caused by unfavourable institutional and sociopolitical situations. Growth differentials are said to be due to the impact of the socio-economic system of each region.

A further critique of the growth poles strategy has been made on the grounds that the spatially polarised growth, itself, comes about from the fact that the individual growth determinants are completely or partially immobile. This immobility is explained (Friedman 1972) by the authority-dependency relationships between nations and regions and increased 'communication costs'. The latter refer to socio-institutional and economic-structural barriers and include the transportation cost, which is not particularly significant in itself. Thus, any activity's profit function is influenced by the supply and demand of inputs and outputs in spatial proximity. These 'communication costs' create by themselves cumulative effects (Bulmer 1975), not only due to the agglomeration advantages, indivisibility of consumption and production, increasing returns to scale and monopolistic distortions, but also due to the control by central elites of activities and institutions.

The beneficial diffusion or 'spread' effects to the periphery, suggested by Myrdal, derive from Hecksher-Ohlin (Ohlin 1933) specialisation and trade theory. This suggests that regions will specialise in the production and export of commodities that use their abundant production factors intensively. But, Hecksher-Ohlin assume immobile factors of production. Thus, any improved 'communications' created by regional policy may, due to the authority-dependency relations, only speed up an inverse, core-oriented polarisation process, owing to the immobility of the complementary regional growth determinants. On this Dicken (1992) argues that the cumulative effects mainly derive from the division of labour, which is a global rather than a regional phenomenon, following complex economic-structural and sociopolitical patterns of production fragmentation and geographical relocation.

Given the above reservations, it can be understood why the Industrial Areas in Greece, designed in the sixties as national growth poles, and implemented in the seventies and eighties, had moderate and varying results. The 'vicious cycles' of Skott, and the 'elites' of Bulmer are probably responsible. The partial immobility of production factors of Friedman was only partially counterbalanced by the role of the financial incentives. Improved communications and the entrance of the country to the EC in the eighties made it difficult for these old concept growth poles to compete even in a european not to mention a global arena.

At a later stage in 1988 (Vliamos 1988), a theoretical reorientation of the development model that the Industrial Areas would serve occurred. The new plans, not yet implemented, follow a generalised industrial space provision policy. A related theoretical rationale for development at local level is that proposed by Robert (1985). He suggests that development strategies based mainly on the transfer of industry may prove to be out of date. It is a question, he argues, whether activities which are artificially deviated from their 'normal' location will remain strong and expand. Thus, and due in part to the recent periods of economic crisis, it is questionable if the redistribution of productive activities among regions is an adequate means of balancing regional inequalities. Of course, the issue of developing the internal resources and infrastructure of the less developed regions in withstanding the current difficulties is challenging. But the possible set-up and implementation of such provision remains to be tested.

This is the up to date theoretical background of the Industrial Areas development programme in Greece. What has been little stressed is the technology component of development, besides the social and political, and all seem to be crucial. Theoretical advances on this context are discussed in the following part.

3.2 Contemporary theories of development and technology

3.2.1 Development in modern world structures

Older theories proposed that regional development and growth would occur if the appropriate policies were applied, and if the population accepted the relevant political and social changes. Their main limitations were the simplicity of their assumptions and their over-deterministic character. Older theories proved unable to include in their modelling the rapid changes in transportation, communications, technology and information flows and production organisation on a world scale that has characterised the last two decades. They also did not take account of cultural and socio-institutional issues operating sub-nationally, nationally and internationally and the economic-political power structures involved.

Thus, current theoretical trends suggest that economic and socio-political phenomena, especially in developing countries, have to be analysed under the conditions of these countries' structural connections with the advanced capitalist societies, while the key factor for their development is often the level of technology they command. To assess the development problem of Greece, one first necessity is to define types of regions in a world structure and their characteristics.

The Core and Periphery theories (Wallerstein 1979, 1989; Friedman 1986b, Castells 1987, Henderson 1987) see the world as a tripartite structure of core, semi-periphery and periphery. Through the process of capitalist development, regions can be characterised within the international division of labour.

The core metropolises are world level magnets attracting money, minds, information, materials and energy. There is an abundance of skilled flexible labour, high wages, advanced technology and diversified product-mix. In the periphery, according to the theory, there is unskilled inflexible or coerced labour, under colonial or state power, simple product-mix, dominant primary and services sectors, fragmentation of cultural and political patterns and ageing technology. Between the two there is the semi-periphery, including the dynamic categories of either de-industrialising ex-core states or regions, or industrialising ex-periphery ones; or even static ones such as many regions of Greece, resting uneasily between the core of Athens and Western Europe and the periphery of the Third World.

The theory argues that in the international arena the core economies attempt to control these world structures and protect disparities that have

arisen. They control the transfer of information and know-how, as well as the prices of raw materials and energy using multiplicity of means, thereby ensuring the stability of the system. Backwardness is tied with the hierarchical capitalist development, where one part of the surplus of the periphery is transferred to the core, while another is held back by local oligarchies and spent in luxury consumption. Giaoutzi (1990) suggests that similar core-periphery structural discrepancy can be found between regions within a national economy as well. This is one characteristic that is evident in regions of Greece and thus characterises the country as a semi-peripheral type.

Further, and on socio-economic grounds, the phenomenon of Dualism is the concept of the traditional and modern economic sectors' marked separation. It is less evident in the developed metropolises, but nonetheless present, as evidenced by growth of an underground social component. It is striking, though in the large cities of underdeveloped nations (Santos 1979). The new technologies are light, flexible and user-friendly, changing not only the organisational structure of production, but also the geographical location of employment in the production process. This internationalisation of the economy reinforces the spatial polarisation between sectors, especially between peripheral regions and their metropolitan areas. In Greece such dualistic characteristics are also evident.

Modern dualism has also social effects. As regards the employment patterns, the job-ladder climbing within the firm's internal labour market was the common pattern during the past phases of industrial growth. The development of information technologies, however, has generated a demand for highly specialised personnel, which is much less industry-specific. Thus, firms tend to externalise the training costs and to rely more on the external labour market. Quality of labour becomes important and labour pools become qualitatively stratified, (Noyelle 1987). This further enhances dualism. This is a case for a developing country to pay serious attention to its educational system and of course this no less applies for Greece.

As regards the control of the new technologies and the new information system, in general, if power is undemocratically exercised by a certain group, (political or economic), then the country may not have development or peace. This feature is also likely to widen rather than close the gap in the dualistic economy (Saito 1988). It appears that the more open administrative structures a country can ensure the better chances it has for development. In Greece the efforts as regards availability of informatics to the country's lower tier governments and peripheries are not as evident.

Having given an account of the type and characteristics of some main

aspects of the economic and political situation the designation relation of a country to its external environment should follow. Castells (1987) notes that dualism on the one hand separates activities, social groups and cultures, which on the other hand are tied in a wider interdependency of structural relations.

The Dependency theories explain why underdevelopment persists and in many cases worsens for less developed countries (Brookfield 1975). Santos (1973) characterises dependency as the conditioning situation in which the economies of a group of countries are tied up to the development and expansion of others. The dependent countries can only reflect the expansion of their dominant countries and this may have positive or negative effects on their immediate development potential. Frank (1971) though was adamant that development of metropolises necessitates the underdevelopment of their satellites.

The perpetuation of underdevelopment arises from the fact that capital, seen as a commodity, is transferred from peripheral areas to the core of the world system on the basis of an unequal exchange. (Henderson 1989). If surplus value is the difference of production value minus the capital used, depreciation and the actual labour remuneration for the period, then the issue of unequal exchange is based on the fact that the rate of labour surplus value extraction is much lower in the centre than in the periphery. This means that labour remuneration is considerably higher in the core, if it is assumed that capital depreciation rates are about the same. Amin(1977) sets out the issue as being the exchange of products whose production involves wage differentials greater than differentials in productivity. This is also true for Greece, since salaries of equally skilled workers or professionals tend to be lower than those of their colleagues in the European core.

The Dependency conceptualisation expands in the fields of high technology. The capitalisation of information will result in the national economic strength being cumulatively more dependent on information (Steward 1978). It is suggested that the increasing volume of information flows that are generated across national frontiers lead the world towards a global community (Haq 1988) and it is understood that information networks of developed and developing countries will be integrated into a worldwide network. It is questionable, as Saito (1988) wonders, if the above mutual dependence can be one of equality or of subordination.

But, dependency theories, while featuring the asymmetrical interdependency of economic functions across national boundaries, do not succeed in tackling the intra-regional and intra-metropolitan divergence, restructuring and dualism says Castells (1987). He explains that it is more a matter of availability of resources that are different in different social groups. These are transformed to

skills and become again resources that traditionally belong to certain social classes.

More recently, the Globalisation of Production theories stress that the technological revolution is one of the main driving forces in the worldwide trend for the restructuring of capitalism (Henderson 1989, Simai 1990, Sadler 1991, Dicken 1992). This creates the contemporary global, structural, economic change. High technology is something more than simply a new technique of production. It is a new form of production, based on information, and following the theory it also reflects a new social organisation. Castells (1987) suggests that structural disturbances and global or regional imbalances seem to be permanent characteristic features of world economic development.

The economic structure of the developed industrial countries is generally characterised by increasing international specialisation that also has spatial repercussions. In the new international division of labour the core is specialising in the services and information economy. To a large extent firms in developed countries, and the multinationals on world scale, while keeping headquarters and research branches relatively fixed, disengage their high skilled labour and technology from one product and shift mass-production facilities from urban / core locations where labour is unionised and demanding, to peripheral areas, where salaries, fringe benefits and workplace practices are more advantageous. The spatial life cycle model (Giaoutzi 1990) suggests that when mechanisation of production emerges, productive capacity shifts from centralisation to geographical dispersal. Thus, core economies themselves may transfer technology and production of certain products to developing countries. This dichotomy in use of new technologies appears both in large scale internationalisation, but also in small scale localisation within nations (Giaoutzi 1990).

Thus would it be a solution for the Industrial Areas of Greece to try to attract industry of this kind, based mainly on the lower wages and benefits? Saito (1988) argues that it will not be long before the 'steel collar' workers (robots) will be replacing the blue collar workers. In many cases the modern mass-production technology requires less specialised labour, and as a result the industry-receiving regions do not necessarily benefit from salaries higher than other specialisations. Automated production systems and routine tasks, that are often undertaken in such locations offer a generally low propensity for regional spread of innovations within the receiving underdeveloped regions.

Is growth of any type and development similar concepts? In some cases it may not be. Growth, i.e. increase in population and output in some area, may not lead to qualitative improvement in the quality of life for its inhabitants. The

phenomena of the newly industrialised countries of the Third World are explained on the basis of reallocation of activities in low cost areas as a result of the new international division of labour. But economic development is associated with increases in quality of life, nature and quality of local jobs, goods and services provided locally and environment quality and conservation. Development as a qualitative change also involves changes in cultural and social orientation towards adaptability, flexibility and new specialisation in order to achieve capacity.

What type of development strategy should a semi-peripheral, or mixed type economy like that of Greece follow? What would this mean for the regional tools for development, and in this case the Industrial Areas? How can the dualistic phenomena in spatial polarisation and in labour stratification be relieved? How can the unequal exchange be counterbalanced? Is a low wage and cheap land deregulated policy guaranteeing development?

Today the single, maybe, way to growth is through new and high technology. The Industrial Areas have a role to play in the development of their respective regions and the country as a whole if there is a persistent turn towards technology. But the likely development and technology structures required should be analysed and understood before any policy can be properly planned.

3.2.2 The structures of development and technology

All industrialised countries are in process of economic change from an industrial society to an information-based, services society. This structural economic change is to a great extent caused by technological change. New technology creates an unequal global interdependency, where countries with large shares in worldwide information systems tend to have more power than others and vice versa.

A theory relevant to the above hypothesis is the Technological Gap theory. It argues that there is a technology gap between the rich and the poor countries (Posner 1961, Hufbauer 1966) which allows only the rich to produce new goods. Vernon (1966) argues that comparative costs between developed and underdeveloped countries for new products are irrelevant, since new products are only developed in proximity to large markets of sophisticated demand. But also, the production of new goods requires significant quantities of skilled labour and research which tends to be available only in rich countries (Hirsch 1967) and thus the technology gap is sustained since new goods cannot be instantly produced in other countries. Thus the necessity of adoption of the new technology for a developing or semi peripheral country comes up. There is some debate, however,

about whether technological advanced cores can keep their distance from other potential competitors.

Malecki (1991) questions the capability of a region to sustain its advantage in producing a new innovative product. He suggests that other regions will try to imitate the innovation. Thus, the initial advantage lasts only for a certain period (imitation lag). Additionally, part of this period is not going to be wholly advantageous to the innovative region, due to a demand lag, i.e. until demand adapts consumption necessities to the new product. The remaining period of the imitation lag, called reaction lag, may not be so long due to rapid diffusion of information.

But the diffusion of information is not perfect and by no means instant. Between 90 and 95 percent of world's research and development is generated in the developed countries. In many cases developing countries may lack the financial resources or the political support (Banerjee 1982) to adopt new technologies. The brain drain from the developing countries is one more built-in factor to the technological gap theme. Additionally, the technological gap in issues of 'potential military significance' (Simai 1990), and other similar activities, is perpetuated and enlarged due to the embargo lists and legal prohibitions by the producing countries. Besides, such products are never constant and unchanging, even when in mass production.

As a conclusion it would appear that if an industrialising country is determined to compete, it has to overcome political instabilities and economic shortages to bridge the technological gap. It should invest seriously in the matter of new technology and the supporting infrastructure. This seems to be the way for the Industrial Areas of Greece, if fruitful results are to be expected. But for how long should the effort go on?

Relevant to the above question are the Product Cycle theories (Vernon 1966, 1979; Hirsch 1975, Thomas 1986), which stress the importance of the imitation effect. The basic theory argues that intensive research and skills capacity concentrated in the more favourable regions lead to the emergence of new products in these regions. Initially, the increased production costs pose few problems as there are no rivals for these innovative, leading-edge technology-based products. Further on, after the new product establishes its contribution, it becomes standardised and widely demanded and mass production begins. In this phase other regions may start competing (imitation). Over time the new producers become favoured using less skilled labour and mass production methods and as a result, in the end, the initiating region may not be able to compete even in its own

local market. In the long run, innovative firms are pressed to divest from the product and the initial innovating region becomes a net importer of the product in question and thus, suggests the theory, the cycle is completed.

A further variation of the rather deterministic product cycle theory above is the Profit Cycle model suggested by Markusen (1985). The model assumes that in the initial phase of a new product there are zero profits due to the demand lag and the high production costs. Later, super profits are experienced due to the high demand and the monopolistic situation of the developer, underpinned by patents or just maintained by the reaction lag of the competitors. By the time the competitors enter there are low profits, due to the competition. Here, it is suggested that either an oligopoly is formed and profits are sustained, or large corporations divest and the sector remains the domain of small and / or peripheral firms.

The product and profit cycle phenomenon is also described by Malecki (1991) who stresses the importance of continuous innovation. He suggests that, as the modern products' life cycles shorten, only the constantly innovating firms are likely to sustain large profits, creating successive life cycles of improved product versions.

Some empirical approaches comparing the situation in developed countries suggest that product cycles are rather theoretical. Gagnon and Rose (1991), after research on American and Japanese trade flows from 1962 to 1988, conclude that there is little empirical evidence of product cycles. They suggest that their findings rather support the standard factor proportion theories (Hecksher-Ohlin), i.e. that goods being exports one year, tend to be exports the following years too, due to each country's standard factor proportions. In another research, Dollar (1990) confirms this pattern as regards the trade between the south and the north, in America.

How can the divergence between theory and empirical findings be explained? Grossman and Helpman (1991) suggest that developed countries will continuously produce and export the higher quality versions of a good and besides at the same time may import the lower quality versions, while the quality of a given good increases stochastically over time. Large product cycles do not seem to appear in the mentioned study, possibly due to the incremental cycles' successive sustainability that actually took place. Malecki's continuous innovation seems to be justified by these findings.

The life-cycles debate should not be discouraging for a development policy that aims to lead a country, here Greece, to a competing position. It only clearly shows that a determined and continuous effort has to be made. One-off

investments such as the provision of an Industrial Area, or financial injections like the establishment incentives, are not adequate to sustain competitiveness. It would appear to be equally ineffective to try to adopt technology from one-off attracted multinational branches. In such cases, the possibility of local imitation is minimal to the extent that production machinery is integrated, all produced in core areas and usually far too complex for local imitation. A longer term technological policy is needed, based on a supporting institutional framework. As a conclusion, it can be argued that only continuous effort on innovation can bring incremental improvements to existing products. These, while minimising the demand lag, also broaden the present competitors' reaction lag, creating a larger total imitation lag. In addition, better quality and more competitive versions of products are produced. But where should an Industrial Area, or a development policy based on industry and innovation, be located?

In the debate about development and technology structures, the optimum location for increased productivity is left an open question. Moomaw and Williams (1991), in a case study test the effects of urban agglomeration on productivity. In a study of Total Factor Productivity (TFP) for the United States they show that the correlation of TFP and leading agglomerations is positive, while for medium ones the relation is the converse. The cause of this observation may be the decline of medium industrial centres, towards either the metropolises, or small, new technology, agglomerations. It appears then that where new technology is abundant, that is in metropolises or small high technology centres, productivity is expected to be higher. A related analysis for the Industrial Areas of Greece is made in chapter four of this thesis.

As it appears, new technology may a the solution, but again the locational question must be posed. A more detailed analysis on location and growth is given by the so-called Locational Factors approach. In a world dominated by the rather deterministic globalisation of production, as described previously, the Locational Factors approach tries to identify factors, besides technology inducement, that are likely to define the underlying attractiveness of particular regions for high technology. A wide variety of such factors is mentioned, among which are the presence of experienced entrepreneurs, skilled labourforce, accessibility of customers and new markets, favourable government policies, proximity to universities, availability of supporting services and attractive living conditions.

For example some activities need to establish in the largest agglomerations. Non-production activities such as non-routine administrative work (i.e. decision making), or research and development rely heavily on face to face contact and

information. Such firms or branches undertaking such activities must be in a place which minimises the costs of contacts and acquisition of information. Establishment near the top of urban hierarchy is one option minimising the above mentioned costs. But establishment near agglomerations of other similar firms, which is exactly the objective of the Industrial Areas strategy, provides the opportunity to maximise the overall chances for acquiring information, rather than just minimising the costs of obtaining it (Oakey and Cooper 1989, Love 1988).

From an organisational point of view, there is a strong pull of research and development departments towards the firms' headquarters location. The latter tend to cluster especially in large urban regions. As regards staff employed in research and development, housing, school quality, recreation opportunities, jobs for spouse and cultural opportunities are important in their stated preferences (Ady 1986). Hall (1987) also stresses the importance of good climate and traditional or political factors.

Given the above implications for technology, some relevance can be found to the Industrial Areas of Greece and especially those in the periphery, in addition to the necessity for the use of new technology. There, even if the headquarters of firms could not be attracted, an effort to provide efficient industrial infrastructure, and urban infrastructure in the nearby agglomerations, given the good climate, can provide some attractive locational factors.

3.2.3 Information, a prerequisite for development through technology

In the previous part the necessity of continuous effort for innovation was stressed, plus the locational prerequisites for an industrialising region to overcome any adverse technological gap. Next some theories stressing the importance of technology in the development process are presented.

The industrial revolution meant a large scale geographical concentration of economic and technological activities and people at places favourable to the production process. As a consequence, a necessity for large scale physical transport was generated and characterises the industrial society.This phenomenon has been called 'locomotion'.

Recently, information appears to have become the most valuable asset for a country or a region (UNESCO 1980). It is a principal factor in increasing productivity in industry, agriculture and services. Besides, informatics is a basic tool in planning, hypothesis testing and the simulation of programmes. Informatics has a leading role as an interface between the 'living system' (community) and its 'control

system' (government) (Sharkas 1982). Nijkamp (1988) believes that the 'wealth of information' appears to be a substitute for Adam Smith's 'wealth of nations'. This trend is called 'infomotion'.

In the infomotive society, the emerging spatial pattern is that competitiveness of areas is determined by their accessibility to information and telecommunication systems (Giaoutzi 1985). Since data networks can function effectively without the participation of developing countries, the 'global village' may not necessary include all countries. Riddle (1988) argues that the large quantities of information that countries, not currently competitive, miss, may make them fall behind at a geometric rate without swift and extensive remedial measures.

The information requirements of the various socio-economic activities will vary, according to space and specialisation. Both the public and private sectors are involved in the race for new technology and information.

To start with the public sector, research in Greece by Terrovitis (1988), puts forward two findings. First that information requirements of core regions are higher than those of peripheral regions. Quality of telecommunications is also better in core regions, while cost of provision is lower. Second, that the services sector is a heavier user of such infrastructure than the primary and secondary sectors. This sector is suggested to be no less critical for a developing society. Related research in India by Narasimhan (1982) showed that in order to develop consciousness of the occupational and development opportunities, the right services inputs have to be deployed, supported by information technology.

Interestingly, Terrovitis, (1988) showed that a slow pace of productivity and competitiveness is not due to lack of demand for telecommunications, but due to the inability of state monopoly supply to offer such services. As demonstrated in this research, failure to provide a high telecommunications standard may preclude development. Thus, it emerges that the need for better technology provision might also have to go through drastic organisational restructuring in such public sector agents. In any case, public sector technological improvements in a country put its existing production and services capacity in better competition terms.

Flexibility is not only needed in the public sector, the state or local government agencies, but also in the enterprises structure. A typology of the differences between the mass production mode and a new more efficient type of production has been made by Albrechts (1989) and Womack (1990). Thus, Fordism is the production philosophy that underlies standardised goods, processed in mass production. The integration of production plants is important, mainly in vertical, but also in horizontal large schemes. The locations themselves are normally resource

driven rather than market oriented. The characteristics of labour in such production modes are those of increased productivity due to job specialisation, minimal learning experience through time, poor labour conditions and low wages. The fundamental point is the low production cost per unit and the external economies of scale. But the production procedure itself makes it difficult to initiate changes in the products' characteristics due to the labour's difficulty in re-specialisation, due to the specialised nature of the type of machinery used and due to the vertical production structure. This makes reaction to demand changes slow and above all, costly. Besides, imitation of technological standards by competitors is normally reasonably easy.

The new pattern of Flexibility in production, with the use of high technology is challenging Fordism. Changes to the production structure, with the use of computer aided design and computer controlled machines, make for easy custom-made production as well as volume production. Production becomes modular, changes in products' specifications are reasonably easily met, and greater variety of product types may be offered. Imitation is difficult due to the continuous nature of improvement and other changes that characterise such systems. Location of plants is demand driven and innovations influence the demand, rather than follow it. Integration is quasi-vertical via subcontracting to several smaller flexible components production firms. Labour characteristics involve multiplicity of tasks, co-responsibility of the workers, on the job training, learning and skills development, high employment security and greater rewards.

Dicken (1992) makes the distinction between mass production and lean production. The latter has the flexibility characteristics and it is 'lean' compared to Fordist production because less manufacturing space, less engineering hours for new products development and far less on-site inventories are needed. The just-in-time supplies system, reduces the inventories of materials within firms. Production is based on collaborators and subcontractors rather than on simple suppliers who are distant, not only physically, but also organisationally (Sayer 1986, Dicken 1992).

The concept of Information Based Manufacturing is the application of information technology in order to integrate all economic, technological and organisational functions of production. Information technology offers flexibility in production and product mix, rapid response to market demand, greater control, accuracy and repeatability of processes, reduced waste, faster machines and distributed processing capability. The whole process can be enclosed in software. (Nijkamp 1988). Riddle (1988) gives the case of Benetton, having over two thousand retail outlets worldwide monitored daily. Trends and needs for new

products can be met in one third of the time of a normal production procedure.

Flexibility in production, apart from its better growth perspectives, may also prove more robust in crisis conditions, due to the multiplicity of the collaborating firms that may channel their part of the production structure to complementary paths.

It would appear then that, infomotion as a principle and the required flexibility in public services and private production can be shown to be the main requirements for economic development.

How can information and technological restructuring interconnection lead to success or failure? Any dynamic economy will simultaneously experience a process of job losses compensated to a varying degree by growth of new employment. Freeman (1986) explains that periods of expansion occur when there is a good match between the new technological paradigm and the socio-institutional climate. Depressions are periods of relevant mismatch. As a consequence, if the productivity of nations or regions is to be improved, a better match between the new technologies and the institutional and social framework should be sought, to create favourable patterns for advance. This is much what seems to be needed also for the case of Greece.

3.2.4 New technology: transfer and match

Deriving from the above discussion, if a region is to develop, it has to recognize the importance of the intangible investment in technical knowledge as equally important physical capital investment. This is a point that the Industrial Areas in Greece have not yet actively encapsulated in their regional development objectives. The method of attaining human embodied technology is learning. Thus, the region has to learn new technologies in order to be able to imitate and / or reproduce them and eventually benefit from them.

Several ways of learning at regional level have been suggested. (Bell 1984, Fransman 1986). 'Learning by using' explains how productivity increases as a result of the production mode and it is relatively costless. The precondition is, though, the acquiring and diffusion of new technology among local firms. Another mode, that requires explicit effort and investment in imported new technological capacity, leads to 'learning by changing' i.e. opening the black box of technology and developing it. Research and development efforts and relevant feedback of the system's performance at the local level are required. It offers the region understanding and confidence. Obviously this procedure is neither automatic nor costless. In 'learning through training', the latter has to go to the hows and the

whys of technology in the productive process. In other words, a high level of technological training should be experienced before any significant improvements in technology and productivity are to be expected.

The pure research and development methods for technological developments are another procedure of learning. These processes of change require explicit allocation of non production resources by firms or regions. They also assume an already advanced technological background in local human and capital resources. But research and development encompasses all of the previous technology adaption methods

Of course in practice the diffusion of technology, as mentioned earlier, is not always easy. Even if there is some tendency to learn, as it might supposedly be the case with the Industrial Areas of Greece, various mechanisms besides patents, copyrights and trade secrets are commonly used means to keep technology away from competitive or potential competitive regions or firms. Still, though there are ways of overcoming some of these difficulties as shall be shown.

Since technology is rarely produced directly for sale, the issue of technology transfer (Ernst 1980, Molle 1990) to a country or a region is not a simple one. The main ways of transfer are either via technical documents, blueprints (disembodied transfer), demonstrations training and technical assistance (human embodied transfer) or by permission to use technology, under licence, franchise or lease, or by intra - multi site (or multi national) firm technology transfers.

The efforts of several international organisations for technology transfer among nations are also significant. The United Nations is running the U.N.D.P. (United Nations Development Programme) that mainly supports the set up of national informatics centres, promoting education and research. The UNESCO (United Nations Educational Scientific and Cultural Organisation) among others, supports postgraduate courses in computers and applications and runs the ICID (International Committee on Informatics for Development) and the IFID (International Federation for Information Processing). Additionally, the UNIDO (United Nations Industrial Development Organisation) provides the information required for selection and use of technologies. It runs the INTIB (Industrial and Technological Information Bank), aiming in generating and disseminating information on technologies. It also runs the TIES (Technological Information Exchange System) aiming in technology acquisition and upgrading of the participating countries. In the European context, the European Community runs SPRINT, a programme for innovation and technology transfer, and other foundations, such as the European Foundation for the Improvement of Working Conditions, also focusing on matters of

technology.

There can be little doubting that no small part of technology transfers are made in an informal way, (Simai 1990). The reason for this is that the formal research and development methods are comparatively more time consuming and costly. Such informal methods are professional visits of experts, engineers and scientists, utilisation of published technological data, books and patents, attendance of international seminars, exhibitions and conferences and technological-scientific intelligence work in commercial and military technologies.

The motivation for the technology recipients is twofold. To increase the value added or profitability of economic activities already established and to increase indigenous technological capability for new products design.

The procedure of new technology match and utilisation in an industrialising country may be divided in three general stages. (Kim 1980, Maissner 1988, Chattergi 1989). The initial stage may be called implementation of imported technology and relevant products are mainly aiming for the local markets. At a second stage, more or less the one being reached in Greece, the assimilation of technology takes place, and makes for product diversification using development engineering. The third stage is the improvement stage for enhancing competitiveness with use of local scientific personnel, research and development and mostly local components and parts, and aiming to produce for both home and international markets.

Finally, but no less important, the success of technology transfer depends on the ability and willingness of the importing society to accept and absorb the new technology, this being the most important and specific role the Industrial Areas in Greece have to play. The type and the technological level of the existing supporting industry of any region is critical. The risk of technology transfers without indigenous technological capability is common, especially in cases of countries attempting to increase their production output in minimal time. Adaption of imported technology, besides destroying traditional technologies and knowledge, may lead to economic dependency on spare parts and repairs larger than initially thought by the importing country. In addition, shortage of managerial capacity by the importing region may be critical. Managerial dependence may prevent entrepreneurship and diffusion of technology to the receiving area. Moomaw and Williams (1991) with US data show that the total factor productivity when correlated with technical change is negative, at least in the short run. This suggested to be due to the pace of change and general confusion until the relevant skills are developed by workers and managers.

As an alternative approach to technology, the Appropriate Technology theories (Heierli 1986, Steward 1987) are a movement aiming somewhat further than the well publicised soft energy application plans such as biogas, solar energy or windmill generators. It is a methodology to find appropriate technological solutions to given problems via the mobilisation of local creativity and use of local skills, while promoting the developing targets of the country. This does not mean that technology should not be new, or of a sophisticated nature, and in this way these ideas can be useful for the Industrial Areas Programme. The theory further criticises the inappropriate technology used in less developed countries by scientific, capital and political elites that is either unadaptable, due to lack of servicing networks and being beyond the local skills, and / or out of reach of the indigenous population due to its cost. (James 1989).

In both underdeveloped countries and core areas the appropriate technology methodology is often applied. For example, custom production of agricultural tools in underdeveloped countries, custom production of hi-fi components in the UK, watches in Switzerland, tailor made bicycles in Italy, or furs in northern Greece can be equally sophisticated, profitable and job creating. As regards information technology, it is essential for the development of more functional services, and the services sector has been seen to be a prerequisite for industrial and economic development. In this sense, information and high technology is perhaps an appropriate technology for development.

3.3 Policy questions arising from the conceptualisation of regional development

3.3.1 Central development policies and the regional tools

Historically, after what in fact amounted to the neo-feudalism of the 19th century, the state started its interventionary economic role. Regional policy emerged as part of state development policy, but it has also been suggested that in many cases a state paternalism replaced landlord paternalism in the 20th century. Regions and localities have too often mainly relied for their development on large scale enterprise and government policies. Regional unemployment and stagnation has been seen by many not as cyclical and temporary, but structural and persisting. On this context recently it has been more often suggested that central policies are able to redistribute economic activity only during growth dominated

periods, (Stohr 1990a). They seem more or less unable to generate local innovative capacity during periods of restructuring needs. Greece, being not an exception, did experience such effects that are demonstrated in the chapters to follow.

As a development of the above, a major characteristic of the eighties has been the shrinkage of the public sector and the associated 'privatisation'. Privatisation in the eighties had questionable results, and as Novy (1990) explains there has been a growth of the 'informal economy' uncontrolled by the state, while the latter has sought to control inflation through fiscal austerity, monetary restriction and the rolling back of the welfare state. These are things about which Zolotas, (1981) had warned, and which became a common experience in Greece in the late eighties and early nineties. Salamon (1989) suggests that privatisation as a policy is focusing only on a narrow financial dimension of a government's possible actions, during periods of crisis. On the contrary, the use of the government's regional policy tools has multiple dimensions in helping both the firms and the local public sector to restructure and develop.

A mainstream theoretical thought regards the policy tools at the regional level as strategic variables for strengthening the local productive systems. These are the local development agencies, local / regional new technology promotion centres, specialty technological agencies, business services centres and development of renewable energy sources. The case for these centres and agencies is that technical and organisational innovations increasingly take on the characteristics of a continuous process rather than of a few giant leaps, hence the necessity of social regulation and better institutional integration of the local system. Development of such a flexible complex of finance and technological assistance is much needed in Greece and much missed by the Industrial Areas Programme.

Local development agencies have a role of interfacing public and private actors and between demand and supply of business services, especially promoting information. Their main tasks are the promotion of a satisfactory industrial operating environment by means of developing various types of infrastructure, and the reinforcement of links among local firms. Other functions involve the creation or support of scientific and technological environments, vocational training and retraining, internal savings mobilisation towards local firms and investment information and finally, the establishment of links with the outside world (Garofoli 1990).

Government aid should be channelled toward small new/high technology firms, providing venture capital for research, which will promote innovations and

new products. Oakey (1986) suggests that, as a result of the short life cycles of high technology products the decisions on loans, etc. should be made fast, through decentralised agencies, in days rather than months. On this, Roobeck (1990) suggests that it is unlikely that a spatially uniform technology policy can be effective. Other writers have observed that, since each type of new technology, i.e. microelectronics, telecommunications, satellite, automation and the like, all have different seedbed conditions, development agencies may have a good case in regional context, but also in specialty context (Cappellin and Nijkamp 1990).

In the case of high technology, where technological advances are rapid, the finance required for research and development increases in magnitude as the firm grows. Oakey (1986) suggests that an agency providing capital for high technology small firms could take equity shares or an equity stake option in return. In this way fast finance is secured and commitment to the firm and long term support is enhanced.

Regarding the status of the development agencies, they can be of public status, through government (national or regional) designated boards, or of private status, with representatives of banks, trade unions, professional unions and/or from the public. Equally, their funds may stem from public bodies, or from banks, loan- issues, regional funds, etc. From experience in Europe (Robert 1985) agencies that mainly provide infrastructure mainly complement regional authorities and their component in regional growth is less evident than those providing specialised services (surveys, studies, finance, planning, technical advice), which often have striking results.

3.3.2 Policies for development through technology

Having the development channels settled, developed countries are mainly concerned in gaining access to and diffusion of leading edge technologies for restructuring and growth, and the promotion of international trade (Cooper 1980). Developing countries, though, (Haq 1988) are burdened with social, political and often ethical questions as well as infrastructural, institutional and human resource development priorities. Greece being somewhere in the middle, most certainly has both types of problems.

First, to start with the socio-political problems, one policy debate is the restructuring versus job losses issue. Currently the productivity of firms is partly increased by reducing labour costs and the use of new technologies. But automation in primary, secondary and even the services sector, is expected to significantly reduce the quantity of labour required and this is posing serious social

problems. A social parameter of the new technology adaptation is the reaction of the workers and the unions. Three case studies in England (Williams and Steward 1985), showed that the application of new technology, despite the unfavourable industrial relations climate, eventually won the compliance and consent of the workforce, and there was little overt conflict. Unions were willing to accept job losses if in parallel with technological change. Intra-organisational disputes were of minor importance. Unfortunately, internal learning by the remaining staff and high technology specialisation within a firm could not guarantee regional spin offs in the form of additional employment and growth.

On the other hand, new technology and informatics-related industries both in manufacturing and services may generate new employment opportunities. Organisations, such as local government or national institutions, should furnish new technology clusters with an adequate policy and legislation framework providing information and skilled workers agglomerated in local markets, as well as encouraging entrepreneurship. This will facilitate the diffusion of firms' achievements to be spread in the regions by means of new, dynamic and flexible firms. From a long term perspective, the development and application of information technology may be the key to economic viability and competitiveness of developing countries. It is important to assess to what extent informatics revolution can give lagging regions the chance to increase productivity, create new wealth and eventually narrow the economic gap.

Second are the material infrastructure problems. Just as transportation is crucial for the distribution of raw materials and manufactured goods, adequate and reliable telecommunications and electric power are absolute prerequisites for new technology and informatics. The extent to which infrastructure for new/high technology can influence development policy and its crucial effectiveness has been demonstrated.

Third is the issue of finance and stimulation. A commonly used policy for sustaining or generating growth, in both developed and developing countries, is that of incentives. The incentives' objectives may vary, according to the state that uses them, according to its economic strength and to its perception of what is desirable for development. Common objectives of incentives are promotion of private investment, rise in exports, promotion of regional development, increased use of new technology, promulgation of research and development, protection of health and safety as well as employment creation amongst others. The broad categories of incentives are direct transfers, fiscal reliefs and facilities provision (Alexakis 1990, Athanassopoulos 1990).

Direct incentives transfer financial resources into the hands of the entrepreneurs. These, and especially those of the fiscal relief pattern, are used to a large extent as income revenues by the firms, and may well not be used in a way which helps the sector's long term self-sustained growth. There is the risk that large sums of direct incentives may create firms and activities in sectors and in areas where under different circumstances these would not have occurred and which lead later to problematic enterprises. Directed incentives can be justified only for a transitory period and in a certain sectoral context.

The facilities provision incentives involve the state undertaking activities to provide conditions that would encourage firms to engage in investment and other activities. They can be both of institutional and of material character. Examples are venture capital provision, finance leasing, factoring and forfeiting, capital markets, development agencies, information preparation and dissemination, products design, classification and standardisation, export trading companies, besides the obvious material infrastructure, such as industrial areas, buildings, locational plans.

In Greece, as was seen in the previous chapter, it is mostly the material incentives which are currently effective. But as research and development functions are extremely polarised worldwide, special stimulation of research and new technology activities is a critical strategy. Policies to improve the efficiency of production might include priority to innovation-oriented research. It might prove more fruitful if new ideas were given attention and procedures were established which actually lead to practical adoption of scientific achievements.

Fourth, incentives alone may prove not enough.The quality of the local public services provision is likely to be critical for the socio-institutional frame which becomes the base for development. The introduction of new technology in the public services can make the potency of them more effective and comprehensive. It is anticipated that fewer movements towards central branches or the capital would eventually be needed while, additionally, regional confidence would be supported.

Relevant research in Ireland, (Blennerhasset and Moran 1984), based on three public services provision departments, showed that computerisation of client services resulted in more convenient, more personalised services, with wider choice and better information for the customers. At the organisational level, the employees had greater variety of tasks, had less autonomy and their work was more tightly controlled, while in fact overtime work was eliminated.

Last, but equally crucial, is the development of the human infrastructure. This includes training of personnel within the regions to supply a variety of informatics services, and this could create new jobs. Data entry subcontracting by

large firm, software development and customising and hardware assembly are labour intensive occupations that may provide jobs in peripheral regions. Of course upskilling does not necessarily mean labour upgrading (Noyelle 1987) since technology gives the opportunity for geographic segmentation of stages of the same industry. In other words the headquarters activities can remain in a metropolis and 'back office' functions tend move to the periphery.

The above problems characterise, as described, the developing countries but also some of the more developed. In the latter cases, some more tools for enhanced development based on new technology and information could be employed. A modern approach that might be seen as supportive of centralisation is the Seedbed - Incubator Hypothesis. It is a theoretical approach for development through innovation that mainly occurs in the centres of large cities, considered also by Moomaw - Williams (1991). But Giaoutzi, (1990) suggests that other specific favourable parts of the spatial structure are capable of generating innovations, a description that should fit a well specified Industrial Area. She suggests that these 'territorial innovation complexes' can be stimulated, financed or guided by development policy so as to create potential spin-offs for their region.

A further advance on the above development practice is the evolution of the Technological Parks concept. They are normally set up in urban areas with a developed industrial fabric, and with presence of techno-scientific infrastructure. They mainly aim to aid the promotion of diffusion of new technologies and information between local firms (Monck 1988, Stohr 1988). The interface and cooperation of the technological parks with world class universities, the leading local industries, and local government and other actors are thought to be critical to the regional effects of this strategy. In a more expanded form, technological parks take the form of Technopolises. Certain countries have set up nationwide technopolises plans, such as the Japanese plan, with 26 technopolises, and the French, with 37 planned and 12 in operation by 1989 (Malecki 1991). Such comprehensive policies have yet to prove their effects. Massey and Quintas (1992), stress the socially divisive and spatially polarising effects of such efforts. But even if technological / science parks may fail to create world beating research, they might keep the regions aware of the latest technologies and therefore become innovation oriented.

Wider policy orientation to informatics also appears to be an attractive option. A case study for Ireland by Hanna (1982) shows how the informatics sector actually created development. Informatics industry was chosen due to its growth potential (25% annually at that time), the high value over volume ratio of its

products and its profitability. The policy offered a well educated workforce, welcoming political structure, and cash, land, and buildings together with taxation incentives. The result was that ten of the world's leading manufacturers were attracted, creating jobs and income. The potential for wider technological diffusion, to the extent that relevant knowledge is abundant, should not be overlooked.

The Business Services Centres concept is also meant to promote the formulation of new firms in less industrialised areas, and use information to match local supply to regional demand. Once established, the creation of joint services for small and medium sized firms, such as for exports and marketing, are possible. But even the more internal operations of the firm can be provided on behalf of small firms, such as legal advice, software customisation, market research and recruitment. It might prove in this way, that small firms concentrating on the clearly productive activities can improve their results. Other policies of potential may be those supporting electronic data interchange networks between firms, which have been shown to offer the potential of reducing local firms' communication costs by 80-99% (Riddle 1988). For example, several car manufacturers in Europe created the ODETTE (Organisation for Data Exchange by Tele Transmission in Europe).

3.3.3 Alternative development patterns: endogenous development

Local cooperation is seen as one of the most appropriate institutional forms for local development and restructuring, as it was wisely set out by Stohr and Taylor (1981) before the crisis of the eighties emerged. Nevertheless, what in many cases might start as a 'local development programme', may often end up as being dominated and controlled by forces external to the region. Bryden and Scot, (1990) suggest that more importance has been placed by central governments on oiling the wheels of the market via loans and grants for the private sector, than supporting the locally based institutional structure, local morale and self confidence.

The phenomenon of the job generation gap is the result of the combined development of the culture of dependency and changing economic conditions (Steinle and Moya 1986). Lack of entrepreneurship in regions may well result from decades of normative acceptance of people working for a wage (Hudson 1983). Brugger (1986) suggests that central governments' regional policy during the last two decades realised a shift from the dictum of 'reduction of regional disparities' to the more convenient 'reduction of the undesirable regional disparities'. The latter can accommodate nationwide measures, maybe ineffective but of political benefit to

the policy makers.

Given the above analysis, the theory of Endogenous Development is based on utilisation of the Endogenous Potential of an area. This is the amount of endogenous factors of production that can be operationalised in the interest of self- reliant regional development (Brugger 1986). In these cases decline tends to be outbalanced to a certain extent through local restructuring, use of high technology and innovation carried out by local entrepreneurs and cooperatives. The preconditions of improving the chances of such restructuring are the existence of a local crafts history or a technical culture, local entrepreneurial spirit and intensive intra regional linkages, physical proximity between local research, production and markets, local solidarity, and democratic decision making. (Stohr 1990b)

First, from an economic point of view, in most cases the smaller the area the weaker the endogenous potential. Nevertheless, it is argued that advantageous use of the regions resources (by raising local value added) in production, maintenance and increase of local entrepreneurial competence and strengthening of intra regional linkages are the key issues. Small and medium enterprises may be increasing the flexibility of the regions' productive base and in some cases may be more receptive to knowledge transfers from universities or research institutes. From an environmental point of view, selective attraction of firms may be adopted and certainly some realistic economic concern should be given for environment.

Second, from a political point of view, it tends to be the case that when the subsidiary and solidarity principles are brought forward within the region, local confidence supports development. The theory suggests that it seems to be of great importance, that any measures taken by central governments should aim to further the potential local mobilisation rather, than being injections of finance and technology irrespective of the local factors. There are no few cases in Europe, where decline was caused by the crowding out effect of few large oligopolistic firms, often state-aided or controlled, later running into problems themselves. Equally, power of decision making, planning and implementing needs is proposed to be transferred down to the local level. Of course coordination usually remains at national level. But still, a continuous process of territorial monitoring and policy adjustment to the goals of endogenous development, may be very valuable, if formulated.

Third, on social and cultural grounds, endogenous development implies a collective process of goal setting, but at the same time the operation of individual decision making processes. It requires people to work towards collective goals,

furthering development processes 'from below', intensification of local communication networks and a strengthening of regional identity.

The above three-way development structure can be said to have been a theoretical underpinning of the recent reorientation of the Industrial Areas Programme in Greece, mentioned earlier. Internationally, in this direction, the I.L.E. (initiative locale de creation d' emploi) are schemes promoted by OECD and EC and are presented as one remedy for unemployment starting from the grass roots. The I.L.Es may be community businesses, often emerging out of the 'alternative' movement, mobilising the grassroots and creating common awareness in the community. They have social, economic and sometimes environmental goals. Their greatest problem is undercapitalisation (European Commission 1988).

The critique to the concept of 'development from below', was initially based on three types of reasons. First, the economic argument is that local economies are too small and in command of too few resources. They would not be able to stop, it was argued, the deterministic changes of international division of labour. Second, a political reasoning focuses on grounds that the power vested at local or even regional level is too small to confront the dominance of large multinational enterprises. Third, is the general lack of information which provides the concept of good decision making, due to the reliance of local governments on central governments during the last decades (Schultze 1985, Gerdes 1985).

An alternative theory to the development from below ideas is the Self Reliance Movement. The theory assumes that endogenous development within the mainstream of economic policy is closed. The main argument is that endogenous development is a viable option only for the world city regions, which can use their countervailing power to negotiate with global capital and the state, for arrangements favourable to their economic and political elites. But this seems to be too far from what is meant as development from below. Friedman (1986a) describes the Self Reliance Movement as a social one, encompassing political action. It would expand beyond regional boundaries to achieve a loose and flexible posture amongst international capital and the states. The object of the movement, is suggested, is to change reality, not to administer it. The Self -Reliance movement is seeking effectiveness though decentralised forms of organisation and dispersed leadership responsibilities. It assumes ordinary people to involve as actors within the civil society and undertake related political engagement.

3.4 Conclusion

Political and economic power structures of today, assisted by the much improved transportation and information networks, have created a globalised economy. Countries and regions try and hope for an improved participation that can be thought of as the reflection of development.

In the world, or in one country, polarisation or centralisation of economic and political power is based on an unequal spread of information and technological advantage. Thus development of capacity, preferably with the use of indigenous capability, in the sectors of leading-edge technology and use of informatics gives countries, or regions, the possibility of better participation in the world economy and decreased dependency.

It is suggested that to attain the technological and information advantages, countries or regions have to overcome socio-political, infrastructural and human resources problems. Subsequently, a determined effort is necessary to promote and facilitate research advance. This process can be aided with the use of decentralised, fast and specific government tools and structures.

As pointed out earlier, postwar Greece has suffered from extreme centralisation of economic and industrial activities that continued while the national regional development policy was based on the two-sector neo-classical model. Given the inadequacy of the resultant regional development, the Industrial Areas Programme was conceived, and was based on the growth poles strategy. At a later stage, in 1988, the Programme was suggested to reorientate, to follow a generalised industrial space provision policy. The new plans are not yet implemented. The Industrial Areas Programme, designed in the sixties as national growth poles, and implemented in the seventies and eighties had varying results.

The Industrial Areas Programme in Greece could be one strategy that could accommodate the application of a flow of new technology and support peripheral infomotion, with the relevant soft and material infrastructure. In the light of the theories brought forward in this chapter, the restructuring of the existing Industrial Areas towards new / high technology initiatives may well prove to be the main necessity, but not the only one. For improved effectiveness, as analysed here, much needs to be done in the area of decision making, decentralisation and efficient operation of existing and new government tools at local level. This is because technology and information do not flourish in 'castles in the desert'.

Chapter 4 : Regional employment and productivity performance

4.1 Introduction

Regional differences in employment and productivity change are important for two reasons. First, they reflect the outcome of different production processes in space, where available labour is combined with various sorts of capital using specific technologies. But also they reflect the regional comparative advantages and the consequent opportunities for efficient business operation in space and of course these can be affected by policy measures. The centralisation problem in Greece was outlined in an earlier chapter as were the development policies adopted and the appropriate theoretical framework. But since the main development policy evaluated here is the Industrial Areas Programme, it is useful to discuss the characteristics of the Industrial Areas and the recipient regions before tackling the quantitative analysis of regional performance.

The Industrial Areas were established in both peripheral industrial centres and remote or lagging regions to promote industrial development and consequently regional development. Table 4-1 illustrates the varying characteristics of the twenty regions with Industrial Areas. It can be seen that their population varies from almost a million to just over fifty thousand; many though are around the 150,000 level. Variations in levels of urbanisation are also large, ranging from some 80% to less than 20%. In most cases though these regions have only one large urban centre around which most industrial activity is located.

Thus the regions are not at all similar in their population setting. This is also the case in respect to their manufacturing characteristics. Leaving aside Thessaloniki, which is by no means peripheral having a manufacturing sector over 100,000 strong, employment varies from over twenty thousand to under two thousand employees in the various regions. Table 4-1 also shows the ratio of employment in manufacturing over total population for each of the regions, termed the manufacturing index. It shows directly the importance of manufacturing for

Table 4-1 : Basic employment magnitudes for all Industrial Area Regions

Geographical Department *	Capital City	Total Population (a)	Urbanisation Percentage	Regional Manufacturing Employment (b)	Manufacturing Index (b) / (a)	Jndustrial Areas Employment (c)	(c) / (b)	Establishments in Region Number	Average Size (d)	Establishments in Industrial Area Number	Average Size (e)	(e) / (d)
Thessaloniki	Thessaloniki	871,580	81.0%	106919	12.3%	6030	5.6%	18232	5.9	110	54.8	935%
Achaia	Patra	275,193	65.5%	21186	7.7%	1360	6.4%	3430	6.2	28	48.6	786%
Larissa	Larissa	254,295	44.7%	17171	6.8%	81	0.5%	3508	4.9	8	10.1	207%
Magnissia	Volos	182,222	58.9%	14612	8.0%	3900	26.7%	2448	6.0	78	50.0	838%
Pella	Edessa	132,386	30.7%	11505	8.7%	234	2.0%	1779	6.5	4	58.5	905%
Kavala	Kavala	135,218	41.9%	11279	8.3%	209	1.9%	1774	6.4	14	14.9	235%
Iraklio	Iraklio	243,622	45.5%	10631	4.4%	1794	16.9%	3831	2.8	100	17.9	646%
Serres	Serres	196,247	23.6%	10208	5.2%	1004	9.8%	2740	3.7	18	55.8	1497%
Drama	Drama	94,772	39.2%	8673	9.2%	1270	14.6%	1254	6.9	39	32.6	471%
Fthiotis	Lamia	161,995	25.8%	8480	5.2%	242	2.9%	1741	4.9	9	26.9	552%
Xanthi	Xanthi	88,777	38.2%	6949	7.8%	405	5.8%	853	8.1	5	81.0	994%
Messinia	Kalamata	159,818	27.1%	6901	4.3%	30	0.4%	1993	3.5	2	15.0	433%
Ioannina	Ioannina	147,304	30.4%	6397	4.3%	138	2.2%	1990	3.2	24	5.8	179%
Evros	Alexandrupolis	148,486	34.0%	6375	4.3%	0	0.0%	1748	3.6	0	0.0	n/appl.
Kilkis	Kilkis	81,562	15.5%	6002	7.4%	1009	16.8%	970	6.2	20	50.5	815%
Dodecanissos	Rhodos	145,071	46.7%	4478	3.1%	0	0.0%	1471	3.0	0	0.0	n/appl.
Rothopi	Komotini	107,957	34.7%	4187	3.9%	1200	28.7%	984	4.3	29	41.4	972%
Arcadia	Tripolis	107,932	19.8%	2956	2.7%	187	6.3%	980	3.0	10	18.7	620%
Preveza	Preveza	55,915	24.4%	2064	3.7%	730	35.4%	600	3.4	6	121.7	3537%
Florina	Florina	52,430	24.0%	1208	2.3%	420	34.8%	465	2.6	7	60.0	2310%
All Industrial Areas		3,642,782	49%	268,181	7.4%	20,243	7.5%	52,791	5.1	511	39.6	780%
GREECE		9,800,000	58%	706,307	7.2%	20,243	2.9%	144,717	4.9	511	39.6	812%

* Sorting Code: "Total Manufacturing Employment "

Sources: Population:Population Census 1981; Industry: Industrial Census 1988

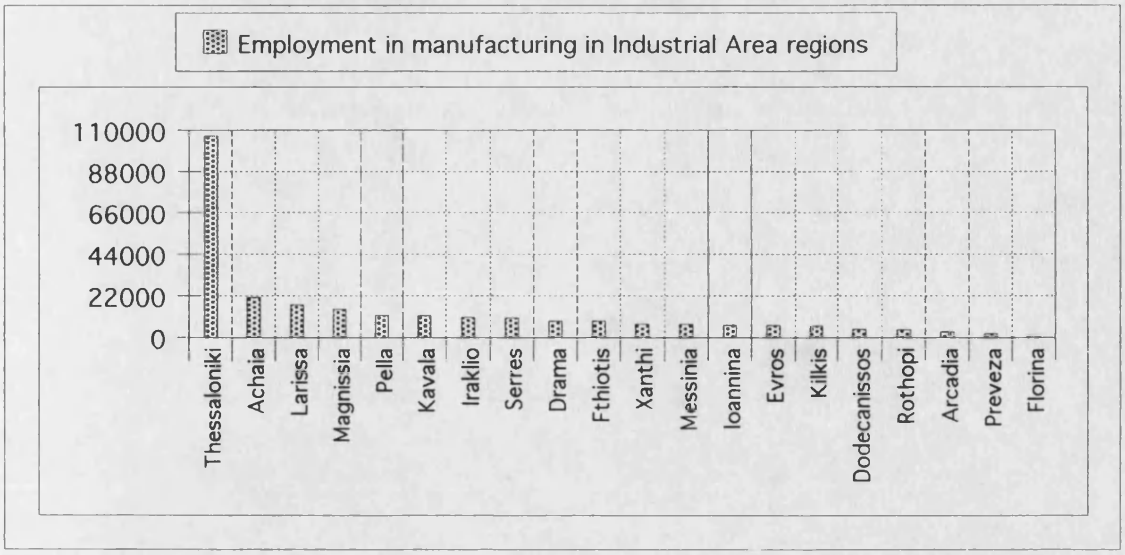
each region, undistorted by the varying economic activity rates, that are often unstable in peripheral regions due to partial employment in agriculture. The manufacturing index ranges from over 12% in Thessaloniki down to 2% in Florina. The median value of the index is 5.2% and the non weighed regional mean is 6%, while the index for all twenty regions - or regional weighed mean is 7.4%. The relations reveal higher values of the index in the larger regions.

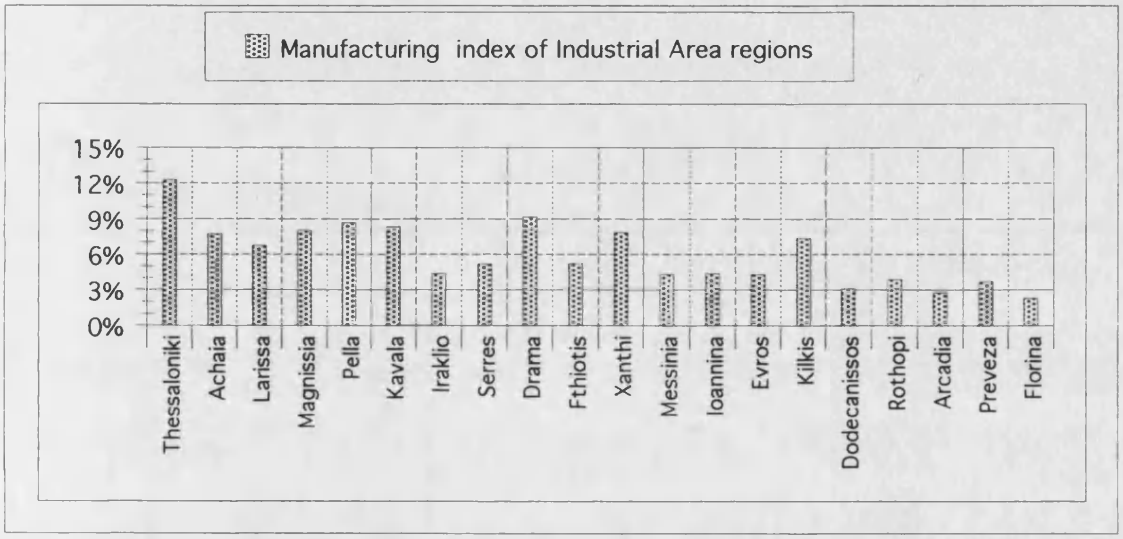
The characteristics of the Industrial Area projects themselves, also vary. In Table 4-1 it can be seen that employment in Industrial Areas varies from over six thousand in Thessaloniki to some one hundred in other cases. One further ratio is extracted featuring the employment in the Industrial Areas over the total employment in manufacturing of each region. This shows the extent of importance of the Industrial Areas to the total regional manufacturing. There is considerable variation in the participation of the Industrial Areas in local manufacturing and this variation is not analogous with the size of each Industrial Area, neither with the manufacturing index of each region.These comparisons can be seen in Figure 4-1.

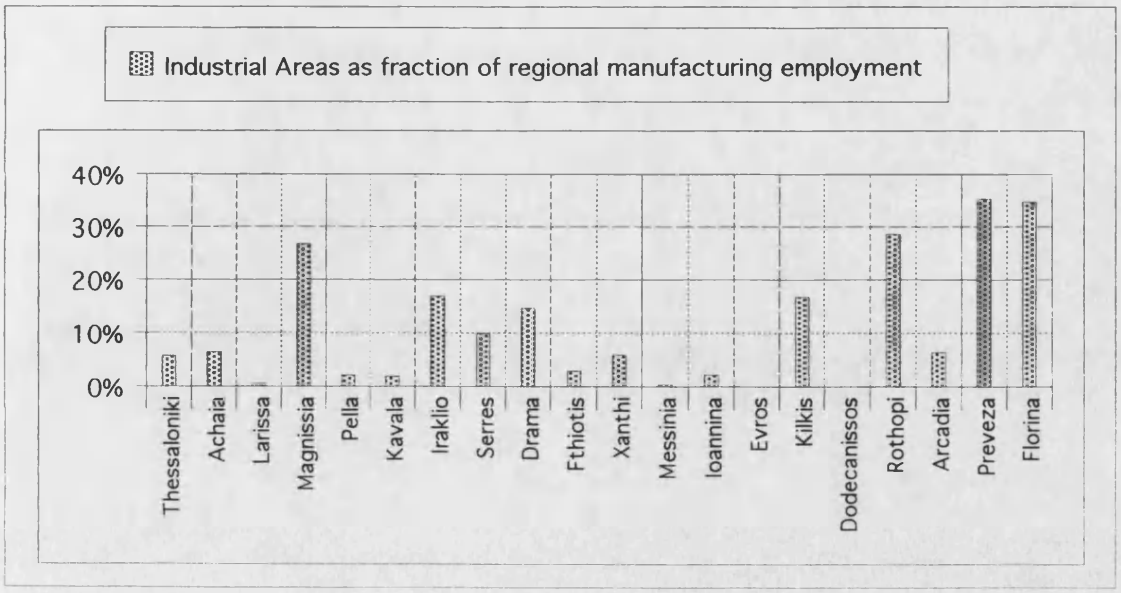
It should be noted that the Industrial Areas are of decisive importance for the lagging regions with small manufacturing sectors, such as Florina, Preveza and Rothopi, where the Industrial Areas cover over 30% of all employment in manufacturing. For the more developed areas the most significantly participating Industrial Areas are in Magnisia (Volos) with some 27% of all manufacturing employment, and Iraklio at some 17%, while the large Industrial Areas of Thessaloniki and the one of Patra represent only around 6% of the respective manufacturing sectors. Finally, the Industrial Area - regions of Dodecanissos and Evros are mentioned as such since there were present Industrial Area sites in operational stage by 1988. But there was no virtually manufacturing employment in either site by 1988, only a small amount of construction and administrative employment. For these last cases, any regional productivity characteristics to be found in the following analysis are not directly attributable to the Industrial Areas.

Given the above employment magnitudes and the last reservation, one important issue arises regarding the importance of the Industrial Areas in the patterns of manufacturing in each region. The percentages may in cases seem low, but the type of the firms establishing in the Industrial Areas in all cases is rather distinctive. In Table 4-1 the average size of the establishments within the Industrial Areas is given, alongside the respective average regional size of all establishments. It can be seen that the size of the establishments in the Industrial Areas is much higher than the typical regional size. The ratio of the latter to the former describes the situation. The two values and the resultant ratio are graphed

Figure 4-1: A comparison of variation in Industrial Area characteristics in relation to regional manufacturing contexts







in Figure 4-2. In some cases the ratio is over 500% such as in Drama, Fthiotis, Messinia, while in Iraklio and Arcadia it is some 650%, in Achaia and Magnisia the ratio reaches about 800%, and in Thessaloniki and Kilkis some 900%. In some more remote northern regions though the ratio becomes even higher, reaching 1000% in Xanthi and Rothopi, 1500% in Serres, 2300% in Florina and 3500% in Preveza. The region with the lowest ratio is Larissa at 207%.

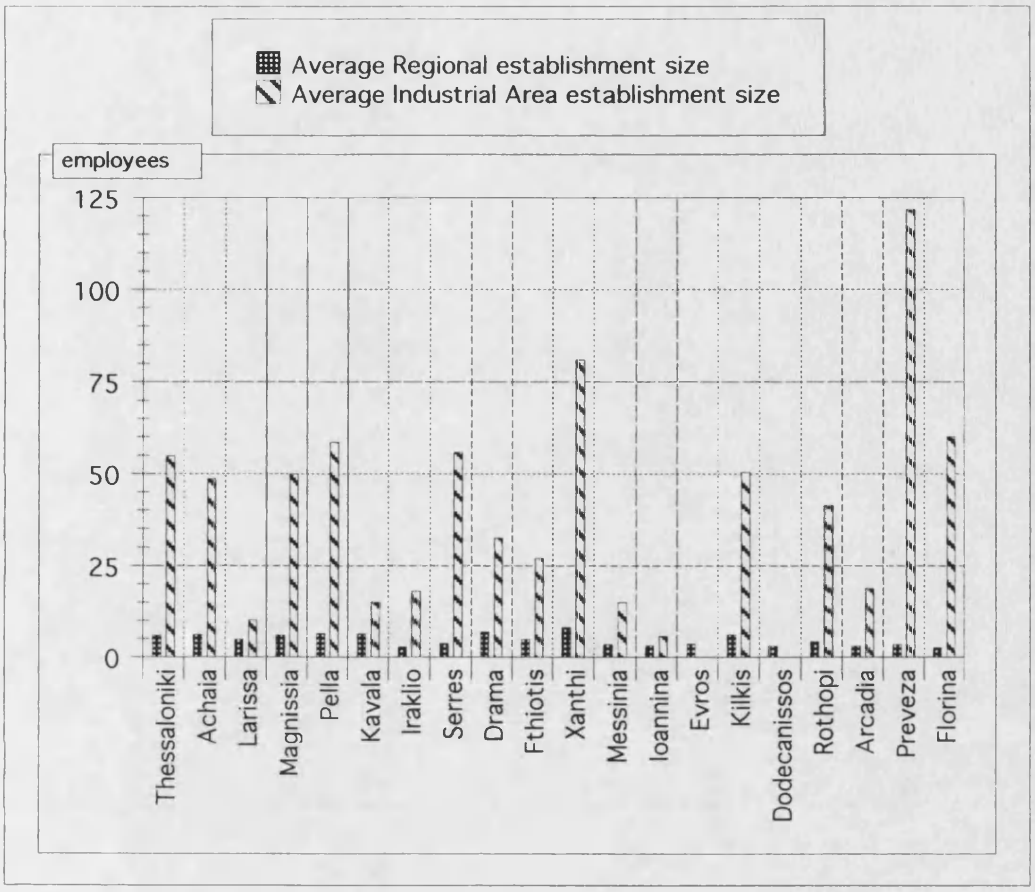
Thus it can be said with confidence that in general the Industrial Areas attract and concentrate the larger firms in the regions. Inevitably it also happens that the age of these production plants is less than the average regional. It can be now speculated that these firms are the very ones which have increased productivity and are more competitive at the national and even international level. It happens that the Industrial Areas are planned to and in cases do provide the operational infrastructure welcoming such firms and this is one of their strengths.

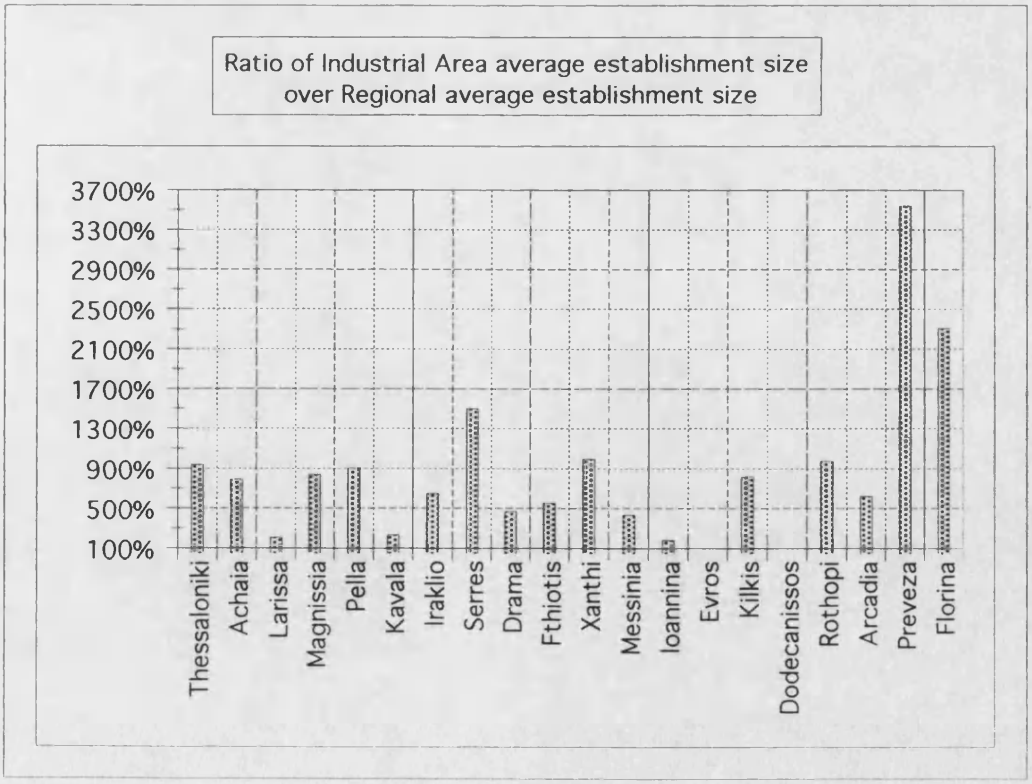
The analysis which follows attempts to investigate whether the Industrial Areas offer measurable external economies and technology transfer to the regions. The analysis provides a measure of the varying rates of employment change in the regions of Greece. Subsequently the productivity gains due to external economies and the utilisation of new technology over the sub-national territory are estimated. Such a framework can facilitate correlation between the regional economic performance and the regional development policy measures, with a specific focus on the Industrial Areas Programme. Finally, an estimation of the role of the structure of agglomerations in the country as regards technological efficiency is made.

4.2 Analysing regional economic performance

In the first part of the analysis a description of recent regional employment change between 1978 and 1988 in the 51 regions of Greece (illustrated earlier in Figure 2-4) will be undertaken. This will point up the basic regional development differences within the country and illustrate the significance of manufacturing activity in this respect. The method used is a standard shift share analysis. The analysis will identify the specifically 'regional' growth aspects of employment change after allowing for expected change due to industrial structure. A manufacturing-based regional performance index is then constructed in an attempt to judge the significance of this component in accounting for such 'regional'

Figure 4-2: A comparison of variation of firm size in the Industrial Area regions





employment change.

The second part of the analysis seeks to analyse the productivity patterns among the regions of Greece. Accounting for regional differences in productivity has become an important focus of research in the eighties (Moomaw 1981, 1983, 1985). Progress has been made in advancing the level of understanding from the early attempts, which simply linked population-based measures of urbanisation and localisation economies, to more recent efforts which have tried to disentangle the effects of technological change from the broad influences of scale economies. Within what is now a substantial body of research on this topic the basic methodology is to derive explanations from the formulation of regional production functions. Some measure of output or value added is linked to a variety of factors of production in an attempt to judge the significance or otherwise of such capital and labour inputs. One such attempt, which is particularly interesting in that it explicitly isolates the role of technological change at the regional level, is by Beeson (1987) looking at productivity differences in the states of the US. She focused attention on the role of agglomeration economies as regards productivity growth. A variant of this approach has been developed here, and deployed in for the regions of Greece.

The objectives here are to utilise technology and variable returns to scale (based in part on agglomeration economies and levels of infrastructure provision) to develop the concept of what has been termed Total Factor Productivity (TFP). This may be usefully thought of as the difference between the growth rate of output and the weighted growth rate of constant returns to scale. In essence it is composed of the two components: variable, or non-constant returns to scale and technological change. The emphasis in this research is on the role of technological change in regional development and how such change might be influenced by regional policy, as with the Industrial Areas of Greece. The TFP model for Greece is calibrated on regional manufacturing value-added data for the years from 1980 to 1988. The model, estimating differences in the value added in manufacturing given the employment and capital inputs, also produces a specifically 'regional' productivity growth component in value added terms. These empirical results are the prime ingredients of the second section.

In the third section, interesting conclusions may be drawn if the TFP model's findings, in value added terms, are compared with the regional growth components measured in employment terms. The characteristics of regions in relation to their results in both analyses may help to trace the extent to which various factors and policy itself work towards regional development.

4.3 Regional employment change in Greece

4.3.1 Operationalising a shift share analysis

Employment statistics for some seven economic sectors have been used to analyze economic change in the regions of Greece between 1978 and 1988. The data derive from the 1978 and the as yet unpublished 1988 Censuses of Greek Industry(National Statistical Service of Greece ΕΣΥΕ-3, 1978; ΕΣΥΕ-3, unpublished). They refer to all 51 Geographical Departments in Greece and cover the following seven economic sectors: 1.Mining, 2.Manufacturing, 3.Electricity, Gas and Water, 4.Trade and Tourism, 5.Transportation and Telecommunication, 6.Financial Services and 7.Other Services. The sector of agriculture and stockfarming and the one of construction are not included in the analysis.

A standard shift share analysis has been used to describe the employment change of the 51 regions. Such analysis produces, besides a national growth component, also a structural effect and a residual effect. This latter is interpreted as the specific regional competitive change effect. This competitive effect is of course the result of the regional performance across all of the sectors used.

Existence of a positive competitive effect is of course the result of the regional performance across all of the sectors used and can only partly be attributed to manufacturing and relevant industrial policy. In order to better judge the manufacturing contribution, a manufacturing-specific regional performance index has been constructed (Rman). The index represents the ratio of the actual regional employment in manufacturing in 1988 over the expected employment in the region's manufacturing assuming national growth rates. One unit is subtracted from the formula so that positive values of the index indicate greater employment than expected, and vice versa.

$$Rman=[Regional\ Eman_{t1} / (Regional\ Eman_{t0} *(National\ Eman_{t1} / National\ Eman_{t0}))]-1$$

where Eman = manufacturing employment.

The index is a measure of how much better or worse than the industry-specific national expectation manufacturing actually performed over time. Now this index is partially accounting for the regional residual component, and thus it can be measured against it. Where the two have the same sign the regional differential shift is enhanced by the specific regional performance in manufacturing, be it in a positive or negative way. In the case where the two have different signs the

manufacturing sector's specific performance counteracts the regional differential shift, again in a positive or negative manner.

Based on this analysis, a typology of four types of areas was produced, providing some potential for interpretation of the results in relation to the effects of the Industrial Area projects and the levels of regional technology.

4.3.2 The results of the shift share analysis

The national employment growth rate for the total of all seven sectors proved to be 12.9% for the decade 1978 to 1988. For the same period manufacturing grew nationally by 5.1%. The sector with the largest employment growth rate was financial services, with an increase of 45.7%. For relevant comparisons see Table 4-2. It should be thus noted that specialisation in manufacturing by a region can be considered unfavourable in this kind of analysis as it produces a negative structural component. The interesting question is to what extent can specific factors, such as for example the use of new technology, overcome this inherent structural disadvantage to produce a positive regional or competitive effect. The case is not theoretical because the manufacturing sector, even if only growing by 5.1% net, is still the second largest absolute contributor of new jobs, having provided some 16.1% of gross new jobs in the period. The first contributor, for Greece, is as expected the trade and tourism sector with 58.1% of gross new jobs.

In Greece, as it was described in Chapter 1, a strong centralisation of economic activity and economic development problems of different types continued during the sixties and seventies. By 1978, some 65% of the seven sector's employment was concentrated in five regions, Attiki, Thessaloniki, Achaia, Iraklio and Magnisia, the figure rising to 68% when manufacturing alone is considered. One region, Attiki, in which the capital city Athens is located, accounted for 48% of the country's employment (except agriculture) and for 49% of manufacturing by 1978 (Table 4-2). The participation of the above five regions fell to 61% in the seven sectors employment and to 64% for manufacturing in the decade. Participation of Attiki lessened to 43% in the seven sector's employment by 1988, and to 42% for manufacturing. Regional policy can be partially accredited in that centralisation of economic activity can be seen to reduce over the period.

Attiki experienced declines in all activities except for financial services, other services, and the trade-tourism sectors. Table 4-3 shows that Attiki with its given industrial structure should have grown by 12.2%, very near to the national average. But Attiki had an employment growth rate of only 1.2%, only

Table 4-2: Greece: changing employment, 1978 - 1988

7 Sectors	% Change in employment	Net New Jobs	Sectors' % contributior in new jobs	Sectors' % contribution in lost jobs
Mining	-3.9	-837	-	5.7
Manufacturing	5.1	33990	16.1	-
Electricity-Gas-Water	22.6	5899	2.8	-
Trade &Tourism	23.4	122430	58.1	-
Transportation &Telecommunication	-9.1	-13906	-	94.3
Financial Services	45.7	32687	15.5	-
Other services	32.4	15887	7.5	-
ALL 7 SECTORS	12.9	196150	100.0 New jobs = 210893	100.0 Lost jobs = -14743

Employment in the Seven Sectors

	1978	**%**	**1988**	**%**
GREECE	1516345		1712495	
Achaia	40278	3%	44426	3%
Attiki	728083	48%	736531	43%
Iraklio	29306	2%	39118	2%
Magnisia	27084	2%	30932	2%
Thessaloniki	153388	10%	201921	12%
FIVE REGIONS	978139	65%	1052928	61%

Employment in Manufacturing

	1978	**%**	**1988**	**%**
GREECE	672317		706307	
Achaia	21119	3%	21186	3%
Attiki	327729	49%	298277	42%
Iraklio	9124	1%	10631	2%
Magnisia	14788	2%	14612	2%
Thessaloniki	82886	12%	106919	15%
FIVE REGIONS	455646	68%	451625	64%

Table 4-3 Greece: Shift-share analysis of employment in seven sectors, 1978 -1988

SHIFT SHARE ANALYSIS Regions	Regional Growth Rate (%) (G.r)	National Growth Rate (%) (G.n)	Regional Growth (%) at National proportions (G.rn)	Structural Component (%) (G.rn-G.n)	Competitive Effect (%) (G.r-G.rn)	R.man. R.man	R.man. correlation measure with Competitive Effect	Existence of Industrial Areas
Achaia	10.30	12.94	12.55	-0.38	-2.26	-0.045	0.102	I. A.
Arcadia	20.10	12.94	14.31	1.38	5.79	0.070	0.407	I. A.
Argolida	13.63	12.94	13.94	1.00	-0.31	-0.105	0.033	
Arta	8.41	12.94	15.84	2.91	-7.43	-0.012	0.091	
Attiki	1.16	12.94	12.22	-0.71	-11.06	-0.134	1.480	
Chalkidiki	33.28	12.94	13.24	0.31	20.03	0.203	4.068	
Chania	13.08	12.94	13.69	0.75	-0.61	-0.123	0.075	
Chios	6.18	12.94	16.12	3.19	-9.94	0.034	*-0.341*	
Dodecanissos	37.20	12.94	18.34	5.41	18.85	-0.062	*-1.168*	I. A.
Drama	40.72	12.94	12.83	-0.11	27.89	0.490	13.658	I. A.
Etoloakarnania	10.77	12.94	16.53	3.60	-5.76	-0.088	0.506	
Evia	4.51	12.94	11.18	-1.76	-6.67	-0.034	0.230	
Evritania	57.47	12.94	16.32	3.38	41.15	1.424	58.589	
Evros	24.70	12.94	16.37	3.43	8.33	0.277	2.310	I. A.
Florina	33.85	12.94	15.86	2.92	18.00	-0.038	*-0.680*	I. A.
Fokida	8.33	12.94	12.25	-0.69	-3.91	0.350	*-1.371*	
Fthiotis	8.31	12.94	13.49	0.55	-5.18	-0.054	0.277	I. A.
Grevena	13.94	12.94	14.53	1.60	-0.59	-0.065	0.039	
Ilia	13.01	12.94	16.37	3.43	-3.36	0.010	*-0.035*	
Imathia	21.17	12.94	11.39	-1.55	9.78	0.135	1.322	
Ioannina	26.67	12.94	13.39	0.45	13.28	0.081	1.073	I. A.
Iraklio	33.48	12.94	16.56	3.62	16.92	0.109	1.846	I. A.
Karditsa	15.86	12.94	17.00	4.07	-1.14	0.149	*-0.170*	
Kastoria	6.88	12.94	8.99	-3.94	-2.12	-0.064	0.136	
Kavala	27.51	12.94	13.46	0.53	14.04	0.333	4.680	I. A.
Kephalonia	27.63	12.94	16.11	3.17	11.52	0.078	0.901	
Kerkyra	8.12	12.94	18.01	5.08	-9.89	-0.156	1.547	
Kilkis	45.57	12.94	13.50	0.56	32.07	0.535	17.170	I. A.
Korinthia	18.38	12.94	13.09	0.15	5.30	-0.008	*-0.045*	
Kozani	52.90	12.94	11.18	-1.76	41.72	0.310	12.929	
Kyclades	54.94	12.94	14.34	1.41	40.59	0.388	15.750	
Laconia	10.62	12.94	16.48	3.54	-5.85	-0.117	0.687	
Larissa	23.44	12.94	12.74	-0.20	10.70	0.110	1.172	I. A.
Lasithi	34.64	12.94	17.87	4.94	16.77	0.029	0.482	
Lefkada	21.68	12.94	16.75	3.82	4.93	0.034	0.169	
Lesvos	2.07	12.94	15.40	2.47	-13.33	-0.112	1.500	
Magnisia	14.21	12.94	12.43	-0.51	1.78	-0.059	*-0.106*	I. A.
Messinia	9.21	12.94	14.85	1.91	-5.64	-0.093	0.523	I. A.
Pella	41.20	12.94	13.52	0.59	27.68	0.470	13.009	I. A.
Pieria	55.57	12.94	15.45	2.52	40.11	0.757	30.348	
Preveza	21.98	12.94	15.16	2.22	6.83	0.079	0.539	I. A.
Rethimno	50.50	12.94	17.11	4.18	33.38	0.290	9.674	
Rothopi	23.31	12.94	15.11	2.18	8.19	0.404	3.309	I. A.
Samos	19.77	12.94	16.23	3.29	3.54	-0.052	*-0.184*	
Serres	12.83	12.94	14.57	1.63	-1.74	0.175	*-0.303*	I. A.
Thesprotia	30.26	12.94	16.92	3.99	13.34	0.559	7.460	
Thessaloniki	31.64	12.94	12.10	-0.83	19.54	0.228	4.452	I. A.
Trikala	23.73	12.94	14.53	1.60	9.20	0.099	0.913	
Viotia	15.24	12.94	8.99	-3.94	6.24	0.092	0.576	
Xanthi	51.80	12.94	12.96	0.02	38.85	0.550	21.358	I. A.
Zakynthos	58.70	12.94	16.52	3.58	42.19	0.305	12.846	

NOTE: The "Rman Correlation Measure with the Competitive Effect" is produced by multiplication of the values of the Competitive Effect and the Rman .

slightly accounted for by a negative structural component of -0.7%, and mainly due to a large negative competitive component of -11.1%. The causes may be lower productivity and diseconomies due to congestion, pollution, etc, besides an effective decentralisation policy due to regional development incentives and of course the Industrial Areas Programme. However, it is still a fact that Athens with 33% of the population of Greece still holds 43% of the jobs in the country.

Employment in Thessaloniki, given its structure and growth at the national rates, should have increased by 12.1%. Instead it grew by 31.6%, playing the role of Athens in the northern part of the country. Although its structural component is negative, -0.8%, its residual -competitive- component is substantially positive at 19.5%. It is not without importance that the Rman of this region was 0.23 showing that manufacturing grew 23% faster than the sectoral expectation. Recent centralisation in Thessaloniki is becoming more marked since here 8% of the country's population holds 12% of the employment by 1988 in the seven sectors considered. But it is interesting to see -later- the way in which productivity is affected by this centralisation. In the region there is a large and thriving Industrial Area.

Besides these two large city regions in Greece, several other departments with conurbations over 50,000 people have been active in attempting to promote economic activity. Patra, for example, is a city of just over 150,000 and has a considerable industrial tradition. Employment here grew by 10.3%, and this is slower than the national growth rate. The mix effect is slightly negative and both the regional competitive factor and the Rman index are negative. In Patra the Industrial Area project was not able to counteract the regional trends; ageing infrastructure and old technology are not untypical of the region. Iraklio is the largest city on Crete with 110,000 population. Here employment grew by 33.5% , much higher than the expected given its structure. Iraklio has a large positive competitive effect that is not all due to tourism; the Rman is positive and the local Industrial Area is successful. New technology in new flexible firms may well be the prime reason? Volos is another industrial city with 100,000 population and a large Industrial Area. Employment increased here by 14.2% which is higher than its structural expectation. The competitive effect is positive while the Rman is marginally negative. This may well be a case where industrial restructuring is having important effects.

It is possible to construct a typology of employment performance in all regions (Table 4-4). In thirteen of the twenty departments possessing an Industrial Area, a positive value for Rman is associated with a positive competitive

Table 4-4: A typology regarding contribution of manufacturing employment to regional competitiveness

AREA TYPE	R.man.	Competitive Effect	Correlation of Rman with Competitive Effect		Number of Regions
	+	+	+	**A.Thessaloniki**	1
	+	+	+	**B. Iraklio**	
	+	+	+	**B. Larissa**	
	+	+	+	B. Viotia	3
	+	+	+	**C. Arcadia**	
	+	+	+	C. Chalkidiki	
	+	+	+	**C. Drama**	
	+	+	+	C. Evritania	
	+	+	+	C. Imathia	
	+	+	+	**C. Ioannina**	
	+	+	+	**C. Kavala**	
	+	+	+	C. Kephalonia	
	+	+	+	**C. Kilkis**	
TYPE	+	+	+	C. Kozani	
	+	+	+	C. Kyclades	
	+	+	+	C. Lasithi	
I	+	+	+	C. Lefkada	
	+	+	+	**C. Pella**	
	+	+	+	C. Pieria	
	+	+	+	**C. Preveza**	
	+	+	+	C. Rethimno	
	+	+	+	C. Thesprotia	
	+	+	+	C. Trikala	
	+	+	+	C. Zakynthos	20
	+	+	+	**D. Evros**	
	+	+	+	**D. Rothopi**	
	+	+	+	**D. Xanthi**	3
Number of Regions consisting Type I					**27**
	+	-	-	C. Fokida	
TYPE	+	-	-	C. Ilia	
II	+	-	-	C. Karditsa	
	+	-	-	**C. Serres**	4
	+	-	-	D. Chios	1
Number of Regions consisting Type II					**5**
	-	+	-	B. Korinthia	
TYPE	-	+	-	**B. Magnisia**	2
III	-	+	-	**C. Florina**	1
	-	+	-	**D. Dodecanissos**	
	-	+	-	D. Samos	2
Number of Regions consisting Type III					**5**
	-	-	+	A. Attiki	1
	-	-	+	**B. Achaia**	1
	-	-	+	C. Argolida	
	-	-	+	C. Arta	
TYPE	-	-	+	C. Chania	
	-	-	+	C. Etoloakarnania	
	-	-	+	C. Evia	
	-	-	+	**C. Fthiotis**	
IV	-	-	+	C. Grevena	
	-	-	+	C. Kastoria	
	-	-	+	C. Kerkyra	
	-	-	+	C. Laconia	
	-	-	+	**C. Messinia *(1)**	11
	-	-	+	D. Lesvos	1
Number of Regions consisting Type IV					**14**

NOTES:

Regions in Bold possess Industrial Areas (I.A.)

The letters pre-fixed to the regions' names show the national incentives classification of the regions, Law 1262/82

(A) Central Regions, no investments financial incentives, except for special high technology projects.

(B) Developed Regions, low financial incentives.

(C) Less developed Regions, stronger incentives.

(D) Lagging and Remote or Strategical Regions, powerful incentives.

*(1) Messinia joined the (D) assisted areas in 1987, with the Law 1682/87 after being hit by earthquaqes.

effect. In other words a better than average performance in manufacturing gives these regions a positive all sectors regional growth effect (type I). In one further case (type II) a faster than average increase in employment in manufacturing was not able to offset a below average all-sectors performance. In three more cases a negative Rman is associated with a negative shift-share residual, again showing the critical role of manufacturing in the performance of a region, (type IV). In only three cases of the twenty (type III) is found that above average performance is associated with manufacturing increase rates below the national average.

There are specific mitigating circumstances in all three deviating areas. Dodecanissos is an island complex successfully devoted to trade and tourism resulting in a positive structural component, in fact amongst the highest in Greece. It is, however, not a prime manufacturing area. The Industrial Area was not in operation until very late in the examined period (as explained) and its future role can be thought of as a receiver for industry rather than stimulating agent. Florina is located in one of the most distant and mountainous areas on the northern boarder of Greece. The location of the Industrial Area has a strategic as well as an economic role. The case of Magnesia is different - a large old industrial region with a port and two significant Industrial Area sites. Employment in manufacturing, the most important sector by far, fell by 1%. This area has a manufacturing base much suited to modernisation and restructuring. Although the region does have a positive competitive effect in the shift share analysis this is much dependent on service sector performance. Larissa, however, the neighbouring department with a similar sized manufacturing sector and also with an Industrial Area, shows a much better and above average performance in manufacturing.

Among the regions that contain an Industrial Areas, some 70% , those shown in Figure 4-3, benefitted from more than proportionate growth in manufacturing for whatever the reasons (types I and II). The relation can be regarded as compatible with the hypothesis that the Industrial Areas strategy helps the recipient regions to maintain and expand their manufacturing capacity above national levels. This is not to say, however, that important manufacturing gains have not been achieved in regions without Industrial Areas. Several of the non Industrial Area regions achieve type I and II classification (positive Rman), but the relevant percentage is 58% compared to the 70% of all the Industrial Area regions. Besides, in 80% of the cases growth in manufacturing (Rman) is co-directional with the all-round competitive effect (types I and IV).

Overall, some 27 of the total 51 regions (53%) experienced accelerated manufacturing gains together with all-round positive competitive effects (type I).

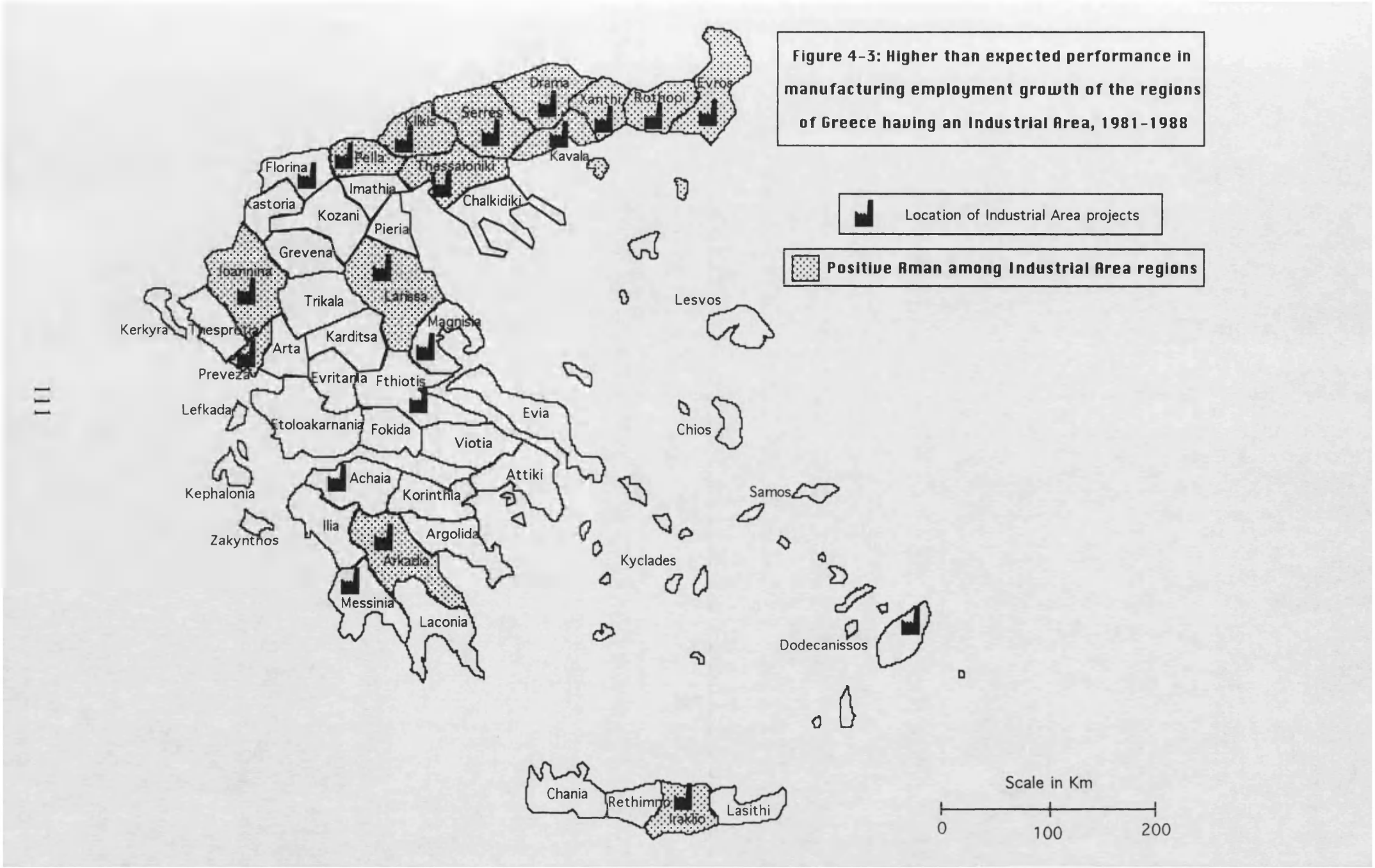


Figure 4-3: Higher than expected performance in manufacturing employment growth of the regions of Greece having an Industrial Area, 1981-1988

Location of Industrial Area projects

Positive Rman among Industrial Area regions

Some 32 regions (63%) experienced faster employment growth in manufacturing than the expected (positive Rman, types I and II). Finally, a co-directional relation between Rman and the competitive effect, (types I and IV) is found in 41 of the 51 regions, 80% overall. The previously observed strong relationship between the fortunes of manufacturing and all-round performance is clear.

One further aspect of the typology needs to be explained. Each region carries with it a particular code letter (A-D) which is its assistance class, reflecting the strength of the assisted status accorded to the region under the national legislation for development (Law 1262/1982). It can be seen that there is considerable relationship between the strength of manufacturing performance in a region and the level at which financial incentives are available to assist industry. Peripheral areas with strong incentives seem to be better represented in the list of high performing (in employment terms) (type I) areas. It would appear that financial incentives of the nationwide assistance scheme plus the existence of the Industrial Areas Programme seem to overcome locational disadvantage in remote areas providing acceptable operating environments for new and re-located firms. Firms located in such areas, being either recently established or enlarged, tend to have more up-to-date equipment using newer technologies. In older industrialised areas the results are less clear cut. Financial incentives are weaker, of course, and local industry is in some cases ageing and in need of restructuring.

There is obvious scope for policy to efficiently pursue technological advance. While employment increase is one aim, productivity and the related competitiveness is another. The last mentioned proved in the theoretical part of this thesis as a main prerequisite for sustaining existing employment and creating new growth. How, when and where do these features match? These are questions that can be approached in the following total factor productivity analysis.

4.4 Regional productivity change in Greece

4.4.1 Measurement of productivity growth and the total factor productivity models

It would be instructive to begin with a definition of productivity growth. In the productive process it can be said that, if the output growth rate is greater than input growth rate from a first period to a second period, then there has been productivity improvement. The length of the time interval over which the

measurement is undertaken is of no determining importance - it may be years or quarters.

Other definitions which derive from the above are provided by Diewert (1992). When output per unit of input is greater in one period than in a previous one increased productivity occurs, and this is termed a 'technical coefficients' definition. The 'deflated costs and revenues' definition claims increased productivity when the final over initial period revenue (output) ratio is larger than the relevant costs ratio. Finally, the 'Jorgenson and Griliches' price index' method defines productivity as a ratio; it is the rate of growth in input prices from the one period to another, divided by the rate of the relevant growth in output prices.

The above methods and definitions are more suitable if one input is measured against one output, or alternatively, the summed costs of several inputs measured against summed revenues from of one or more outputs. The use of production functions for the measurement of productivity allows the use of more extensive and distinctive sets of inputs and/or outputs.

Output (Q) can be described for each period as a function of inputs. For two inputs x1 and x2 it has the form:

$Qt = f(x1,x2)$

As this is the case for each period, the right hand part of the equation can be transformed into a temporary component (at) and an atemporal part:

$Qt = at\ f(x1,x2)$

Then the measure of productivity (P) is $P = at=1 / at=0$

The equation can be redefined in various operational forms such as a linear production function, or Cobb-Douglas type production function. The latter is one that implies that inputs (capital and labour) and outputs, if several, are perfect substitutes and the elasticities of output in respect to inputs sum to one, if scale economies are not assumed. A quadratic form, or a translog production function, introduced by Christensen et. al. (1971) does not restrict substitution possibilities.

Total factor productivity (TFP) attempts to measure the effects on output of all factors of production, as opposed to only labour productivity and/or only capital productivity, etc. The TFP methodology was introduced by Kendrick (1973). He used the real gross product as the output measure and was interested in the TFP of various sectors of the US economy. In a later work (1980) he emphasised the trends and cycles of the TFP over time, using data for the US between 1948 and 1976.

Jorgenson et.al. (1987) also made analyses of the economic growth of the US for 1948-1979. They too measured gross output of the economy and produced

a production function for each economic sector. The innovative part of their method was that they used a labour input factor which was enhanced by a complex factor of labour quality. They also incorporated a quality dimension to their capital input factor. In addition to their capital and labour inputs they used the interesting notion of an intermediate input and this was empirically calibrated using input-output tables. Results showed that the driving forces in the 3.4% annual average expansion of the US economy over this period were mainly due to capital and labour increases, contributing an average of 2.6% annually, while in contrast productivity growth only accounted for 0.8%.

For international comparisons the work of Kurosawa (1984) should be mentioned. In a measurement of the productivity of Japan for the period 1970-1980 he finds an annual increase in national (all sector) productivity of 4.0%. The manufacturing sector's annual productivity growth for Japan was 9.3%, while that of Singapore was, he suggests, only around 4%.

One advantage of a value added as opposed to a gross output based TFP production function is that capital and labour inputs alone adequately account also for the 'intermediate' input. In addition, the use of value added information embodies important socio-economic aspects of the economy that the gross output does not (Kurosawa 1984). A further advantage of the TFP methodology is that it does not have to account for the (social) opportunity cost of investment since it uses capital stock instead of total investment. On the other hand the method is also, almost by definition, sensitive. If, in a progressive economy, the ratio of capital stock over total investment rises constantly, or, in other words, if net investment is ever increasing, the method would tend to underestimate value added productivity.

Using a value added TFP model, Beeson (1987) advances previous work in that she extends analysis of productivity in the regional context. Specifically she evaluates the role of agglomeration economies in the regional productivity growth of the manufacturing sector. Data for the 48 contiguous states of the US for 1959-1973 on value added and the labour input were obtained from government manufacturing surveys. The more elusive capital stock data relies heavily on previous research by other authors. The research deploys two analytical stages. First, using time series data, TFP is estimated together with its constituent components, scale economies and technological change. Second, the TFP findings are related, using cross-sectional data, to a series of location specific explanatory variables, selected to represent agglomeration effects of various sorts as well as the spatial arrangement of cities.

In the field of measurement of productivity, there have been further

attempts to consider ideas such as the efficiency of use of capital and labour inputs in the manufacturing sector. Beeson and Husted (1989) use the TFP methodology through a stochastic frontier production function model which estimates the properties of the best practiced technology among the regions of the US. Inefficiency of a state's manufacturing is measured as deviation from the best technology practice frontier.

4.4.2 Operationalising the total factor productivity analysis for Greece

This research utilises the TFP methodology. Regional translog production functions accounting for value added in manufacturing comprise the model to be used here. Beeson (1987) was mainly concerned to account for the spatial differences in the productivity change components by agglomeration economies. But the productivity components and their distribution over space seem just as, if not more, interesting themselves. These are the focus of this paper.

Employment and value-added data are derived from the Annual Industrial Surveys of Greece (ΕΣΥΕ-4, various; ΕΣΥΕ-4, unpublished) for the years 1980 to 1988. For reasons of confidentiality and resultant necessary aggregation statistics are provided only for 42 regions instead of the full 51 departments.

In the main equation of the model the difference in output is a function of the elasticity-weighted capital stock of a region, the elasticity weighted labour inputs for the period and the rate of technical change. Growth in value added is decomposed into a constant returns to scale (CRS) portion, a scale economies (VRS) portion, and a portion attributed to technical change (TEC). The TFP is the growth attributable to all factors, apart from the CRS component. In other words TFP is the output growth due to VRS and TEC. In accounting for changes in manufacturing output, VRS need not be restrictively attributed to agglomeration economies. This component may well incorporate the results of an interventionary policy by government as well as the regional entrepreneurial and innovative potential. Similarly for technological change.

Subsequently, a technological stochastic frontier arrangement is deployed for the decomposition of the part of value added growth attributed to technology. Here again CRS and VRS are used, but allowance is made for distorting factors in the previously estimated TEC. The regions are then distinguished and ranked according to their deviation from where best technology practice occurs.

In order to utilize these types of TFP growth models and to be able to

estimate the technological evolution, a critical input of the regional capital stock was needed. For the case of Greece, an estimation of the capital stock for industry and in a regionally disaggregated manner was unavailable to the present authors, if available at all.

Creating a method that would provide an estimate of the capital stock used by industry in the regions of Greece was a challenge, as well as a necessity, in this stage of the research. The following procedure was followed using the investments in 42 regions for fourteen years (1974 to 1987). Regionally disaggregated data for investments in industry are not available for the years before 1974. The annual current prices of the above mentioned investments were then deflated to constant 1974 prices. Given the lack of nationwide land value indices for the years mentioned, the investments were deflated by a rated scale based on the capital goods and building materials deflators provided by the official source EΣYE.

Based on these constant price measures, an average annual investment indicator was produced (AI). The estimation of the capital stock was based on the fact that investment in industry is divided in three categories, investment in land, in buildings and in machinery. The relevant average percentages of these categories were extracted and named PL, PB and PM respectively. It is set that PL+PB+PM=1. Subsequently, the estimation was based on an assumed full depreciation period for each category of investments. This was named TL, TB and TM respectively. Given these, the estimated capital stock, (KE) can be computed by the formula:

$$KE_{t=0} = AI \ (PL\ TL + PB\ TB + PM\ TM)$$

where the (PL TL + PB TB + PM TM) may be called weighted full depreciation period.

For the case of Greece, AI was computed from the years 1974-1979, the year t=0 was 1980, and the settings were PL= 0.0477, TL= 62.5 years, PB = 0.7143, TB = 25 years, and PM = 0.2380, TM = 10 years. These gave a weighted full depreciation period of about 16 years.

Subsequently, the model can provide estimations for the next years' capital stock, based on the subtraction of the annual weighted depreciation and the addition of the relevant new investment (I). Thus,

$$KE_{t=1} = KE_{t=0} \ [1 - 1 / (PL\ TL + PB\ TB + PM\ TM)] + I_{t=0}$$

The annual weighted depreciation rate $[1 / (PL\ TL + PB\ TB + PM\ TM)]$ for

the settings used for Greece was about 0.062 or 6.2%.

The capital estimation method which has been created is likely not to be wholly accurate but gives theoretically meaningful estimations and fully utilises the limited existing data. Besides it is possibly the first such attempt for the regions of Greece.

After the capital stock estimation was completed the value added in manufacturing for each of the 42 regions was deflated to 1974 constant prices, for the years 1980 to 1988. As an estimation of the work hours variable, which was required by the model, a 1974 constant price variable of the total salaries paid to workers was used for the same 42 regions for the same years. They derive from the same dataset as the value added.

Having all the disaggregated variables for the years 1980 to 1988 the model was thus fully operationalised. The first equation of the model takes the form of a translog production function attempting to account for levels of value added for each region. It is regressed separately for each of the 42 regions for the years 1980 to 1988.

$$\text{Ln } VA_{it} = b_{0i} + b_{Ti} \ln_T + b_{Li} \ln L_{it} + b_{Ki} \ln K_{it} + b_{LKi} \ln L_{it} \ln K_{it} + u_i$$

where T=1...9, a dummy variable for the years 1980 to 1988, L=labour input and K=capital stock; i = 1...42 and t = 1...9.

The above produces 42 sets of (b_o , b_T , b_L , b_K , b_{LK}), one set for each region. The goodness of fit and the values of the above coefficients can be seen in Table 4-5. It should be noted that the i (42) sets of b_K , b_L , b_{LK} are timeless, that is they are used time-fixed for the multiplication with the t (9) time-different K_i and L_i datasets to produce the e_{Kit} and the e_{Lit} elasticity matrices.

The elasticities eK_{it} and eL_{it} of capital and labour are then constructed as follows:

$$e_{Kit} = b_{Ki} + b_{LKi} \ln L_{it} \quad \text{and} \quad e_{Lit} = b_{Li} + b_{LKi} \ln K_{it}$$

The scale economies factor is then the sum of the capital and labour elasticities.

$$v_{it} = e_{Kit} + e_{Lit}$$

Table 4-5: Regression coefficients of the value added production function

Regions	R. sq	Bo	Bt	Bl	Bk	Blk
Achaia	0.66	-569.4	-0.180	74.38 (*)	60.70 (*)	-7.82 (*)
Arc.& Laconia	0.39	-867.8	0.208	190.47 (*)	123.26 (*)	-26.90 (*)
Argolida	0.83	-702.6	0.019	135.63 (*)	88.96 (*)	-17.02 (*)
Attiki	0.83	448.7	-0.091	-42.63 (**)	-37.32 (**)	3.63 (**)
Chalkidiki	0.99	234.0	-0.148	-49.94 (*)	-36.58 (*)	8.02 (*)
Chania	0.44	441.8	0.040	-100.47 (*)	-74.37 (*)	17.11 (*)
Chios	0.93	-98.3	0.043	30.81 (*)	17.40 (*)	-5.25 (*)
Dodecanissos	0.47	-235.0	-0.054	51.91 (**)	34.99 (**)	-7.55 (**)
Drama	0.92	966.2	-0.002	-154.91 (*)	-126.50 (*)	20.42 (*)
Etoloakarnania	0.47	-240.9	-0.040	47.45 (**)	29.97 (**)	-5.76 (**)
Evia	0.95	324.7	-0.094	-42.73 (**)	-32.45 (**)	4.38 (**)
Evrit.& Fokida	0.41	101.6	-0.751	-14.72 (**)	-13.05 (**)	2.03 (**)
Evros	0.80	-70.1	0.041	15.44 (**)	10.71 (**)	-2.18 (**)
Florin.& Grevena	0.65	87.4	-0.216	-30.30 (**)	-15.23 (**)	5.54 (**)
Fthiotis	0.71	-95.2	-0.219	20.84 (**)	10.35 (**)	-2.12 (**)
Ilia	0.76	683.6	-0.241	-135.83 (*)	-85.31 (*)	17.11 (*)
Imathia	0.80	1260.7	0.190	-184.89 (*)	-147.64 (*)	21.78 (*)
Ioannina	0.66	73.2	-0.018	-11.43 (*)	-8.49 (*)	1.44 (*)
Ionian Isles	0.56	-32.6	-0.094	7.47 (**)	6.93 (**)	-1.37 (**)
Iraklio	0.55	2223.4	0.224	-406.68 (*)	-285.63 (*)	52.39 (*)
Karditsa	0.76	-17.7	-0.084	7.73 (**)	3.27 (**)	-1.13 (**)
Kastoria	0.90	13.6	0.015	-1.27 (**)	-3.11 (**)	0.56 (**)
Kavala	0.95	-20.0	0.117	3.62 (**)	2.65 (**)	-0.34 (**)
Kilkis	0.90	-84.5	0.099	16.73 (**)	11.05 (**)	-2.03 (**)
Korinthia	0.83	-166.6	-0.365	21.12 (**)	18.53 (**)	-2.23 (**)
Kozani	0.83	551.0	-0.116	-89.41 (*)	-61.79 (*)	10.15 (*)
Kyclades	0.92	-65.2	-0.587	15.40 (**)	8.74 (**)	-1.93 (**)
Larissa	0.86	3628.8	0.243	-535.96 (*)	-404.69 (*)	59.89 (*)
Lesvos	0.93	-147.2	-0.215	37.23 (*)	23.87 (*)	-5.83 (*)
Magnisia	0.43	-463.9	-0.051	65.11 (**)	47.48 (**)	-6.55 (**)
Messinia	0.84	-54.1	-0.384	14.10 (**)	7.36 (**)	-1.70 (**)
Pella	0.89	-23.5	-0.125	5.91 (**)	2.76 (**)	-0.55 (**)
Pieria	0.88	-141.5	-0.063	29.74 (*)	18.69 (*)	-3.77 (*)
Pre.The. Arta	0.30	-87.2	-0.079	17.26 (**)	12.99 (**)	-2.39 (**)
Reth.& Lasithi	0.42	35.3	-0.314	-13.31 (**)	-7.57 (**)	3.26 (**)
Rothopi	0.98	38.6	-0.259	-10.88 (*)	-5.79 (*)	1.81 (*)
Samos	0.78	30.3	1.000	-8.80 (**)	-2.72 (**)	0.96 (**)
Serres	0.49	1429.7	-0.130	-261.03 (**)	-192.40 (**)	35.29 (**)
Thessaloniki	0.41	2934.2	-0.01	-337.43 (*)	-274.68 (*)	31.69 (*)
Trikala	0.89	-710.4	0.139	142.22 (*)	105.29 (*)	-20.91 (*)
Viotia	0.44	1648.0	0.019	-206.31 (*)	-152.51 (*)	19.20 (*)
Xanthi	0.85	-375.5	-0.014	65.36 (*)	44.83 (*)	-7.66 (*)
GREECE	**0.75**	**380.9**	**0.008**	**-34.16 (**)**	**-32.20 (**)**	**2.99 (**)**

Key to significance of estimated coefficients:

(*) shows cases with significant t-statistic above the 0.10 level (20 cases)

(**) shows cases with significant t-statistic from 0.10 to 0.25 level (22 cases)

The final equation that measures output growth between consecutive time periods requires the differential elasticities E_{Kit} and E_{Lit}, the differential scale economies factor V_{it}, and finally the weighted output value X_{it}. These are derived as follows:

$E_{Kit} = 0.5 [e_{Ki}(t) + e_{Ki}(t-1)]$ and $E_{Lit} = 0.5 [e_{Li}(t) + e_{Li}(t-1)]$

$V_{it} = 0.5 [v_i(t) + v_i(t-1)]$

$X_{it} = E_{Kit} [\ln K_i(t) - \ln K_i(t-1)] + E_{Lit} [\ln L_i(t) - \ln L_i(t-1)]$

The final output growth measuring equation of the model is the following:

$\ln VA_i(t) - \ln VA_i(t-1) = V_{it}^{-1} X_{it} + (1-V_{it}^{-1}) X_{it} + TEC_i$

The left hand part of the equation is the growth in output (VA) between any two years. On the right hand side the $V_{it}^{-1} X_{it}$ component is the breakdown of the weighted output due to constant returns to scale CRS, and the $(1-V_{it}^{-1}) X_{it}$ component is the output assigned to variable returns to scale VRS. The value TEC_i is a normal subtraction residual between the growth in VA and the weighted growth due to constant and variable returns to scale. This is the part of output growth credited to technological change. All these components are either known or estimated by regression and subsequently derived.

The TFP for each region is defined as the addition of the VRS and the TEC components. The growth in value added is provided by the model in the form :

$\ln(b) - \ln(a) = CRS + VRS + TEC$

this is an approximation of the actual growth percentages which are (b-a) / a.

The calculation of the actual percentage is as follows:

$P = kCRS + kVRS + kTEC$

where $\ln(b) - \ln(a)$ is $\ln(b/a)=A$ and $P= e^A - 1$ and $k = P / A$.

This transformation is undertaken for precision reasons only, since the differences of the percentages are small and the positive or negative sign is always the same.

The equation is operationalised eight times, starting with growth from 1980 to 1981, finishing with growth from 1987 to 1988, thus giving for each region eight different decompositions of VA growth. An average of the components from the eight equations is made to produce the actual growth percentages. Thus

average VA growth for each region is decomposed to its average CRS, VRS and TEC components for valid comparisons over the regions. Time trends could be constructed for individual regions, for any or all components.

4.4.3 Some technical issues on measuring and modelling the total factor productivity

Official statistics in Greece do, as elsewhere, underestimate the value of output produced as well as the numbers in the employed workforce, possibly at different levels for each. It should be emphasised here that manufacturing is the sector least susceptible to 'informal economy' practices in comparison with activities in agriculture and trade and services. However one of the advantages of the methods used in this research is that they are mainly dependent on year to year variations in the changes of the input factors of production and the resultant outputs. The research is thus not biased by absolute magnitudes and possible relevant inconsistencies in the way data are collected.

On a technical point, mention should be made here of the technical difficulties encountered in research of this nature which uses regional time series data having few observations. Similar problems are to be seen in the work of Kurosawa (1984) and Beeson (1987) already referred to. The basic difficulty with the present study is that with only nine yearly observations (for a considerable number of regions) the levels of statistical significance associated with the resultant regression coefficients are likely not to be high. In many regional cases in this study this is true, although in all cases t-statistics would be significant at the 0.25 level. Several alternative methods were devised to query the reliability of the magnitude and direction of the parameters given above and the subsequent results. The results given in the tables that follow refer to the original data set.

Interpolation

The nine years' observations for each region were enhanced to produce some 17 observations by deriving mid-year estimates based upon inter-year averages. The whole analysis was replicated using these enhanced data. The result, as might be expected, was that the variance explanation was substantially improved and the t-statistics for the key parameters are almost all significant at the 0.10 level, with many significant at the 0.05 and some at the 0.01 levels. But more important than the level of significance is the fact that the model run on 17 observations gave similar results to those for the original data set. The regions all remained in the same classes of performance - this typology being the object of the exercise.

Pooling

A different method to overcome statistical difficulties is the pooling of all the data, which was also operationalised. This increases the number of observations to 378 and produces one single set of parameters representing the relationships involved between value added and labour and capital for the whole of the country for the whole of the time period. The results from such an exercise are statistically robust, both in terms of the variance explained and the levels of significance achieved. For Greece as a whole the results, although not identical, are not particularly different when compared with the main method used in the analysis. In fact the value for TFP is the same (-0.04%) in both cases. However the pooled estimators are for Greece as a whole and are not regionally specific. To apply these national parameters to each of the different regions in Greece to produce the composition of output would be misleading.

Cross-sectional regression

Both approaches above consider labour and capital relationship fixed for the whole period. Pooling of data also looses the regional dimension for increased significance. A cross-sectional regression method delivers equally high explanatory value and significance as the pooling one, still missing the regional dimension, but accounting for changing labour and capital relations over time. Accordingly, the value added regression equation was run nine times, once for each of the years 1980 to 1988, over the 42 regions ($R^2 \sim 0.96$ to 0.98). This produces nine sets of (b_K , b_L , b_{LK}) to produce nine sets of annual nationwide elasticities, e_{Kt} and e_{Lt}. From then on, the described methodology is followed for the decomposition of annual growth of value added to CRS and TFP. The latter are consequently averaged to produce a comparative basis, as above. This significantly different method, that is time sensitive, results in decomposition of the national average annual decline of value added of -0.47% to -0.26% CRS and -0.21% TFP. The method stresses further the inefficiencies of production, that in some years were large, and pulls the average estimations of the TFP - annually discretely constructed-, somewhat lower. Again, here, the method's national parameters should not be applied to each of the different regions in Greece.

The technological efficiency frontier model

An innovative idea on measurement of productivity in the manufacturing sector of

the regions has been the use of a stochastic frontier production function model. To utilise the idea, the following procedure was adopted, based on the TFP model that was used above. In the model, the growth rate of value added (DVA) for each succession of years (t) was finally transformed through each regional (i) estimated production function as:

$DVA_{it} = CRS_{it} + VRS_{it} + TEC_{it}$

The CRS_{it} and VRS_{it} were constructed, while the TEC value was derived as the one that would satisfy the equation.

Following the frontier model's assumptions, the TEC_{it} contain external distortion, in addition to any technological efficiency indications. If the equation

$DVA_{it} = CRS_{it} + VRS_{it} + U_{it}$

is regressed in the form

$DVA_{it} = b_{oi} + b_1 CRS_{it} + b_2 VRS_{it} + u_{it}$

for each region, (i times), over t years, the U_{it} are decomposed in b_i intercepts that are regionally distinct allowing for the noise residual u_{it}.

These intercepts account for the technological efficiency of each region. The frontier arrangement is based on these intercepts. Inefficiency of a region's manufacturing is measured by its deviation from this best technology practice frontier - the largest intercept. The measure of deviation from the technological frontier, for each region, is given by an always negative value V_i as follows:

$D\text{-}VA_{it} = (b_0 max + Vi) + b_1 CRS_{it} + b_2 VRS_{it} + u_{it}$

or,

$D\text{-}VA_{it} = bmax + b_1 CRS_{it} + b_2 VRS_{it} + V_i + u_{it}$

The model also allows for ranking of regions, according to their deviations (V_i) from the region with the optimal technological efficiency.

The model was constructed and run for Greece and the results are presented subsequently, after the ones of the original method, and in relation to them.

Finally, before examining some of the results, it must be recognised that these are only models for concepts that are really complicated processes. The models deal with straightforward input values of the basic factors of production, measuring the efficiency with which they are combined, which is affected by several other factors in times and places.

4.4.4 Total factor productivity results

Following the originally described method, the growth rates are decomposed into constant returns to scale (CRS), variable returns to scale (VRS), the technology factor (TEC). The total factor productivity (TFP) estimates were produced for the manufacturing sector of Greece, covering some 42 regions of Greece, based on some aggregations of all 51 departments, for the eight years, 1981 to 1988.

What can meaningfully be compared are only the average TEC and VRS values as well as TFP for each department over the whole period. This is because analysis of the year to year and region to region values of the TFP, TEC and VRS estimates developed as above proves to be extremely problematical since the values move in a cyclical way. Manufacturing value added from year to year varies, amongst other reasons, due to market conditions, which in turn are based on the performance of other sectors, international demand, local wages policy, political coincidences and the like. All these factors explain why neither technological advances nor infrastructural efficiency gains can be evaluated on a year to year basis for individual regions. Thus, the results given in Table 4-6 comprise the average annual percentages of growth in regional value added. Indication of the regions that have an Industrial Area is also made.

For the whole of Greece, a simple average of growth and its components for all the regions would be deceptive due to varying regional importance in contributions to national output. To overcome this and to create a measure of national value added growth and its decomposition into CRS, VRS, and TEC, the model was run in full but for the whole of Greece over the same years. The rate of output in manufacturing, in value added terms, for Greece shows an average annual decrease of 0.47%. But as was shown earlier the increase of employment in manufacturing for the ten years 1978-1988 was 5.1%; an average annual increase of 0.5%. Thus the average annual change in value added (-0.47%) is negative and as large as the relevant employment growth rate (+0.5%). Nationwide then, productivity in manufacturing, as traditionally conceived, was considerably reduced over this period.

Table 4-6: Greece: Total Factor Productivity for 1981-1988

Regions		Average DVA	Average CRS	Average VRS	Average TEC	Average (VRS+TEC)=TFP
Achaia	I.A.	0.72%	6.09%	-0.21%	-5.16%	-5.37%
Arc.& Laconia	I.A.	-5.01%	5.20%	-14.18%	3.96%	-10.22%
Argolida		-1.09%	-0.74%	-0.52%	0.18%	-0.35%
Attiki		-1.45%	-0.51%	1.00%	-1.94%	-0.94%
Chalkidiki		4.27%	-2.43%	11.22%	-4.52%	6.70%
Chania		1.41%	0.32%	-0.21%	1.30%	1.09%
Chios		-7.37%	0.71%	-9.88%	1.79%	-8.08%
Dodecanissos	I.A.	0.53%	0.29%	1.19%	-0.95%	0.24%
Drama	I.A.	4.06%	-9.59%	13.51%	0.14%	13.65%
Etoloakarnania		0.07%	-2.20%	1.46%	0.81%	2.27%
Evia		-3.17%	0.77%	-1.52%	-2.42%	-3.94%
Evrit.& Fokida		-0.96%	-5.34%	26.39%	-22.01%	4.38%
Evros	I.A.	6.22%	-9.03%	12.81%	2.44%	15.25%
Florin.&Grevena	I.A.	-7.16%	1.39%	-1.66%	-6.89%	-8.55%
Fthiotis	I.A.	3.32%	-3.25%	10.41%	-3.85%	6.57%
Ilia		-0.38%	0.81%	3.54%	-4.73%	-1.19%
Imathia		2.05%	0.49%	-2.89%	4.45%	1.56%
Ioannina	I.A.	3.26%	-2.15%	4.21%	1.21%	5.42%
Ionian Isles		0.99%	7.41%	-0.50%	-5.92%	-6.42%
Iraklio	I.A.	0.97%	0.80%	-6.75%	6.92%	0.17%
Karditsa		6.53%	-6.94%	14.48%	-1.02%	13.47%
Kastoria		-0.05%	6.66%	-6.28%	-0.44%	-6.71%
Kavala	I.A.	9.28%	4.46%	1.23%	3.60%	4.83%
Kilkis	I.A.	5.64%	2.33%	1.65%	1.66%	3.31%
Korinthia		-2.31%	1.90%	5.95%	-10.15%	-4.21%
Kozani		-2.60%	1.09%	-0.51%	-3.19%	-3.69%
Kyclades		-6.38%	3.79%	4.94%	-15.11%	-10.17%
Larissa	I.A.	1.38%	-0.85%	-4.56%	6.79%	2.23%
Lesvos		-9.85%	-7.48%	3.55%	-5.91%	-2.36%
Magnisia	I.A.	-1.12%	-1.22%	0.43%	-0.33%	0.10%
Messinia	I.A.	-4.34%	-3.07%	9.09%	-10.36%	-1.27%
Pella	I.A.	2.05%	13.38%	-6.01%	-5.32%	-11.33%
Pieria		4.43%	-1.43%	8.48%	-2.62%	5.86%
Pre.The.Arta	I.A.	-1.50%	3.00%	1.19%	-5.69%	-4.50%
Reth.& Lasithi		2.58%	5.31%	7.77%	-10.49%	-2.72%
Rothopi	I.A.	13.93%	5.65%	14.67%	-6.39%	8.28%
Samos		15.21%	7.31%	-19.71%	27.61%	7.90%
Serres	I.A.	-2.32%	0.98%	-0.82%	-2.48%	-3.30%
Thessaloniki	I.A.	-0.36%	4.84%	-4.65%	-0.54%	-5.20%
Trikala		4.77%	0.74%	0.34%	3.69%	4.03%
Viotia		0.26%	3.06%	-4.41%	1.61%	-2.80%
Xanthi	I.A.	7.37%	3.64%	4.53%	-0.80%	3.73%
GREECE		**Aver. DVA**	**Aver. CRS**	**Aver. VRS**	**Aver. TEC**	**Aver. T.F.P.**
		-0.47%	**-0.43%**	**-1.26%**	**1.22%**	**-0.04%**

I.A. = Industrial Area

Given such productivity declines what about TFP? For Greece, CRS is negative at -0.43% and as such roughly corresponds with the output performance. But the VRS are strongly negative at -1.27% implying that agglomeration and infrastructural diseconomies may well be in place. The TEC effect, however, appears strong and positive (1.22%) indicating that there has been some new technology utilisation over the period. This factor counteracts for the most part the negative VRS. As a result, the TFP is marginally negative at -0.04%. Such analysis suggests that, for the given structures and elasticities calibrations, even at constant returns to scale manufacturing output would decrease by a rate which is practically the same as the total output decline. The negative VRS would then further decrease the output rate if it were not for the positive technological factor.

For the regions of Greece TFP varies widely from -11.33% to some +15%. The unweighted mean TFP among the regions is +0.18%, and median value is 0%. The TEC percentages again vary widely from -22.0% to +27.6%; the unweighted mean is -1.69% and the median value is -2.45%. The results show that more regions experience negative TEC and the fewer have stronger positive values. The VRS values cover the range from -19.7% to +26.4% annual average growth, the unweighted mean being +1.88% and the median some +1.1%. Thus, positive VRS regions are more frequently occurring and experience stronger effects. No conclusions for Greece as a whole can be drawn from these averages, as explained above, since they are unweighted. At the regional scale now, both extremes in VRS and TEC belong to the two same regions. Such dramatic results can occur in small regions with small manufacturing sectors. One or two large expanding or closing plants over the whole period can make large differences. The cases of Samos and Kyclades are not untypical in this respect.

It should also be noted that when comparing employment change and productivity, inverse rates of change in manufacturing employment and value added are experienced for a number of areas, much in line with the given declines in national productivity. It could simply mean that in the regions where this occurs production has shifted to lower value added activities, perhaps from production to assembly, in some manufacturing sectors, yet taken on workers to provide this capacity. It may well reflect a slowness to adopt new technology or new working practices. Such a feature is especially typical of Thessaloniki as shall be discussed subsequently. Finally, the time periods for the TFP and the previous employment analyses are not exactly the same as stated. The employment change data derived from periodic industrial censuses (1978 and 1988) while the TFP model ones come

from annual industrial surveys from 1980 onwards. Much employment growth has in fact occurred, in certain cases, in the period 1978 to 1980 - a period not covered by the TFP model's data. Standing this reservation, next follow some comments on interpreting the position in some of the more important regions.

The Attiki region produces a negative Rman of some 13% (Table 4-3). This means that the employment performance of manufacturing here is lower than expected given national rates, for 1978-88. In output terms Attiki has an average value added change rate that is negative at -1.45%. The CRS factor is also negative at -0.51% and in line with the decrease in employment. The VRS, however, are larger and positive (1.00%) showing that as regards manufacturing Attiki still offers external economies, which is as anticipated. Such returns partially justify the Kaldorian theory of the economies of large urban centres. But the TEC factor is strong and negative at -1.94% and this produces a negative TFP rate of -0.94%. Why should the TEC be negative in Attiki? One reason that can be advanced concerns policy. Firms in Attiki receive minimal expansion incentives and also some restrictions for new industry location. On the contrary, firms are assisted if they move out to other areas. As a result it might be expected, especially as regards manufacturing, that the younger firms and the new branches of the older established firms - those possibly deploying more modern technology - are locating out of Athens. Thus employment, output and utilisation of modern technology in manufacturing all seem to be declining in the capital city.

In Thessaloniki, as has been shown, the Rman is large and positive (23%), implying that the region is increasing employment in manufacturing considerably faster than its structural expectation. The average value added growth though is negative at 0.36%. What could be the cause of this advancing low productivity? The CRS are large and positive at 4.84% annually, again coincident with the large gains in manufacturing jobs. The TEC factor is negative but small (-0.54%). Nevertheless Thessaloniki has a large Industrial Area project and this may well be a reason why its TEC, even though negative, is four times smaller than that of Athens. According to the analysis it is the large negative VRS of -4.65%, which accounts for the decline as regards value added. What appears to be the case is that the real congestion diseconomies are occurring in the second city rather than in the capital even though Thessaloniki is more than three times smaller an agglomeration. To repeat, although only housing 8% of the national population, Thessaloniki holds 12% of the total national employment. The area seems to be a centre of labour intensive, rather low productivity production. The important employment gains in Thessaloniki are due wholly to the competitive effect in shift share terms. It would seem that

the comparative advantage of economic activity in this region does not stem from better productivity. The success of the Industrial Area may well be evidence of the substantial infrastructural and agglomeration diseconomies of the rest of the region.

Volos (Magnisia) is an established industrial region located midway between Athens and Thessaloniki along the main north-south national motorway. It has a negative Rman of -5.9%, much less than the structural expectations of the region. The annual change in value added is negative at -1.12%. Here, as in both previous cases, the CRS is co-directional with the Rman; in this case it is negative (-1.22%). Being an older industrial region Volos expectedly has a positive VRS (0.43%). The region has two large Industrial Area sites that, given the region's small size compared to the two previous areas, can provide the foundation for such advantageous external economies. Here the TEC is negative, perhaps related to its modest assisted area status, but it is small enough for the region to have positive TFP (+0.10%).

Patra (Achaia) has been the largest peripheral industrial centre (excluding Thessaloniki). The area is known to be de-industrialising in the eighties and it only manages a negative Rman of -4.5%. Even given this, the established manufacturing industries here have succeeded in producing a positive average annual growth (0.7%) in value added for the period, in contrast with all previous regions mentioned. These two statistics alone show an increase in the productivity of labour. Consequently, and since the CRS is large and positive (6.07%), it has to be the case that a considerable substitution of labour by capital has occurred. The VRS of the area are negative but small (-0.2%). Patra has an Industrial Area but it seems that the location there is unattractive for new firms and that the older firms survive by automating production. The TFP value is large and negative (-5.3%), due mainly to a large and negative TEC component (-5.1%). How can this be accounted for? It may sign that the outcome of a positive increase in value added is caused by significant increase in CRS, but in a strange and seemingly non-economical way. A plausible explanation could be that, given the closures of industrial units and the employment decrease, the capital already injected, does not create the value necessary for the extra technological economies. Or, put another way, that there is idling capital, that confuses the model that regards it as old technology. Patra is effectively preserving its profitability and productivity at the expense of employment.

Where in Greece, then, are then the positive TEC values that are strong enough to give the whole country a positive TEC character? And where are the VRS

positive if not mainly in the large urban centres? For the following departments it can be seen that specifically regional characteristics and perhaps interventionary policy seem to be at least as important as agglomeration effects.

Larissa and Fthiotis, both near the middle of the Athens-Thessaloniki axis and neighbouring to Magnisia, show positive TFP. In the case of Fthiotis it is large (6.5% annually). Kavala (4.6%), Kilkis (3.3%) and Drama (13%) in northern Greece all have positive TFP due to both positive VRS and TEC. All these mentioned regions have Industrial Area projects. Xanthi, Rothopi (7.7%) and Evros(14%), that is all regions of Thraki in the northeast of Greece, have all strong positive TFP and again are also Industrial Area regions. Thraki is strongly assisted by grants and incentives of the national assistance policy containing several class D areas. Also, Iraklio and Ioannina , both capitals of the larger geographical departments of Kriti and Ipiros, have positive TFP. They both have Industrial Areas and little competition from neighbouring regions due to physical geographical characteristics. Lastly the island complex of Dodecanissos has a positive TFP although, like Patra, it has a negative Rman of (-6%) but is increasing its value added.

In summary, for the whole country, the technology factor has a positive effect in output growth of value added for fewer departments than the VRS factor. The TEC value is positive in 38% or 16 of the 42 regions, as illustrated in Figure 4-4. Positive VRS (beneficial economies of scale) are experienced in 24 of the 42 regions (57%). The TFP for the period is positive for 21 regions, shown in Figure 4-5, which comprise half of the regions examined.

Six types of regions are defined and are analysed in detail in Table 4-7 on the basis of the sign of their VRS and TEC values, and their overall TFP sign. The positive TFP areas are grouped into three types and so also are the those areas with negative TFP performance.

Type I areas are those with both agglomeration economies and economies due to technological change. The constituents of the group show that all seven are medium sized cities (of around 50 to 60 thousand population) and all are newly industrialising (none is an old industrial region, or a central area). Apart from Evros, all belong to the medium, non remote class C division of assisted status. They have experienced rapid economic growth and five out of seven have an Industrial Area. Six out of seven are in northern Greece (north of Volos - Larissa)

Type II areas are those with positive TEC and negative VRS. These appear to be remote areas or areas without large urban centres, which seem to have benefitted from modern technology utilisation. This is certainly the case in three out of five of the constituents. The fourth, Iraklio, is a large urban centre, probably

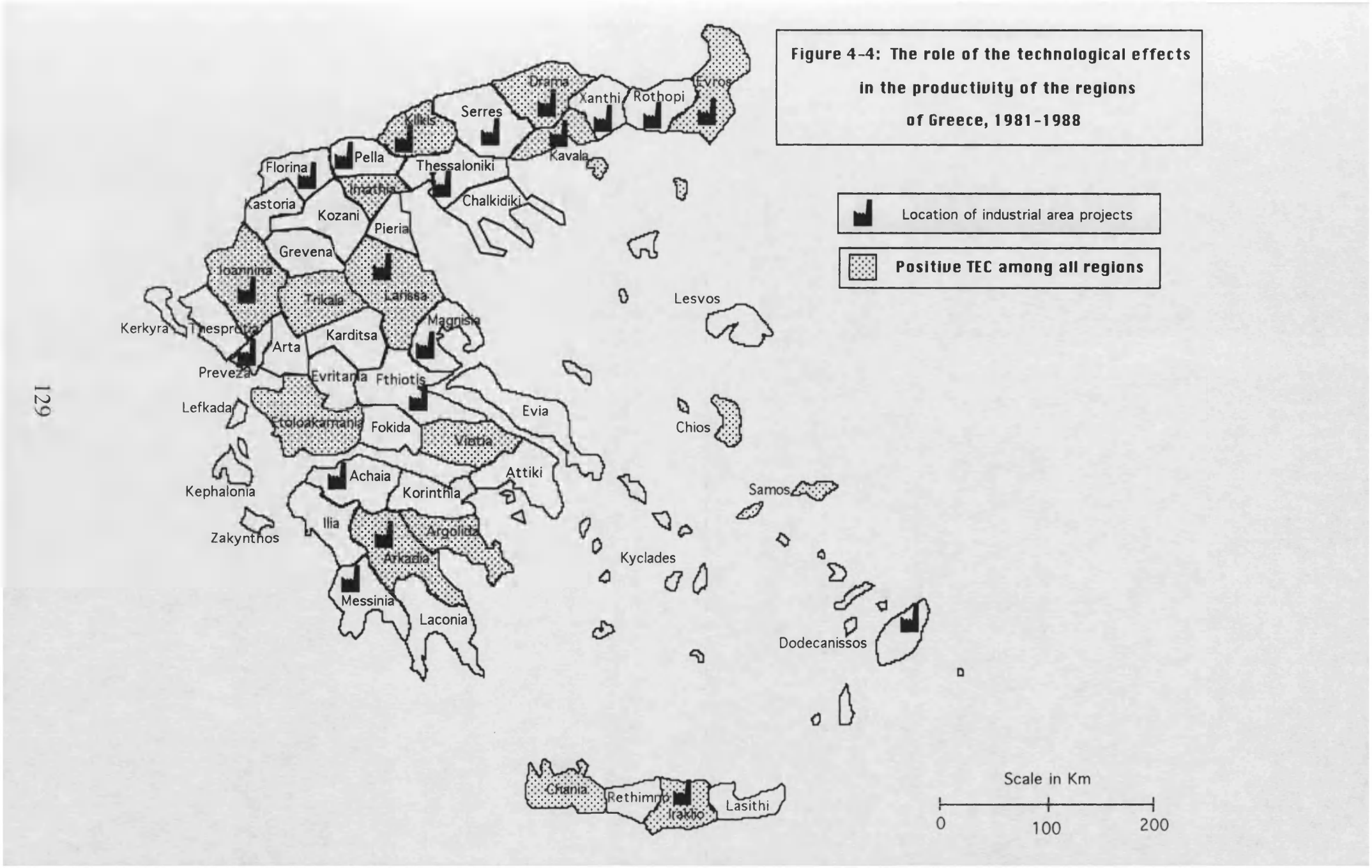


Figure 4-4: The role of the technological effects in the productivity of the regions of Greece, 1981-1988
Location of industrial area projects
Positive TEC among all regions
Drama
Xanthi
Rothopi
Evros
Kilkis
Serres
Kavala
Pella
Florina
Thessaloniki
Imathia
Chalkidiki
Kastoria
Kozani
Pieria
Grevena
Ioannina
Trikala
Larissa
Lesvos
Kerkyra
Thesprotia
Karditsa
Magnisia
Arta
Preveza
Evritania
Fthiotis
Lefkada
Evia
Etoloakarnania
Fokida
Viotia
Chios
Achaia
Attiki
Kephalonia
Korinthia
Samos
Ilia
Argolida
Zakynthos
Arkadia
Kyclades
Messinia
Laconia
Dodecanissos
Crania
Rethimno
Irakhio
Lasithi
Scale in Km
0
100
200

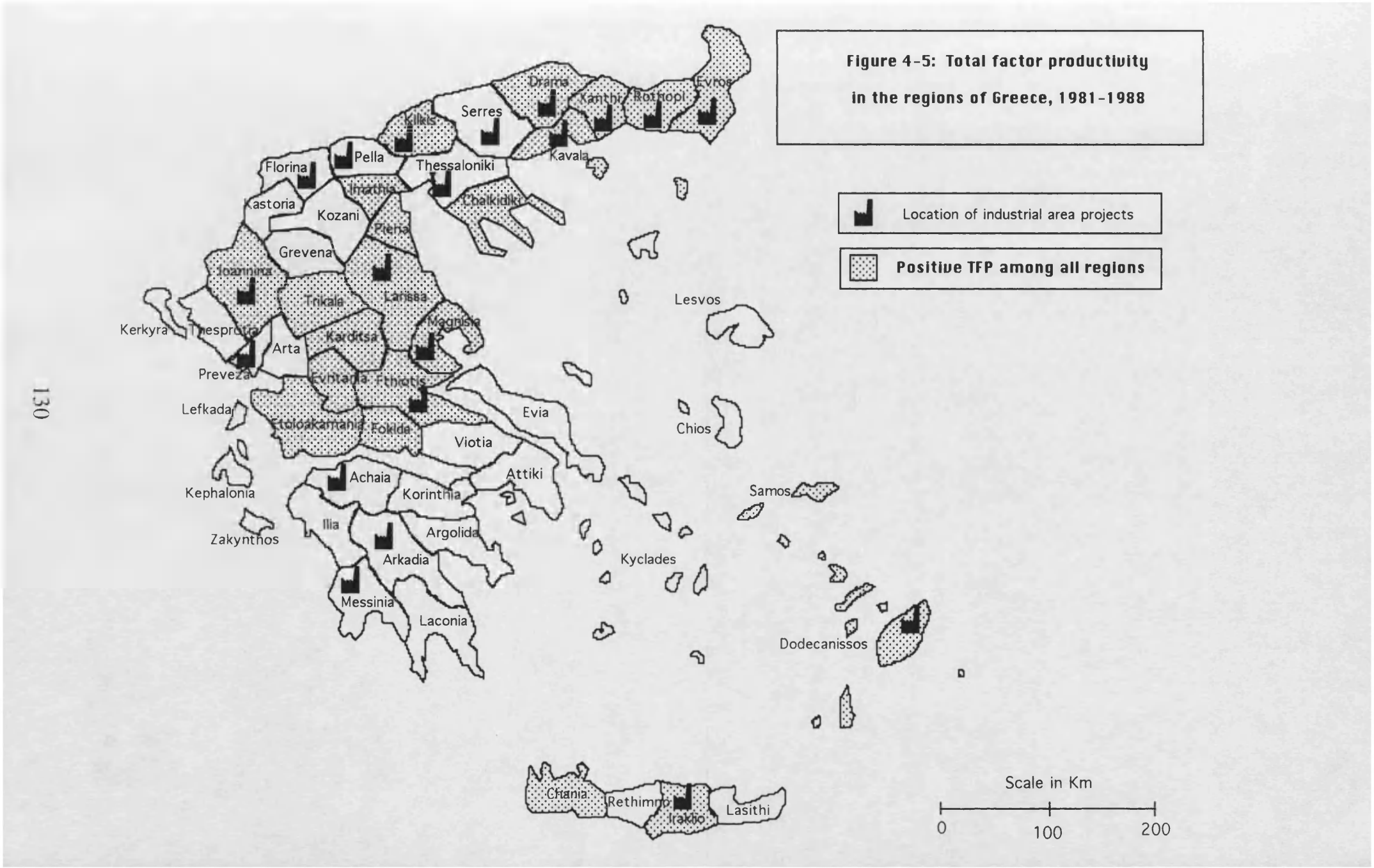


Figure 4-5: Total factor productivity
in the regions of Greece, 1981-1988
Location of industrial area projects
Positive TFP among all regions
Drama
Kavala
Xanthi
Rodopi
Evros
Serres
Kilkis
Pella
Florina
Thessaloniki
Imathia
Kastoria
Kozani
Pieria
Chalkidiki
Grevena
Ioannina
Trikala
Larissa
Kerkyra
Thesprotia
Karditsa
Magnisia
Arta
Preveza
Evritania
Fthiotis
Lefkada
Evia
Etoloakarnania
Fokida
Viotia
Attiki
Achaia
Kephalonia
Korinthia
Ilia
Argolida
Zakynthos
Arkadia
Messinia
Laconia
Lesvos
Chios
Samos
Kyclades
Dodecanissos
Chania
Rethimno
Irakio
Lasithi
Scale in Km
0
100
200

Table 4-7: Greece: Total factor productivity typology (1981-1988)

Positive T.F.P.			Negative T.F.P.		
Type I	**Type II**	**Type III**	**Type IV**	**Type V**	**Type VI**
+ Tec , + Urs	**+ Tec , - Urs**	**- Tec , + Urs**	**- Tec , - Urs**	**+ Tec , - Urs**	**- Tec , + Urs**
C. Drama	**B. Irakllo**	**B. Magnisia**	**A. Thessaloniki**	B. Viotia	A. Attiki
C. Etoloakarnania	**B. Larissa**	C. Chalkidiki	**B. Achaia**	**C. Arc.& Laconia**	B. Korinthia
C. Ioannina	C. Chania	C. Evrit.&Fokida	C. Evia	C. Argolida	C. Ilia
C. Kavala	C. Imathia	**C. Fthiotis**	**C. Florin.&Grevena**	D. Chios	C. Kyclades
C. Kilkis	D. Samos	C. Karditsa	C. Ionian Isles		**C. Messinia *(1)**
C. Trikala		C. Pieria	C. Kastoria		**C. Pre.Thes.Arta**
D. Evros		**D. Dodecanissos**	C. Kozani		C. Reth.&Lasithi
		D. Rothopi	**C. Pella**		D. Lesvos
		D. Xanthi	**C. Serres**		

NOTES:

Regions in bold possess Industrial Areas

The letters pre-fixed to the regions' names show the national incentives classification of the regions, Law 1262/82

(A) Central Regions, no investments financial incentives, except for special high technology projects.

(B) Developed Regions, low financial incentives.

(C) Less developed Regions, stronger incentives.

(D) Lagging and Remote or Strategical Regions, powerful incentives.

*(1) Messinia joined the (D) assisted areas in 1987, with the Law 1682/87 after being hit by earthquaqes.

utilising modern technology, but suffers from problems of congestion which seem to affect its VRS. Larissa is larger, but seems not yet to have developed the required industrial infrastructure to an adequate degree.

Type III areas have a negative TEC with a positive VRS. Theoretically these ought to be long established, central, Industrial Areas certainly possessing agglomeration economies, but deprived of the recent benefits of modern technical change. This is likely to be the case for Magnisia and Fthiotis. But interestingly, the group is also joined by three class D assisted areas. These are certainly not central or developed. Policy may well be significant here and be related to the presence of Industrial Area projects.

Type IV are areas with negative TEC and negative VRS. This group contains, as expected, some areas that are remote and undeveloped, without any significant urban centre. But the main constituents, six in all and including Thessaloniki and Patra, are those that did not manage to increase productivity. This was associated either with manufacturing employment declines (Patra and Evia), or substantial growth (Thessaloniki, Pella, Kozani and Serres).

Type V are supposed to be areas with some positive technology utilisation, not enough though to give them a positive TFP, due to their negative regional characteristics. This group is most consistent, as none of the regions has a city greater than 30,000. The fact that Viotia belongs to assistance group B is only because it is on the northern borders of the Attiki region and if it were C, little industry would be tempted to move further afield.

Finally, Type VI are areas with some positive agglomeration economies, but with a TEC component negative enough to drag them down into the negative TFP group. There are two sub-groups here again. One is Attiki and its westward neighbour Korinthia, both with well developed infrastructure that still provides them with economies of scale and agglomeration. However they both lack the structure of industrial incentives to maintain and attract new and modern industries. The other group is comprised of six areas which are technologically lagging peripheral regions that have managed to secure some scale economies. Two of them have an Industrial Area and Lesvos is a strongly assisted area.

The regional constituents of these TFP types can also be considered in terms of assisted area class (Table 4-8) under the nationwide assistance policy. For areas of least assistance -class A (Attiki and Thessaloniki), TFP is negative. For areas of the most modest assistance -class B, half the regions have positive TFP and these are medium to large conurbations (Iraklio, Magnisia and Larissa). The other half have negative TFP and these include Viotia and Korinthia which are neighbours

Table 4-8: Greece: Total factor productivity and types of assisted area status

Incentives Areas	Positive T.F.P.	%	Negative T.F.P.	%
A		0%	Attiki (VI) **Thessaloniki (IU)**	100%
B	**Irakilo (II)** **Larissa (II)** **Magnisia (III)**	50%	**Achaia (IU)** Korinthia (VI) Viotia (V)	50%
C	Chalkidiki (III) Chania (II) **Drama (I)** Etoloakarnania (I) Evrit.&Fokida (III) **Fthiotis (III)** Imathia (II) **Ioannina (I)** Karditsa (III) **Kavala (I)** **Kilkis (I)** Pieria (III) Trikala (I)	48%	**Arc.& Laconia (U)** Argolida (V) Evia (IV) **Florin.&Grevena (IU)** Ilia (VI) Ionian Isles (IV) Kastoria (IV) Kozani (IV) Kyclades (VI) **Messinia (UI) *(1)** **Pella (IU)** **Pre.Thes.Arta (UI)** Reth.&Lasithi (VI) **Serres (IU)**	52%
D	**Dodecanissos (III)** **Evros (I)** **Rothopi (III)** Samos (II) **Xanthi (III)**	71%	Chios (V) Lesvos (VI)	29%
ALL REGIONS	(21)	50%	(21)	50%

Parentheses show Types of Positive or Negative TFP as defined in Table 4-7
Regions in bold have Industrial Areas
*(1) Messinia was a (C) region until 1987. It became (D) with Law 1682/87

of Attiki and which have unfavourable incentives for what they offer. Class C areas, having the second to top tier of industrial incentives, comprise the largest group (27) and these tend to be medium sized cities, usually peripheral but not lagging. Although five out of the six Type I (+VRS, +TEC) regions are in this group, overall only 48% are TFP positive. Lastly, class D areas, where maximum incentives are available, are in remote locations. These areas have performed well both in terms of TFP as well as in job generation and some 71% of the group have positive TFP. These percentages can be usefully compared to the national percentage of 50% positive TFP and 50% negative.

In terms of TEC components (Table 4-9) the percentages of both positive and negative values in the two least assisted classes of regions, A and B, are much the same as for TFP. However the lists for the two classes of highest assisted status are dominated by negative values. Technology , then, needs some form of agglomeration to establish itself. Only policy-induced VRS can be observed in remote regions as the much higher relevant percentages of positive TFP in classes C and D show. Overall only some 38% of areas managed to produce positive TEC values.

From the twenty departments with an Industrial Area, 12 or 60% had a positive average TFP; these are illustrated in Figure 4-6. However in the two assisted classes B and D the TFP is positive in 75% and 100% of the cases respectively. It is no accident that while the class B areas have a considerable agglomeration near the Industrial Area and class D areas are those with strong assistance, in class C areas, where none of these conditions occur, the positive percentage is much lower. Considerably lower scores are achieved on positive TEC values by regions with Industrial Areas. Eight of the twenty such regions have positive TEC as can be seen in Figure 4-7. For these regions the positive TEC percentages fall with increasing assisted status; for B areas it is 50%, for C is 45% and for D only 25%. The requirement of the presence of an agglomeration seems to be more important for a positive TEC for the Industrial Area regions. The necessity for an agglomeration will again be tested -and verified- later in this chapter. It becomes clear that the high positive TFP percentages in the Industrial Area regions are due to mainly to VRS economies and these are what the Industrial Areas rather successfully offer to the peripheral regions.

To summarise the findings of the TFP model, 57% of all regions experience positive VRS and 60% of the Industrial Area regions, and 38% of all regions have positive TEC rising to 40% of those with Industrial Areas. Half of all the regions have positive TFP, but this feature amounts to 60% of the Industrial Area regions. As shown in Table 4-10, areas with an Industrial Area have observable positive

Table 4-9: Greece: Technical change and types of assisted area status

Incentives Areas	Positive T.E.C.	%	Negative T.E.C.	%
A		0%	Attiki (VI) **Thessaloniki (IV)**	100%
B	**Irakllo (II)** **Larissa (II)** Viotia (V)	50%	**Achaia (IV)** Korinthia (VI) **Magnisia (III)**	50%
C	**Arc.& Laconia (V)** Argolida (V) Chania (II) **Drama (I)** Etoloakarnania (I) Imathia (II) **Ioannina (I)** **Kavala (I)** **Kilkis (I)** Trikala (I)	37%	Chalkidiki (III) Evia (IV) Evrit.&Fokida (III) **Florin.&Grevena (IV)** **Fthiotis (III)** Ilia (VI) Ionian Isles (IV) Karditsa (III) Kastoria (IV) Kozani (IV) Kyclades (VI) **Messinia (VI) *(1)** **Pella (IV)** Pieria (III) **Pre.Thes.Arta (VI)** Reth.&Lasithi (VI) **Serres (IV)**	63%
D	Chios (V) **Evros (I)** Samos (II)	43%	**Dodecanissos (III)** Lesvos (VI) **Rothopi (III)** **Xanthi (III)**	57%
ALL REGIONS	(16)	38%	(26)	62%

Parentheses show Types of Positive or Negative TFP as defined in Table 4-7
Regions in bold have Industrial Area
*(1) Messinia was a (C) region until 1987. It became (D) with Law 1682/87

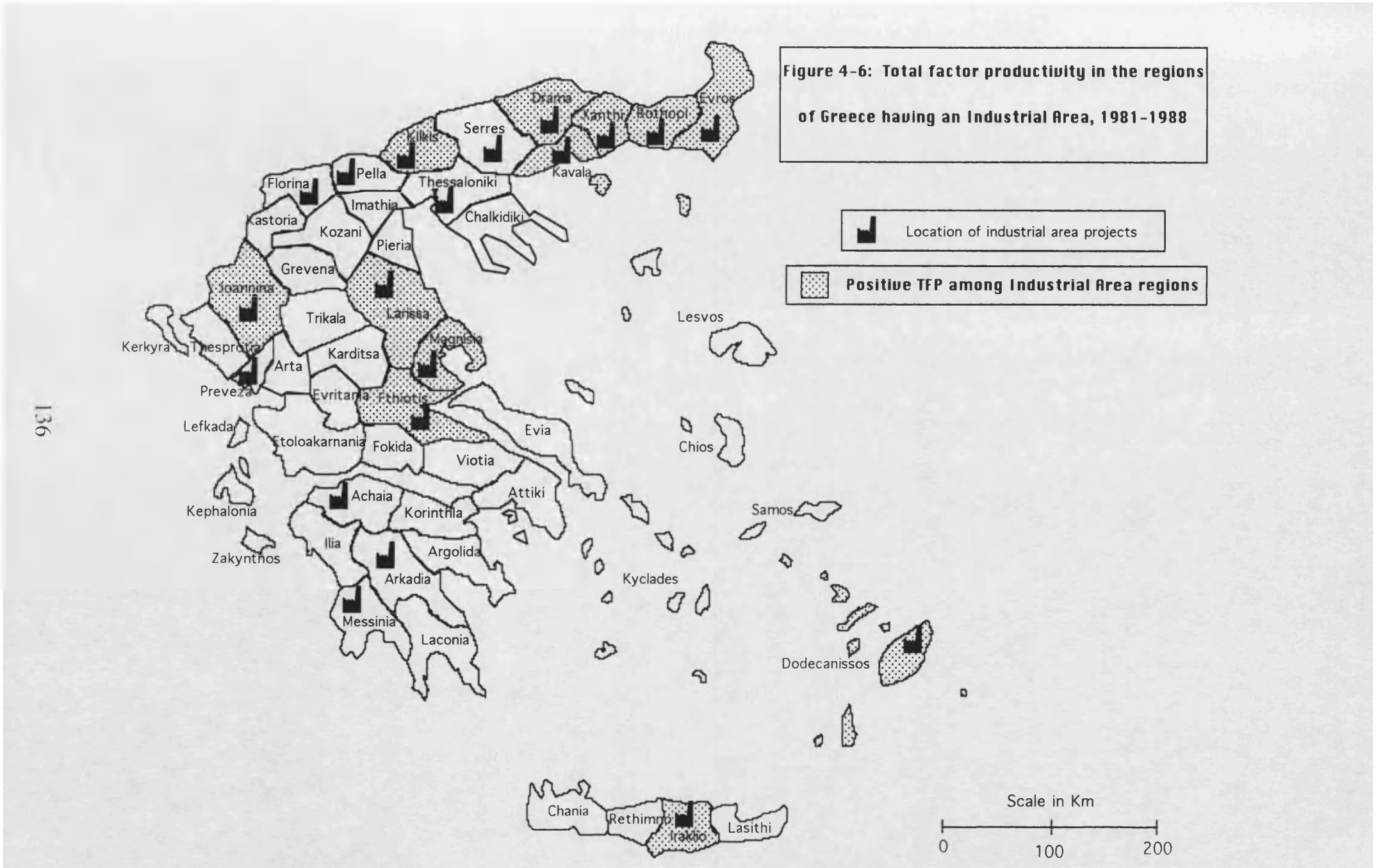


Figure 4-6: Total factor productivity in the regions of Greece having an Industrial Area, 1981-1988
Location of industrial area projects
Positive TFP among Industrial Area regions
Drama
Xanthi
Rodhopi
Evros
Kilkis
Serres
Kavala
Pella
Florina
Thessaloniki
Imathia
Chalkidiki
Kastoria
Kozani
Pieria
Grevena
Ioannina
Trikala
Larissa
Lesvos
Magnisia
Kerkyra
Thesprotia
Karditsa
Arta
Preveza
Evritania
Fthiotis
Lefkada
Evia
Etoloakarnania
Fokida
Chios
Viotia
Attiki
Achaia
Kephalonia
Korinthia
Samos
Ilia
Argolida
Zakynthos
Arkadia
Kyclades
Messinia
Laconia
Dodecanissos
Chania
Rethimno
Irakio
Lasithi
Scale in Km
0
100
200

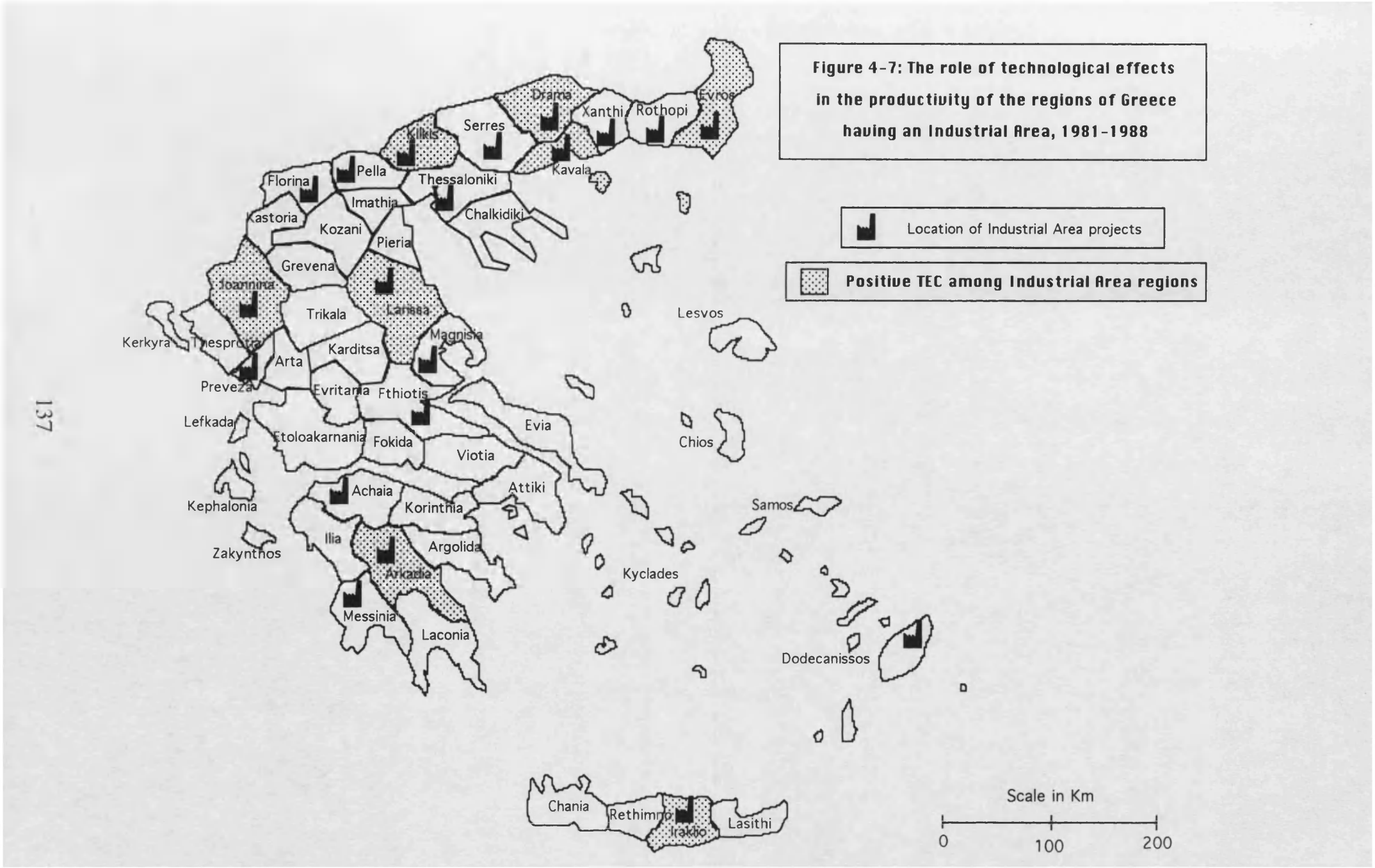


Figure 4-7: The role of technological effects in the productivity of the regions of Greece having an Industrial Area, 1981-1988
Location of Industrial Area projects
Positive TEC among Industrial Area regions
Drama
Xanthi
Rothopi
Evros
Serres
Kilkis
Kavala
Pella
Florina
Thessaloniki
Imathia
Chalkidiki
Kastoria
Kozani
Pieria
Grevena
Ioannina
Trikala
Larissa
Lesvos
Kerkyra
Thesprotia
Magnisia
Karditsa
Arta
Preveza
Evritania
Fthiotis
Lefkada
Evia
Etoloakarnania
Fokida
Chios
Viotia
Attiki
Achaia
Samos
Kephalonia
Korinthia
Ilia
Argolida
Zakynthos
Arkadia
Kyclades
Messinia
Laconia
Dodecanissos
Chania
Rethimno
Irakio
Lasithi
Scale in Km
0
100
200

Table 4-10: Greece: A summary of the combined results of employment and productivity analysis

Results in Respect to the Industrial Areas

	Positive Rman	Positive TFP	Positive TEC
Industrial Area Regions	70%	60%	40%
Non Industrial Area Regions	58%	41%	36%
All Regions	**64%**	**50%**	**38%**

Results in respect to the National Assistance Divisions

	Positive Rman	Positive TFP	Positive TEC
A	50%	0%	0%
B	50%	50%	50%
C	67%	48%	37%
D	57%	71%	43%
All Regions	**64%**	**50%**	**38%**

National Assistance Divisions:

(A) Central Regions, no financial incentives, except for special high technology projects.
(B) Developed Regions, low financial incentives.
(C) Less developed Regions, stronger incentives.
(D) Lagging and Remote or Strategical Regions, powerful incentives.

advantages as regards accelerated employment growth and productivity. Rman is positive in 70% of these areas; it is positive in only 58% of the non-Industrial Area regions and in 63% overall. Also positive TFP is considerably higher in Industrial Area than non-Industrial Area regions. The Industrial Area regions boast positive TFP by 60% while non-Industrial Areas regions only by 41%. As regards positive TEC, only 40% of Industrial Areas may be so classified, compared to 36% for non-Industrial Areas and 38 % overall. Thus the Industrial Areas appears to provide successfully employment opportunities and infrastructure-induced agglomeration external economies, while the technological advantage is less apparent.

Areas with assisted status seem to gain some mild positive advantage as regards participation in accelerated employment growth especially where the most favourable grants are available (Table 4-10). As regards positive TFP, important progress is to be found in remote regions where considerable assistance is available. When it comes to technology it would seem that regions housing medium to large agglomerations, but having at least some grants and incentives available to draw upon, are more advantaged. In summary both aspects of regional policy intervention seem effectively to promote regional development by decentralisation of employment and productivity.

4.4.5 The technological frontier model results

With the technological frontier arrangement, a different procedure for the decomposition of the part of value added growth ascribed to technology (TEC) is deployed, as described. The consistency of the frontier technology model to the original TFP model is high. The two sets of technological indices for the regions have a correlation of 0.85. The regions classified as above the national level in technology by the TFP model are by 83% the same to those so classified by the frontier model (10 out of 12). Those below national levels are the same to the tune of 90% (27 out of 30). Table 4-11 shows the two technological indices of the regions, in comparison. These are the intercept of the frontier model (F-TEC), and the TEC of the original one.

Consequently, following the frontier model the regions are distinctively ranked according to their deviation from where best technology practice occurs. The results of this type of analysis and a ranking thereupon can be seen in Table 4-12. It can be seen that the best technological utilisation occurs in the small region of Samos where there exists a 20.17% annual increase in value added due to technological effects, or 20.67% above the relevant figure of Greece as a whole.

The relative magnitudes in this respect of this region explain the reservation

Table 4-11: The technological indices for the regions : the TFP model's TEC, and the frontier model's F-TEC

TFP model TEC	Regions		Frontier model Intercepts (F-TEC)
27.61%	Samos		20.17%
6.92%	Iraklio	I.A.	5.64%
6.79%	Larissa	I.A.	3.04%
4.45%	Imathia		3.77%
3.96%	Arc.& Lakon.	I.A.	-3.54%
3.69%	Trikala		0.68%
3.60%	Kavala	I.A.	2.13%
2.44%	Evros	I.A.	2.30%
1.79%	Chios		4.45%
1.66%	Kilkis	I.A.	-0.84%
1.61%	Viotia		1.65%
1.30%	Chania		1.18%
1.22%	**GREECE**		**-0.50%**
1.21%	Ioannina	I.A.	4.99%
0.81%	Etoloakarnania		0.83%
0.18%	Argolis		-1.17%
0.14%	Drama	I.A.	-0.85%
-0.33%	Magnisia	I.A.	0.69%
-0.44%	Kastoria		-0.43%
-0.54%	Thessaloniki	I.A.	-0.55%
-0.80%	Xanthi	I.A.	-2.89%
-0.95%	Dodekanissos	I.A.	-0.96%
-1.02%	Karditsa		-2.91%
-1.94%	Attiki		-2.40%
-2.42%	Evia		-1.99%
-2.48%	Serres	I.A.	-3.76%
-2.62%	Pieria		-7.24%
-3.19%	Kozani		-3.60%
-3.85%	Fthiotis	I.A.	-4.18%
-4.52%	Chalkidiki		-6.10%
-4.73%	Ilia		-4.95%
-5.16%	Achaia	I.A.	-3.37%
-5.32%	Pella	I.A.	-0.40%
-5.69%	Pre.The.Arta	I.A.	-5.05%
-5.91%	Lesvos		-11.80%
-5.92%	Ionian Isles		-0.49%
-6.39%	Rothopi	I.A.	-2.76%
-6.89%	Florin.&Grev.	I.A.	-7.78%
-10.15%	Korinthia		-9.61%
-10.36%	Messinia	I.A.	-10.14%
-10.49%	Reth.& Lasith.		-18.72%
-15.11%	Kyklades		-13.25%
-22.01%	Evrit.& Fokis		-10.09%

I.A. = presence of Industrial Area

Table 4-12: The results of the technological frontier model, 1981-1988

Regions	Intercepts (F-TEC)	Deviations from Technological Frontier of Samos	Deviations from Technological Frontier of Iraklio	Deviations from National Technological Level	Rank	
Samos	20.17%	0.00%	14.53%	20.67%	1	
Iraklio	5.64%	-14.53%	0.00%	6.14%	2	I.A.
Ioannina	4.99%	-15.18%	-0.65%	5.49%	3	I.A.
Chios	4.45%	-15.72%	-1.19%	4.95%	4	
Imathia	3.77%	-16.40%	-1.87%	4.27%	5	
Larissa	3.04%	-17.13%	-2.60%	3.54%	6	I.A.
Evros	2.30%	-17.87%	-3.34%	2.80%	7	I.A.
Kavala	2.13%	-18.04%	-3.51%	2.63%	8	I.A.
Viotia	1.65%	-18.52%	-3.99%	2.15%	9	
Chania	1.18%	-18.99%	-4.46%	1.68%	10	
Etoloakarnania	0.83%	-19.34%	-4.81%	1.33%	11	
Magnisia	0.69%	-19.48%	-4.95%	1.19%	12	I.A.
Trikala	0.68%	-19.49%	-4.96%	1.18%	13	
Pella	-0.40%	-20.57%	-6.04%	0.10%	14	I.A.
Kastoria	-0.43%	-20.60%	-6.07%	0.07%	15	
Ionian Isles	-0.49%	-20.66%	-6.13%	0.01%	16	
GREECE	**-0.50%**	**-20.67%**	**-6.14%**	**0.00%**	*	
Thessaloniki	-0.55%	-20.72%	-6.19%	-0.05%	17	I.A.
Kilkis	-0.84%	-21.01%	-6.48%	-0.34%	18	I.A.
Drama	-0.85%	-21.02%	-6.49%	-0.35%	19	I.A.
Dodekanissos	-0.96%	-21.13%	-6.60%	-0.46%	20	I.A.
Argolis	-1.17%	-21.34%	-6.81%	-0.67%	21	
Evia	-1.99%	-22.16%	-7.63%	-1.49%	22	
Attiki	-2.40%	-22.57%	-8.04%	-1.90%	23	
Rothopi	-2.76%	-22.93%	-8.40%	-2.26%	24	I.A.
Xanthi	-2.89%	-23.06%	-8.53%	-2.39%	25	I.A.
Karditsa	-2.91%	-23.08%	-8.55%	-2.41%	26	
Achaia	-3.37%	-23.54%	-9.01%	-2.87%	27	I.A.
Arc.& Lakon.	-3.54%	-23.71%	-9.18%	-3.04%	28	I.A.
Kozani	-3.60%	-23.77%	-9.24%	-3.10%	29	
Serres	-3.76%	-23.93%	-9.40%	-3.26%	30	I.A.
Fthiotis	-4.18%	-24.35%	-9.82%	-3.68%	31	I.A.
Ilia	-4.95%	-25.12%	-10.59%	-4.45%	32	
Pre.The.Arta	-5.05%	-25.22%	-10.69%	-4.55%	33	I.A.
Chalkidiki	-6.10%	-26.27%	-11.74%	-5.60%	34	
Pieria	-7.24%	-27.41%	-12.88%	-6.74%	35	
Florin.&Grev.	-7.78%	-27.95%	-13.42%	-7.28%	36	I.A.
Korinthia	-9.61%	-29.78%	-15.25%	-9.11%	37	
Evrit.& Fokis	-10.09%	-30.26%	-15.73%	-9.59%	38	
Messinia	-10.14%	-30.31%	-15.78%	-9.64%	39	I.A.
Lesvos	-11.80%	-31.97%	-17.44%	-11.30%	40	
Kyklades	-13.25%	-33.42%	-18.89%	-12.75%	41	
Reth.& Lasith.	-18.72%	-38.89%	-24.36%	-18.22%	42	

I.A. = presence of Industrial Area

made earlier in the chapter about small regions and extreme results. The value added in manufacturing for the island of Samos was in constant 1974 prices some 32 million drachmas in 1980, to rise to 99 million drachmas by 1988 or to some 310% of the base. Meanwhile employment was less than doubled over the period. The bulk of the investment was made in the first two years of the period and from then on the capital stock remained constant, that is investment only covered depreciation. All of this may be due to only one large plant and the result is that the region becomes one of the most noted for utilising technology to increase productivity. The opposite happened in the Kyklades islands. Here a large state shipyard kept on its employees although gradually reducing its business, until it shut down in 1989. With all this idle capital and labour, productivity was pulled down to amongst the worst in the country, although some other small industries might have done well in productivity terms.

Among all regions in Greece there is a wide range of divergence in growth due to technology. This extends to some 39% annually below the frontier of Samos, as seen in Table 4-12. If the extreme case of Samos is excluded, as it probably should be, then Iraklio, in Kriti becomes the technological frontier region in Greece. This is empirically quite acceptable, since Iraklio is the major agglomeration in the large island of Kriti, offering a comprehensive range of services, a university, and of course a dynamic Industrial Area with young innovative firms, as shall be shown from the field study results. From the technological frontier of Iraklio, regions lie in a range of some 24% of deviation in annual growth due to technology.

To facilitate comparison a measure of the deviations from the national level is also shown in Table 4-12. Greece as a whole stands at some 6.1% below Iraklio. From the frontier region of Iraklio (within the deviation of +6.1% annually) there are fifteen other regions, those having a technology component above the national levels. Below, there are some twenty six regions that extend over a range reaching 18.2% of annual deviation from national level. Figure 4-8 illustrates the regions according to their level of efficiency in technology practice.

As regards the Industrial Areas factor, in the first eight technologically leading regions five house an Industrial Area. If the case of Samos and the similarly small island region of Chios are excluded this becomes five out of six. While an Industrial Area may not be the absolute prerequisite for technological competence in a peripheral region the above feature looks to be more than just a coincidence.

Finally, and as also found in the original TFP model, the type of regions that seem to practice technology efficiently and above the national levels may be peripheral regions but housing substantial medium sized agglomerations (Figure 4-

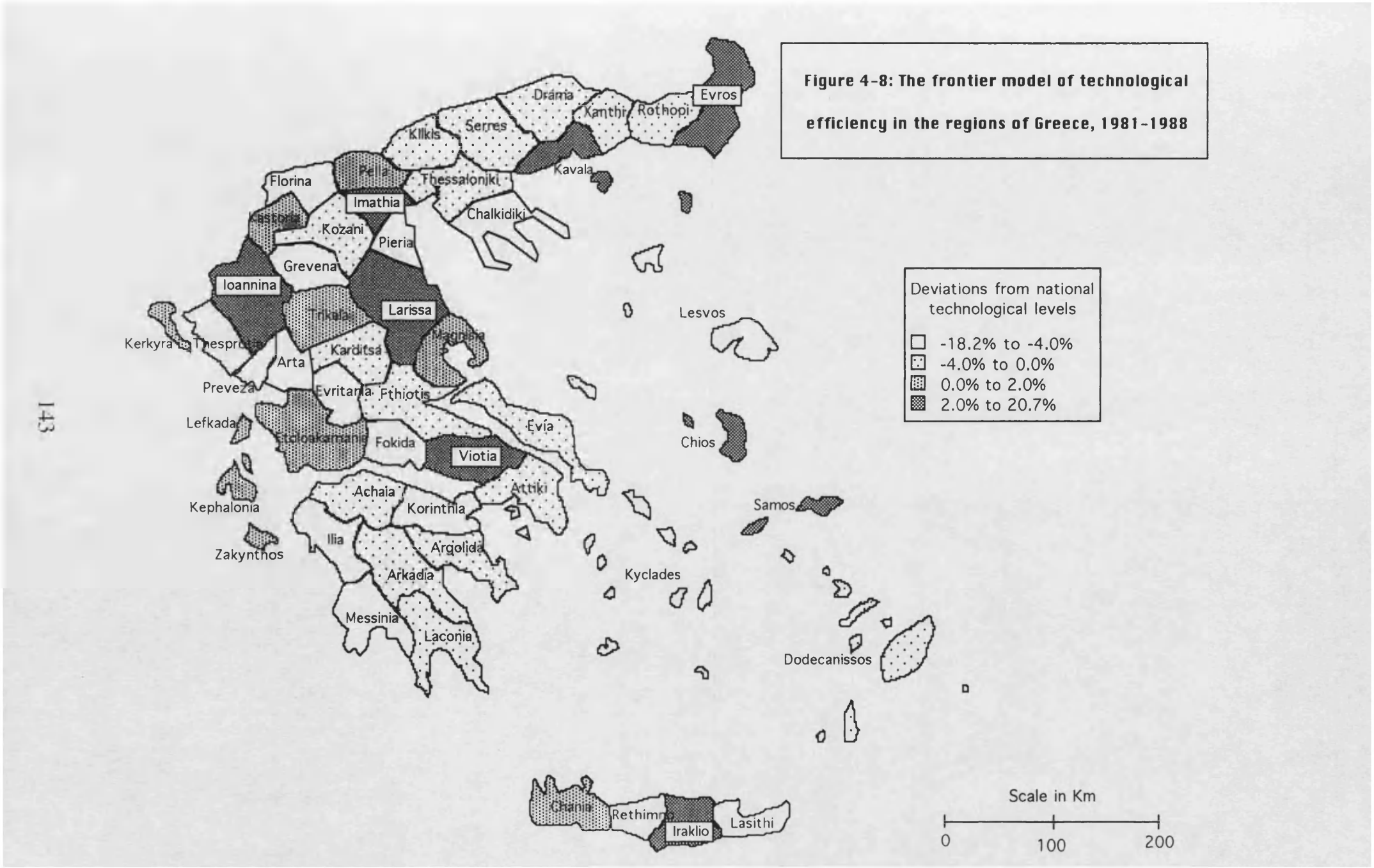


Figure 4-8: The frontier model of technological efficiency in the regions of Greece, 1981-1988

8) and not the older established industrial centres.

Overall, the variants of the value added TFP model portrayed the recent regional patterns of manufacturing growth in Greece quite realistically. Reality indicates that as regards export and non-locally oriented manufacturing industry there is absolutely no reason to establish in the south near the capital. There is a preference for the well assisted areas elsewhere, for example in regions bordering Thessaloniki. Activities oriented to central Greece are attracted to Magnisia, Larissa or Fthiotis. Kriti is served by Iraklio and the northeast of the country by Kavala, or for the most pioneering all of Thraki offers considerable financial assistance opportunities. To all of the above regions the model has assigned positive TFP, meaning above expected (CRS) average output growth for the eighties.

4.5 Technological efficiency and agglomeration

4.5.1 Urbanisation as a factor for technological efficiency

It has become apparent that the regional policy of Industrial Areas has had some positive effects on the recipient regions' TFP. Significant effects of the policy on the technological aspects of on productivity (TEC) have not been so well established. One reason may be that the Industrial Areas Programme and the more wide national economic assistance for development, are not specifically designed to promote the technological development of the recipient regions. The previous analysis gave an indication, and it was thought useful, using the originally described dataset to examine here whether technological efficiency advantage is significantly inherent in the TFP of regions with considerable urbanisation levels and urban agglomerations in Greece. In addition, to measure the impact of the general assistance policy against the urbanisation effect on technological efficiency.

Based on Pred (1966) and Kaldor (1970) it might be expected that larger agglomerations provide the facilities for scale economies and economies due to human specialisation, and also at the same time increase the rates of technical change. Under the more recent 'seedbed - incubator' hypothesis is suggested that centres of large cities, or other specifically favourable parts of the urban system function as territorial innovation complexes. These through their technological advances, have the potential to create development spin-offs. Giaoutzi (1990) suggests, under a neo-Fordist approach, that the new industrial cluster based on high technology industry has introduced a 'new regime of accumulation'. The

corresponding mode of social regulation is suggested to be determined by the technical core, its surrounding managerial subsystem and the inclusive institutional system.

In an empirical evaluation of the technological effects of agglomeration, Beeson (1987), found that an agglomeration gravity index for the US relates positively with technical change induced productivity. In a later work though, (Beeson and Husted 1989) a significant negative relation of technological efficiency and size of metropolitan population was found. On the other hand, states with high diversity of employment seemed to be technologically efficient, high levels of unionisation and education are positively related to efficiency and finally, the four most capital intensive states have negative relation to efficiency. From these two papers it can be seen that while the actual size of agglomeration is not inducing technological supremacy, certain arrangements of urban centres in regions do seem to relate to such an advantage.

Thus, technological change and spatial transformation are increasingly regarded as parallel phenomena with closely intertwined relationships. Nijkamp (1990) focuses in his research on the questions of technological take-off (technogenesis) and spatial technological impact (pervasiveness of new technologies). He suggests that traditional theoretical contributions emphasise in the role of spatial mobility of production factors such as labour and capital, assuming technology as given and uniform. But economic development is also affected by the regional receptivity towards technological change. Regional or spatial factors may facilitate or hinder the generation and diffusion of new technologies. Different regions have different levels of development of important enabling factors such as social entrepreneurity, economic robustness, institutional and organisational structures and availability of information. Entangling with policy issues, Nijkamp suggests that the urban orientation of modern technologies supports the need for a better integration of the urban dimension within regional policies.

It is thus evident, at least in theory, that the urban sector of regions plays a significant role in their technological competence and development.

4.5.2 Technological efficiency, urbanisation and regional development policy in Greece

To empirically test some of the above assumptions, agglomeration measures and assistance indices are next entered into linear regression models to understand their significance in explaining the variance of the TEC amongst the

different regions.

The agglomeration index U_1 is the percentage of population in any one region that live in urban agglomerations over 10,000 people. The agglomeration index U_2 is constructed to show the percentage of the population of the single largest urban centre of each region. The assistance indices are first, A_1, for the total state support in manufacturing in the form of grants (of Law 1262/1982) that were destined to the region from the initiation of the Law in 1982 to 1993. Second, A_2, for the ratio of the above support over total investment carried out in the region. Data for this are obtained by the Ministry of National Economy of Greece, (MNE, unpublished). The spatial dimension of the above indices is illustrated in Figure 4-9 for the urbanisation levels and in Figure 4-10 for the distribution of support in absolute terms. There is an indication, that is going to be tested next, that although the structure of assistance over the national territory, (Law 1262/1982), shown in Figure 4-10, features increased intensity of assistance for the peripheral regions, assistance in absolute terms remains quite centralised. In fact the region having received the highest support is Thessaloniki and its small neighbouring, highly assisted Department of Kilkis. Equally the large industrial activity of the capital Athens is assisted to 'decentralise' few miles along the motorway to the north in the neighbouring Departments of Viotia and Fthiotis. All the islands and most part of the southern and central/western peripheries have received small amounts of support. The Industrial Areas Programme has the advantage that it specifically prescribes the targets for development than rather 'blanket' covering the national territory; but the focus in this section -only- is on agglomeration and the national assistance scheme. Some of the above indications are going to be tested empirically next.

It was not expected that agglomeration or assistance indices, either singly or in combination would explain fully the spatial variance of the technologically induced productivity, that is TEC. What was hoped for was to first, test the existence and significance of such relations and second, to compare the strength of the assistance policy impact in this context with the assumed 'natural' affiliation of urban agglomeration and technological advance.

Correlation of the two urbanisation indices, U_1 and U_2 is high, 0.92, showing that most regions are uni-polar. Correlation between the two assistance indices A_1 and A_2 is low, 0.29, showing that intensity of assistance is much less related to the absolute amounts of assistance. Correlation between the urbanisation index U_1 and

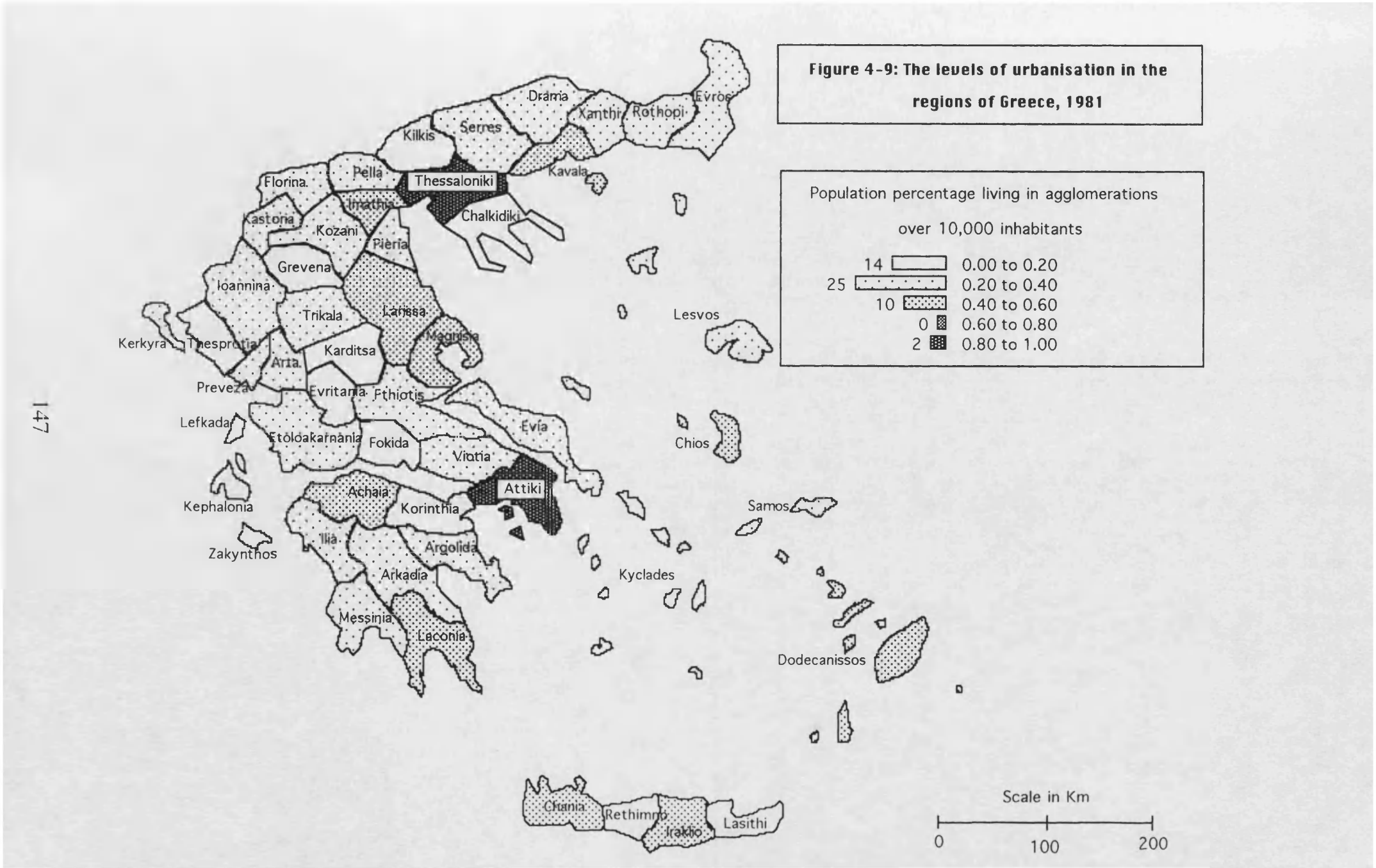


Figure 4-9: The levels of urbanisation in the regions of Greece, 1981
Population percentage living in agglomerations over 10,000 inhabitants
14 0.00 to 0.20
25 0.20 to 0.40
10 0.40 to 0.60
0 0.60 to 0.80
2 0.80 to 1.00
Drama
Xanthi
Rothopi
Evros
Kilkis
Serres
Kavala
Florina
Pella
Thessaloniki
Imathia
Chalkidiki
Kastoria
Kozani
Pieria
Grevena
Ioannina
Trikala
Larissa
Lesvos
Kerkyra
Thesprotia
Magnisia
Karditsa
Arta
Preveza
Evritania
Fthiotis
Lefkada
Evia
Etoloakarnania
Fokida
Viotia
Chios
Attiki
Achaia
Kephalonia
Korinthia
Samos
Ilia
Argolida
Zakynthos
Arkadia
Kyclades
Messinia
Laconia
Dodecanissos
Chania
Rethimno
Iraklio
Lasithi
Scale in Km
0
100
200

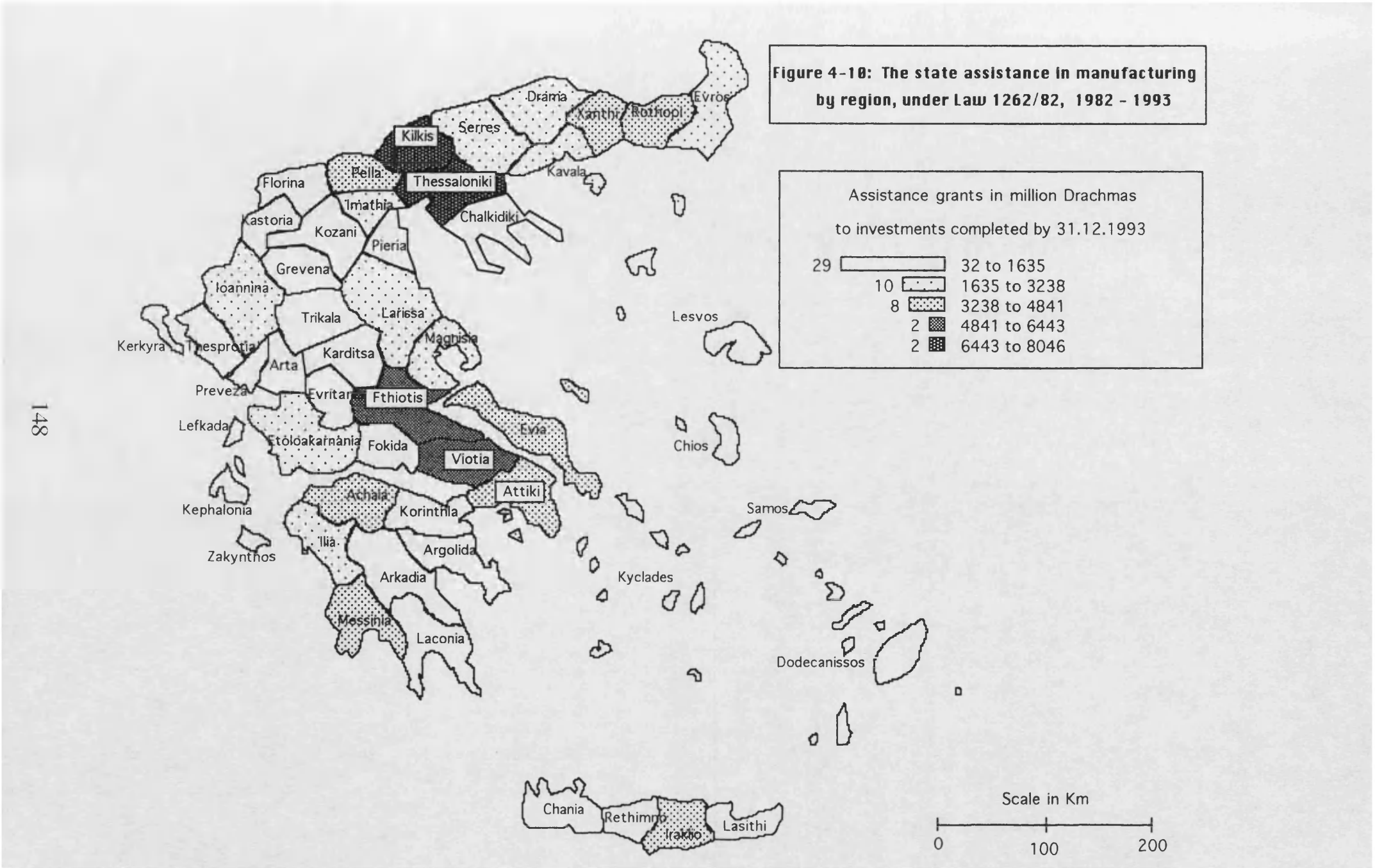


Figure 4-10: The state assistance in manufacturing by region, under Law 1262/82, 1982 - 1993
Assistance grants in million Drachmas
to investments completed by 31.12.1993
29 32 to 1635
10 1635 to 3238
8 3238 to 4841
2 4841 to 6443
2 6443 to 8046
Drama
Xanthi
Rodhopi
Evros
Serres
Kilkis
Pella
Thessaloniki
Kavala
Florina
Imathia
Chalkidiki
Kastoria
Kozani
Pieria
Grevena
Ioannina
Trikala
Larissa
Magnisia
Lesvos
Kerkyra
Thesprotia
Karditsa
Arta
Preveza
Evritania
Fthiotis
Lefkada
Evia
Aitoloakarnania
Fokida
Viotia
Chios
Attiki
Achaia
Kephalonia
Korinthia
Samos
Ilia
Argolida
Zakynthos
Arkadia
Kyclades
Messinia
Laconia
Dodecanissos
Chania
Rethimno
Irakio
Lasithi
Scale in Km
0
100
200

assistance index A_1 is a medium 0.45, showing that developed regions still get much of the assistance.

After the above rough indications, the first set linear regressions were run for the U_1 index. A logarithmic transformation of the indices was used as a second option to normalise them since the TEC are percentages with a mean near zero while the values of the indices are all positive. The equations were in the following forms:

$$TEC_i = b_0 + b_1 U_{1i}$$

that resulted to the equation: $TEC_i = -0.73 + 1.52\ U_{1i}$ $R^2 = 0.39$

$t=5.54$, $p=0.0001$

and

$$TEC_i = b_0 + b_1\ lnU_{1i}$$

that resulted to: $TEC_i = 0.35 + 0.42\ lnU_{1i}$ $R^2=0.55$

$t=7.66$, $p<0.0001$

where TEC is the technological component of the TFP and U_1 is the first urbanisation index, as defined above and i are the 42 regions.

The set of equations provides a surprisingly high R^2 at 0.39 which with the logarithmic transformation increases to $R^2=0.55$. The negative intercept of the original equation shows that with zero urbanisation level the technologically induced productivity would be negative. Results reveal a considerably high relationship between the size of urban agglomeration and the productivity growth due to technological advantage. The finding is very much in line with the theoretical assumptions in this context.

Second, the same TEC were regressed with the second urbanisation index U_2. This index can more specifically measure the effects of polarisation or centralisation in a single centre of a region. Thus, in the light of the previous general urbanisation index results as regards technological efficiency, the effect of polarisation was isolated by calibrating the equations:

$$TEC_i = b_0 + b_1 U_{2i}$$

that resulted to the equation: $TEC_i = -0.59 + 1.25\ U_{2i}$ $R^2 = 0.23$

$t=3.82$, $p=0.0004$

and the second form was

$TEC_i = b_0 + b_1 \ln U_{2i}$

that resulted to: $TEC_i = 0.17 + 0.33 \ln U_{2i}$ $R^2=0.10$

$t=2.34$, $p=0.02$

where U_2 is the second urbanisation index, as defined above.

In this set of equations the R^2 is 0.23 and significance is strong, but if the index is transformed to logarithms explanation and significance reduce. Clearly, using the urbanisation index U_2 as an explanation of the variance of the TEC, explanatory power is reduced in comparison to the previous index (U_1) however significance remains quite strong. In result it can be said that the centralisation around one single urban agglomeration within the regions is a not as strong a prerequisite than general urbanisation levels themselves. If the largest city only is measured much urban potential in several dual pole regions is not thus accounted for. This accounts for the lower explanatory and significance levels of this second index.

It is justified then to conclude that the spatial variance of the technological efficiency leading to increased productivity is to a considerable extent explained by the intensity of urban agglomeration in the various regions. All such potential is important and not only that centralised around the dominant city of each region.

Next, in a similar mode of testing, the connection of the actual monetary flow of national assistance in manufacturing with the regional TEC indices is explored in the following regression models:

$TEC_i = b_0 + b_1 A_{1i}$

that results to the equation: $TEC_i = -0.43 + 0.001 A_{1i}$ $R^2= 0.10$

$t=2.25$, $p=0.03$

and

$TEC_i = b_0 + b_1 \ln A_{1i}$

that results to: $TEC_i = -1.63 + 0.19 \ln A_{1i}$ $R^2=0.21$

$t=3.59$, $p=0.001$

where A_1 is the absolute national assistance index.

In this set of equations the R^2 is 0.10 and if the index is transformed to logarithms explanation and significance are increased (R^2 becomes 0.21). Thus, some significance can be found in the levels of assistance to manufacturing

investment in the forms of one-off grants explaining the technological competence of the region. Also, the negative intercept shows that with zero assistance the technological induced productivity would be negative. But explanation of the variance in these models is not as high as in those examining agglomeration relationships.

Finally it was tested whether the intensity of assistance (index $A_{2)}$ is any more related to the technological efficiency. The following equations were estimated:

$$TEC_i = b_0 + b_1 A_{2i}$$

that results to the equation: $TEC_i = -0.81 + 1.49\ A_{2i}$ $R^2 = 0.03$

$t=1.19,\ p=0.23$

and

$$TEC_i = b_0 + b_1 \ln A_{2i}$$

that results to: $TEC_i = 0.35 + 0.60\ \ln A_{2i}$ $R^2=0.04$

$t=1.31,\ p=0.19$

where A_2 is the assistance intensity index, as defined above.

In this set of equations the explanation offered by this index is negligible, R^2 being at 0.03 and also significance is quite low. With transformation into logarithms no significant improvement was recorded. Intensity of assistance does not seem to relate with technological competence.

Overall, the results of the above tests of urbanisation and national assistance in manufacturing as regards their relation to technological efficiency give a quite clear picture. There is considerable relation of the absolute money flow of assistance with technology. But the intensity of assistance is disappointingly, but not unexpectedly (Figure 4-10), much less significant. The second point can be understood considering the design of the assistance structure. Of course, the remote and lagging regions are those that achieve higher assistance percentages. In these regions, although assistance is higher as a percentage of the absolute investment, it is more than likely to be smaller in absolute terms than in more developed regions. In addition these areas are also likely to have lower urbanisation percentages. The latter proved to be an important factor that can be suggested as a prerequisite for the promotion of technological competence. More specifically the existence of urban agglomerations appears to be important, rather than a necessity for population to be centralised in one pole within the region.

To make a comparison from an empirical point of view it was interesting to test the significance of the 'natural' urbanisation structures against that of the 'induced' assistance of manufacturing as regards their relevance to technological levels. Testing of the following model makes the necessary comparison:

$TEC_i = b_0 + b_1 \ln U_{1i} + b_2 \ln A_{1i}$

resulting to: $TEC_i = 0.52 + 0.44 \ln U_{1i} - 0.02 \ln A_{1i}$ $R^2=0.55$

$t=5.97$ $t=0.41$

$p=0.0001$ $p=0.71$

where U_1 is the total urban agglomeration index and A_1 is the total assistance index.

This final test shows that compared to the significance of the structure of the urban agglomerations in the regions of Greece (U_1), the assistance in investment in manufacturing (A_1) has little effect as regards technological efficiency. This is not to suggest that assistance alone has had little or no impact, because it was found it does have, but that the 'natural' array of agglomerations remains the main determining factor as regards the levels of technological advancement.

In commenting on the general effectiveness of the assistance policy as regards technological efficiency several wider issues need to be brought forward. From one point of view, it is not given that the policy designers indeed aim to divert the structure of technologically supreme regions to a different one. After all, the development legislation itself (Law 1262/1982 and 1892/1990) makes practically no distinction among regions as regards projects that can be characterised as 'of high technology' and assists such efforts even in the capital, Athens. On the other hand though, it may be that the scope of such policy may be more concerned with new employment creation or sustenance of existing jobs. Two implications are important in this respect. First, technological advance may not go hand in hand with job generation goals, at least in the short term. And second who is to say that the more intensively recipient regions could have been even worse off had the policy been not undertaken. Finally, it should be stressed that if the regions that more intensively receive assistance are still technologically lagging, then it can be argued that these are precisely those that should continue to be assisted. The question is if these regions indeed and effectively receive a 'critical mass' of such assistance through the general assistance policy or should perhaps the more specific-targeted

type of Industrial Areas intervention be allocated more funds from the development budget.

4.6 Conclusions

In this chapter an analysis of the regional performance as regards employment and productivity was carried out. The methodology used was mainly based on the shift-share analysis and on variants of the total factor productivity analytical structure. The comparison of employment and value added change over time for regional manufacturing in Greece points to some interesting conclusions.

The shift share analysis first shows that the manufacturing sector is still an important contributor to new employment. Growth in this sector is strongly correlated with the overall regional competitive effect. Second, the Industrial Area projects, and to a lesser extent the general levels of economic assistance, can be shown to be closely related to the regionally specific conditions that prove favourable for new employment creation.

In terms of regional productivity it can be demonstrated that strong correlations exist between an Industrial Area location and increased TFP, mainly due to agglomeration and scale economies. However the Industrial Area causality relationships are favourable but not as strong when it comes to growth in productivity due to technological change. Some substantial agglomeration seems to be also needed. The nationwide assistance policy indicates that, by and large, they help peripheral regions create employment and, to a certain extent, semi-central regions to restructure or gain technological advances.

The results of the two main analyses, the employment-based shift share and the value added-based TFP, are not conflicting. They lead to the conclusion that restructuring is taking place in old established industrial regions, often using less labour with higher technology, but also taking advantage of the existing infrastructure. Elsewhere in strongly assisted peripheral regions agglomeration economies can be replicated or simulated by the policy effects. For the locations where technological advance can be seen, medium sized peripheral cities are the norm. This is also proved to be the case with the technological frontier methodology showing high consistency with the results of the TFP model. Large gains in employment are rarely related to the occurrence of substantial gains in the technological component. There is a strong indication that productivity has been

improved and some new technology utilised outside the central areas of the country and as a result regional competitiveness can be said to have improved at least for manufacturing through these processes.

In the final section of this chapter it was found evident in theory, that the urban sector of regions plays a significant role in their technological competence and development. In Greece also, the spatial arrangement of technological supremacy is related to the intensity of urbanisation levels among the regions of the country. It is less important if, within those regions, the urban agglomeration structure is centralised or multi-polar.

The assistance in manufacturing under the nationwide regional development assistance policy has milder effects in providing better technology utilisation to the recipient regions. It has done little to divert the existing structure of technologically supreme regions in the country. A technology policy needs focused orientation towards regional and sectoral specific circumstances to induce technological advances. Variety and flexibility of policy may seem to be more important in this context than comprehensiveness.

Chapter 5: The selection and characteristics of the sample of Industrial Areas and the structure of the survey

5.1 The context and purpose of the survey

The purposes of a form of regional policy like that of the Industrial Areas Programme are tied to the theoretical underpinning of the potential agglomeration and localisation economies, mentioned in the theoretical context of the policy. But development theories further stress, as was seen, the necessity of new technology utilisation, the effective interaction between enterprises and the local socio-economic interaction. Following these issues, an evaluation of the Industrial Areas is needed as to the extent to which they managed to attract to the distant regions, technologically advanced competitive firms, to provide technological support for the local industry to upgrade, mobilise and stimulate the local potential and entrepreneurial spirit. In some cases this might mean the creation of productive industrial nuclei and in others, the restructuring of older and less productive regional manufacturing character. Understanding the empirical reality of such complex questions explains the indices of secondary data analyses. These remarks illustrate the necessity of undertaking the survey.

The statistical analysis in chapter four of this study followed two separate and parallel procedures. With the shift share analysis various characteristics were assigned to the regions according to their all-round economic performance and their specific performance as regards employment growth in manufacturing. The second procedure, a measurement of productivity growth, provided a view of the efficiency of regional manufacturing. Having a combined assessment of employment and productivity results, a more precise typology of the type of growth each area experienced was formulated. Thus, estimations for each type of assisted area regarding productivity beyond constant returns to scale, perhaps due to local technological levels and regional specific economies, were regionally quantified. These showed in various ways some connection of the Industrial Areas Programme with positive regional economic performance.

The aim of the survey is first, to help to explain and specify the indications of the statistical analysis. Evidence about the state of manufacturing in the selected Industrial Areas will be valuable in providing a perspective on the real dimensions to the regional development characteristics. In other words this will reveal the extent, and more important, the ways in which the existence of an Industrial Area supports the quantified regional characteristics. A secondary aim is to capture the restructuring processes in specific types of the industrial regions and to view the role of industrial pole formation in the evolution in the lagging regions. More specifically the survey aims to draw evidence of the extent to which firms do actually transfer productivity and employment to a region having been attracted from more central locations. The survey will measure how many new local firms were born in the Industrial Areas and how many local firms relocated to the projects in an attempt to rise their productivity recognising any advantages experienced there. The survey was designed to discover evidence of the state of technology used, any specific technological support received, or any channels of technology diffusion among firms.

Second, questions were posed in tending to evaluate and provide measurements of qualitative regional characteristics, the measurement of which officially is not even attempted, such as the levels of industrial conscience, local cooperation and morale. Finally the survey explores the evidence of any inadequacies in the Industrial Areas that could be improved.

5.2 The selection of the Industrial Areas to be surveyed

The areas where the field study was carried out were selected on the basis of the results of the foregoing statistical analysis. As analysed, regions were put into categories according to their performance in the shift-share-employment analysis and the TFP output productivity analysis. Representative regions of various types were then selected for the case studies.

For the necessities of the field study design, regions with a placement in the positive cluster in both types of analysis are termed group one. They are the faster growing regions in both productivity and employment in manufacturing. The important characteristic of the cluster is that all regions are peripheral, newly industrialising, with medium sized agglomerations. The four large cities of Athens, Thessaloniki, Patra and Volos are not represented. The group includes none of the A

class assisted regions, Larissa and Iraklio of class B, Ioannina, Kilkis, Drama and Kavala of C, and Rodopi, Xanthi, Evros, of D. Recall that increasing economic assistance applies from A through D. Three representative regions are to be selected from this important group, that includes nine of the twenty Industrial Area regions. As it can be seen in (Figure 5-1), a common attribute is that all regions (with the exception of Iraklio) are located in northern Greece. From the regions of this group, Iraklio on the island of Crete was selected due to its distinct location amidst the other regions of the group. From the less developed regions of the group, Xanthi and Rothopi, were selected, to represent the group's peripheral character.

The second group consists of the regions that have positive TFP in the relevant model, but belong to the slower than national average increase group as regards employment growth in manufacturing. These regions can be characterised as undergoing restructuring. They are, Magnisia of the B assistance class, Fthiotis of C and Dodecanissos of D. The second group, (Figure 5-2), are rather more developed regions that restructure their methods of production to a more productive and less labour intensive character. The representative area selected here is Magnisia, an old established, industrially developed area. It was selected to represent a core type aspect and to provide for comparative purposes of the development characteristics of larger peripheral centres. Dodecanissos could not have been a representative region, since it is predominantly devoted in tourism. Here the Industrial Area intervention is small and too young, as discussed earlier, and is based on the larger and most developed of the twelve islands comprising the region, Rhodes. At the moment it can be regarded more as a local industry accommodating land-use policy and further problems of the non-contiguity of the region would make an analysis problematic.

The third group consists of regions that managed to increase employment without any productivity increases. One of these is the Thessaloniki region of A assistance class. This is the second largest conurbation in Greece, which is by no means peripheral, while experiencing very fast growth in the eighties. For this region, the scope of regional development policy as such, is vague. The Industrial Area here is more of a national, if not international, importance. The other regions in this group are the peripheral regions of Arcadia, Pella, Preveza and Serres (Figure 5-3). These regions house small and mostly incomplete Industrial Areas without local administration. As it will be explained in the findings of the field study, that follow, such cases are not yet integrated in the local economic networks and local growth is often diverted in other more favourable locations in the region.

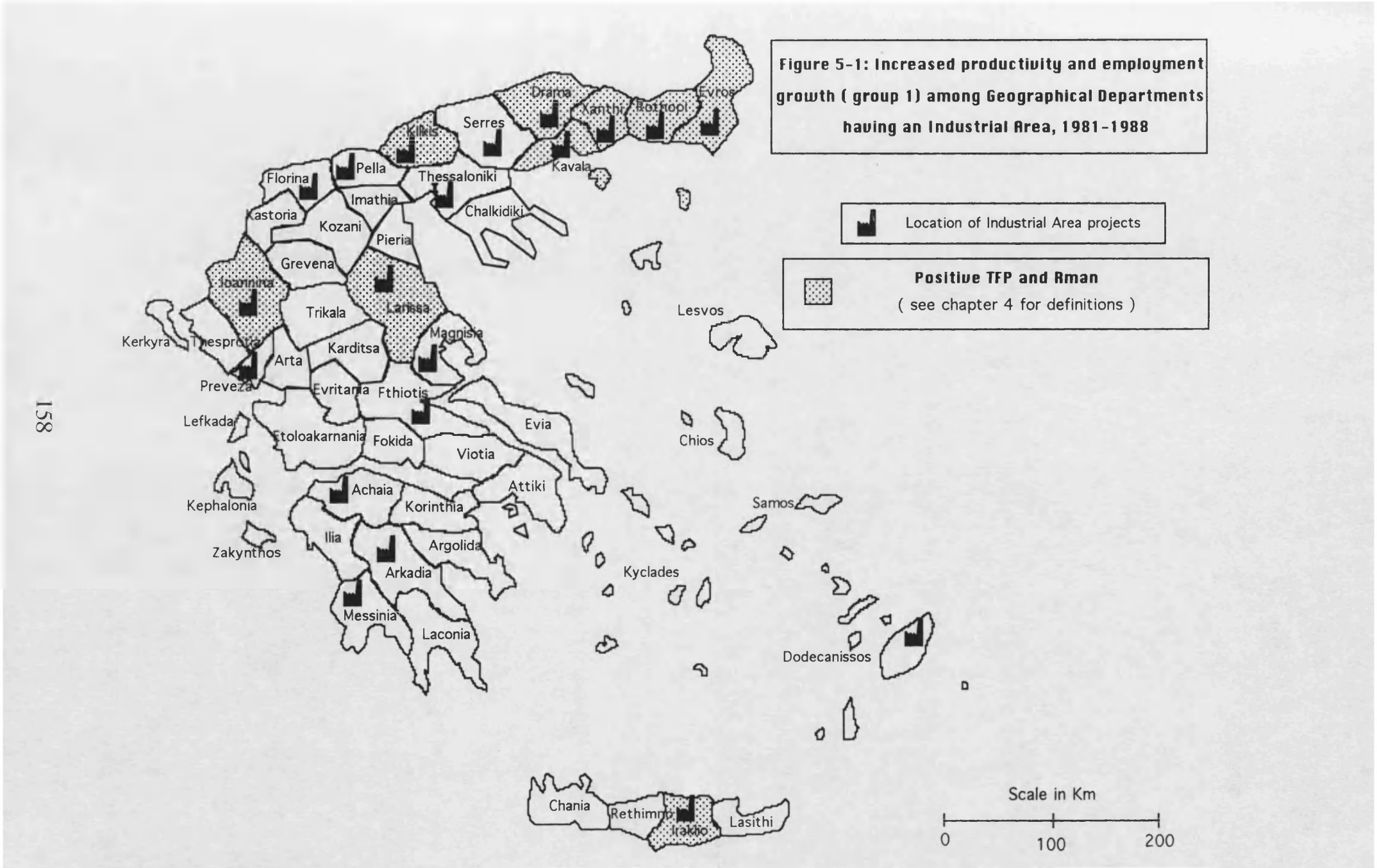


Figure 5-1: Increased productivity and employment growth (group 1) among Geographical Departments having an Industrial Area, 1981-1988
Location of Industrial Area projects
Positive TFP and Rman
(see chapter 4 for definitions)
Drama
Xanthi
Rodopi
Evros
Serres
Kilkis
Kavala
Pella
Florina
Thessaloniki
Imathia
Chalkidiki
Kastoria
Kozani
Pieria
Grevena
Ioannina
Trikala
Larissa
Lesvos
Kerkyra
Thesprotia
Magnisia
Karditsa
Arta
Preveza
Evritania
Fthiotis
Lefkada
Evia
Etoloakarnania
Fokida
Viotia
Chios
Achaia
Attiki
Kephalonia
Korinthia
Samos
Ilia
Argolida
Zakynthos
Arkadia
Kyclades
Messinia
Laconia
Dodecanissos
Chania
Rethimno
Irakho
Lasithi
Scale in Km
0
100
200

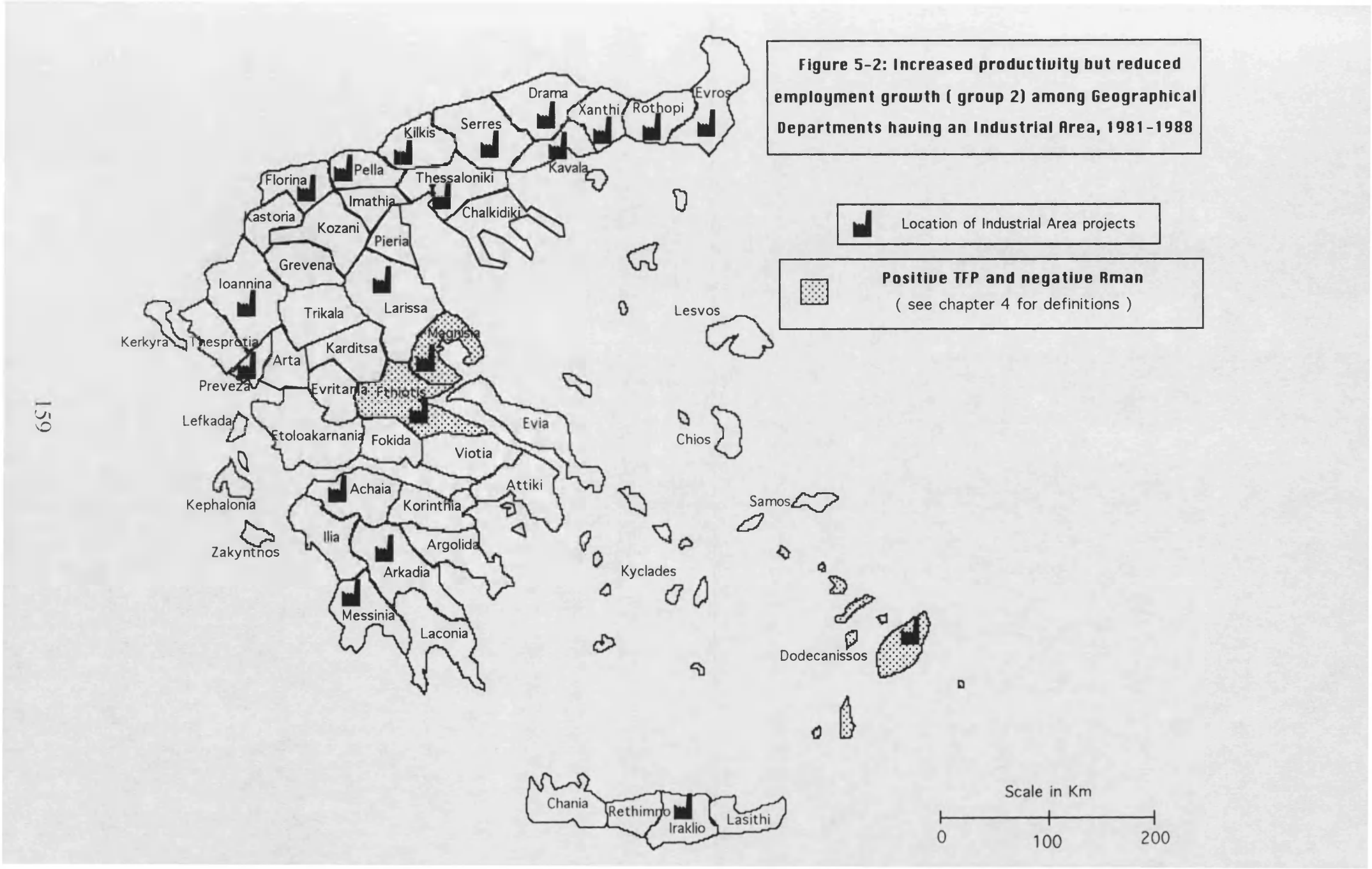


Figure 5-2: Increased productivity but reduced employment growth (group 2) among Geographical Departments having an Industrial Area, 1981-1988
Location of Industrial Area projects
Positive TFP and negative Rman
(see chapter 4 for definitions)
Drama
Xanthi
Rothopi
Evros
Kilkis
Serres
Kavala
Pella
Florina
Thessaloniki
Imathia
Chalkidiki
Kastoria
Kozani
Pieria
Grevena
Ioannina
Larissa
Trikala
Lesvos
Kerkyra
Thesprotia
Karditsa
Magnisia
Arta
Preveza
Evritania
Fthiotis
Lefkada
Evia
Etoloakarnania
Fokida
Chios
Viotia
Attiki
Achaia
Samos
Kephalonia
Korinthia
Ilia
Argolida
Zakyntnos
Arkadia
Kyclades
Messinia
Laconia
Dodecanissos
Chania
Rethimno
Iraklio
Lasithi
Scale in Km
0
100
200

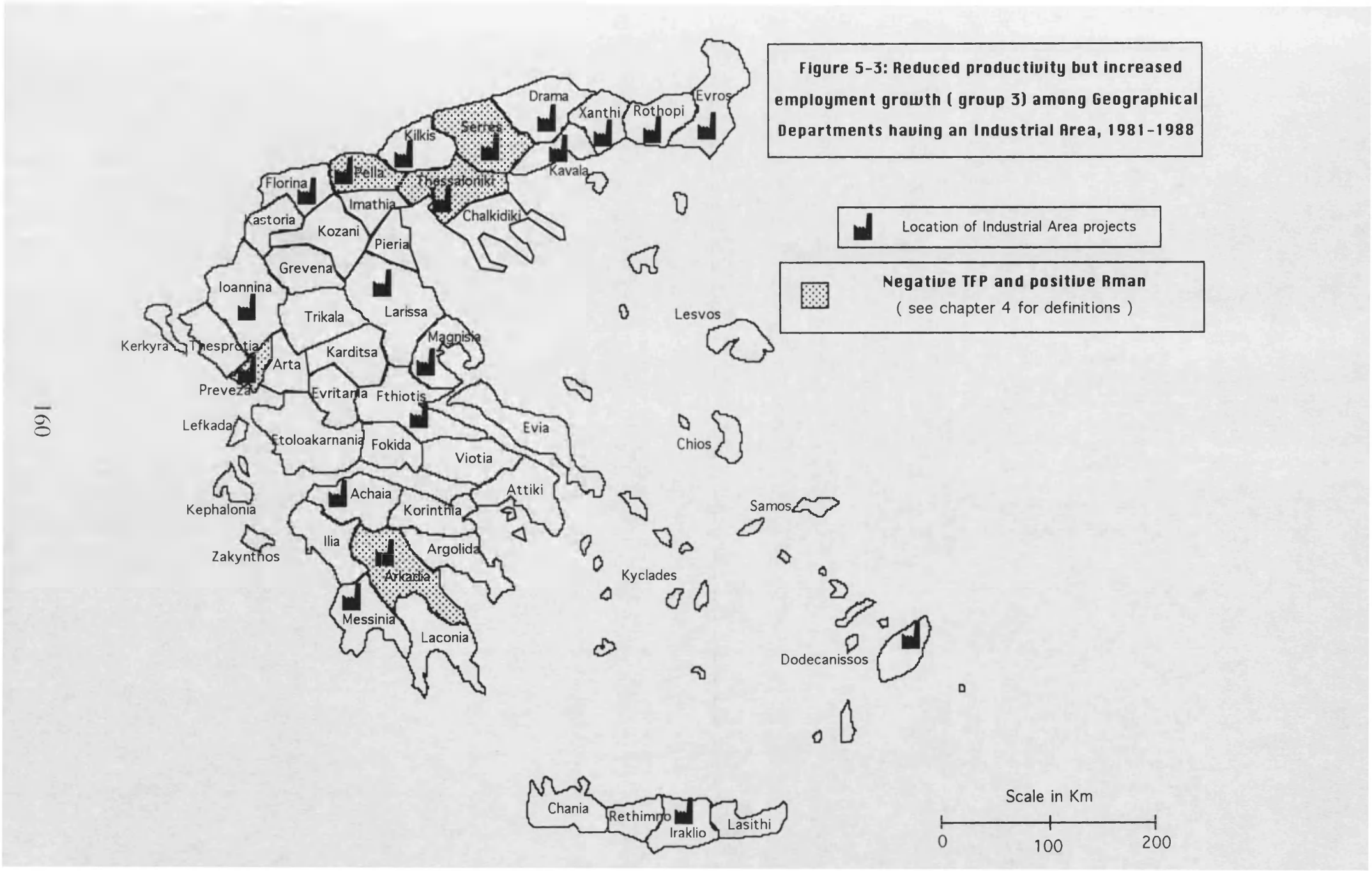


Figure 5-3: Reduced productivity but increased employment growth (group 3) among Geographical Departments having an Industrial Area, 1981-1988
Location of Industrial Area projects
Negative TFP and positive Rman
(see chapter 4 for definitions)
Drama
Evros
Xanthi
Rothopi
Kilkis
Serres
Kavala
Florina
Pella
Thessaloniki
Imathia
Chalkidiki
Kastoria
Kozani
Pieria
Grevena
Ioannina
Larissa
Trikala
Lesvos
Magnisia
Kerkyra
Thesprotia
Karditsa
Arta
Preveza
Evritania
Fthiotis
Lefkada
Evia
Etoloakarnania
Fokida
Chios
Viotia
Attiki
Achaia
Samos
Kephalonia
Korinthia
Ilia
Argolida
Zakynthos
Arkadia
Kyclades
Messinia
Laconia
Dodecanissos
Chania
Rethimno
Iraklio
Lasithi
Scale in Km
0
100
200

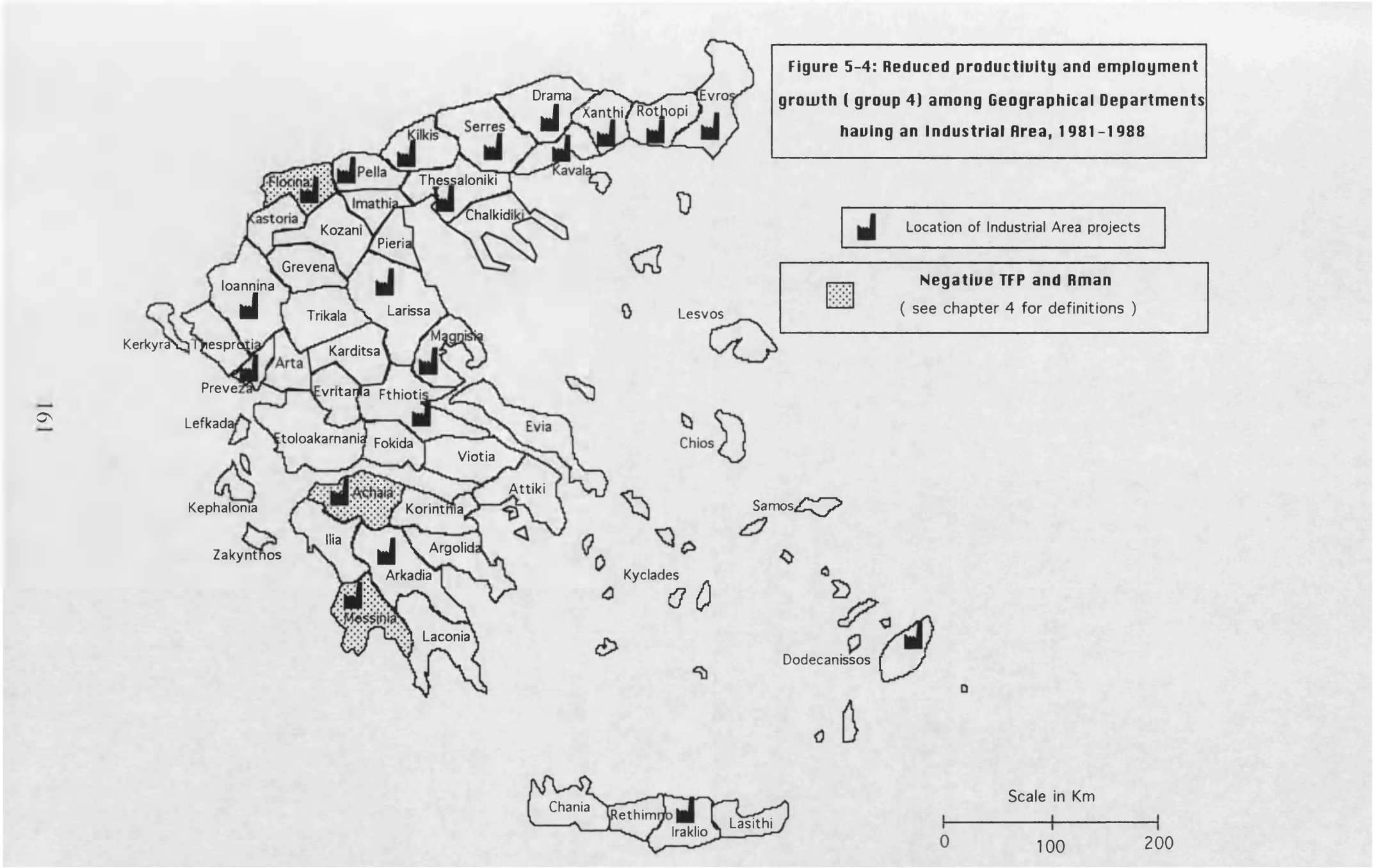


Figure 5-4: Reduced productivity and employment growth (group 4) among Geographical Departments having an Industrial Area, 1981-1988
Location of Industrial Area projects
Negative TFP and Rman
(see chapter 4 for definitions)
Drama
Xanthi
Rothopi
Evros
Kilkis
Serres
Kavala
Pella
Thessaloniki
Florina
Imathia
Chalkidiki
Kastoria
Kozani
Pieria
Grevena
Ioannina
Trikala
Larissa
Lesvos
Magnisia
Kerkyra
Thesprotia
Karditsa
Arta
Preveza
Evritania
Fthiotis
Lefkada
Evia
Etoloakarnania
Fokida
Chios
Viotia
Attiki
Achaia
Samos
Kephalonia
Korinthia
Ilia
Argolida
Zakynthos
Arkadia
Kyclades
Messinia
Laconia
Dodecanissos
Chania
Rethimno
Iraklio
Lasithi
Scale in Km
0
100
200

Information for the Industrial Area of Arcadia was obtained by the local administration of Patra.

The fourth and final group consists of those regions that scored negatively to both employment and productivity measurements. From this group the region of Achaia housing the important city of Patra was selected. Patra, an old established peripheral industrial centre has been subject to rapid restructuring of economic activity. The other declining regions of the group are Florina and Messinia (Figure 5-4).

The geographical locations of all the selected Industrial Areas for the field study are shown in Figure 5-5.

5.3 The characteristics and industrial specialisations of the selected regions

The above mentioned five Industrial Area regions that shall be the main objects of the field survey cover a range of population from about 90,000 in Xanthi to 275,000 in Achaia. They cover the range of typical non-central Greek regions. The capitals of these regions are urban centres again representative of typical provincial towns with agglomerated populations ranging from 31,500 in Xanthi, to some 155,000 inhabitants in Patra. The average urbanisation percentage of the sample regions is 52%. The sample is representative of urbanisation percentage for the whole country, that is some 58%, if some allowance for the existence of the large urban concentration in Athens is made. As regards the industrial assistance status of the regions, three of them belong to the 'B'-class less assisted developed regions, and two of them in the remote or lagging highest assistance 'D' regions.

The profiles of the selected areas follow, as regards their population, their employment in manufacturing, both in the region as a whole and in the Industrial Area, their assistance group and their productivity and employment growth results based on previous analysis. These are summarised in Table 5-1.

Xanthi : This is a rather small region on the northern border of Greece with population of 88,777 and the smaller capital city of the sample, Xanthi, of 31,541 inhabitants. The urbanisation percentage in the region is low, at 38%. The region belongs to the higher 'D' assistance class. The region has a total employment in manufacturing (1988) of 6,949 producing an average manufacturing establishment size of 8.1 which is the highest of the sample. Employment in large manufacturing

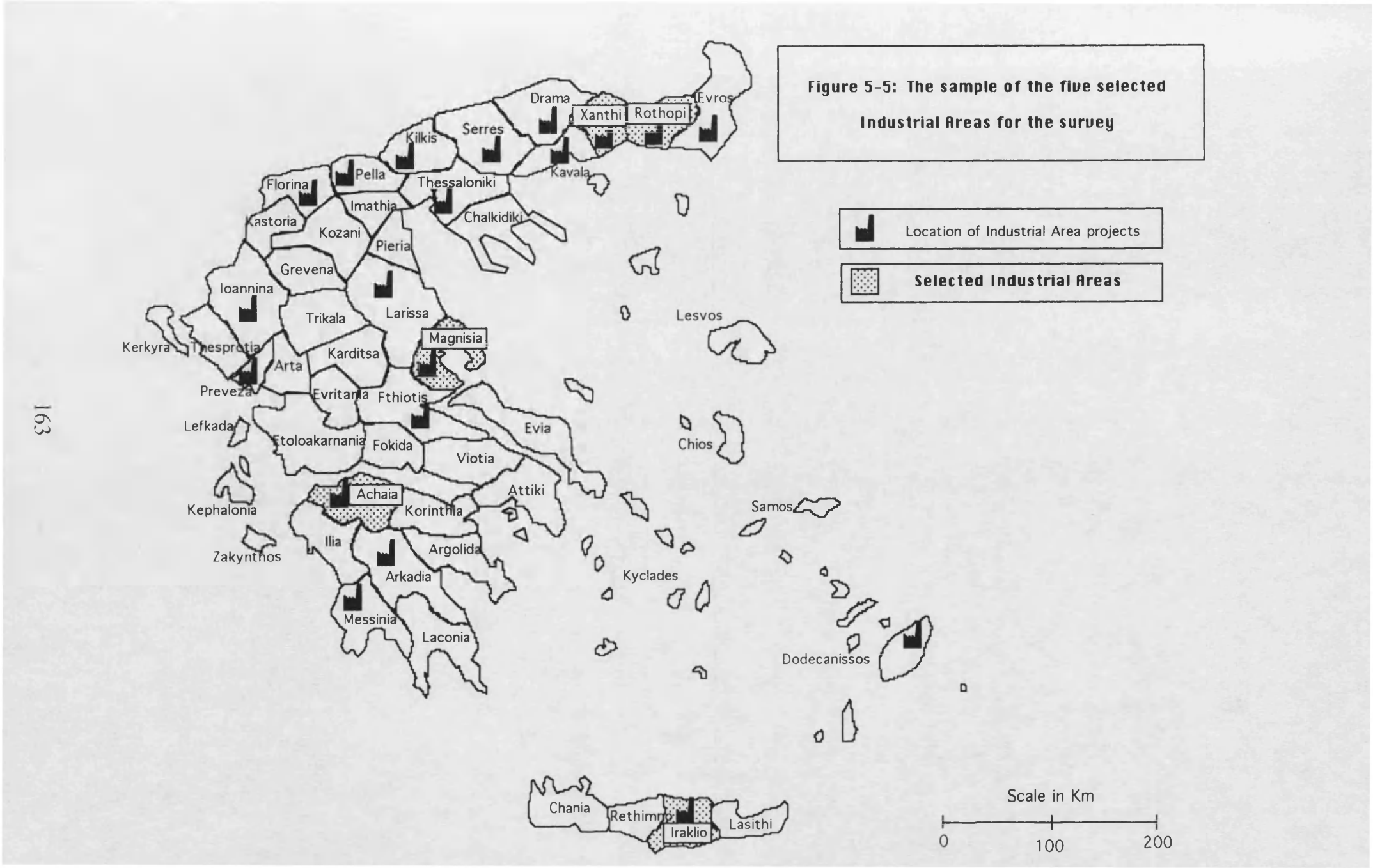


Figure 5-5: The sample of the five selected Industrial Areas for the survey
Location of Industrial Area projects
Selected Industrial Areas
Drama
Xanthi
Rothopi
Evros
Kilkis
Serres
Kavala
Pella
Florina
Thessaloniki
Imathia
Chalkidiki
Kastoria
Kozani
Pieria
Grevena
Ioannina
Trikala
Larissa
Lesvos
Magnisia
Kerkyra
Thesprotia
Karditsa
Arta
Preveza
Evritania
Fthiotis
Lefkada
Evia
Etoloakarnania
Fokida
Chios
Viotia
Attiki
Achaia
Kephalonia
Korinthia
Samos
Ilia
Argolida
Zakynthos
Arkadia
Kyclades
Messinia
Laconia
Dodecanissos
Chania
Rethimno
Lasithi
Iraklio
Scale in Km
0
100
200

Table 5-1 : Comparative attributes of the geographical departments of the five sample Industrial Areas

Geographical Department	Xanthi	Rothopi	Magnisia	Achaia	Iraklio	Sum of 5	All Industrial Area-regions	GREECE
Total Population	88,777	107,957	182,222	275,193	243,622	897,771	3,642,782	9,800,000
Capital City	Xanthi	Komotini	Volos	Patra	Iraklio	-	-	-
Capital City Population	31,541	37,461	107,407	154,596	110,848	-	-	-
Urbanisation %	38%	35%	59%	66%	46%	52%	49%	58%
Area's Assistance Class	D	D	B	B	B			
Total Employment Manufacturing	6949	4187	14612	21186	10631	57565	268181	706307
Average establishment size	8.1	4.3	6.0	6.2	2.8	5.0	5.3	4.9
Employment in 'Large' Manufacturing (over20 employees)	4208	1223	8191	11520	1842	26984	109067	294989
Average 'Large' establishment size	114	58	122	113	37	97	81	83
Industrial Area								
Operation Date	1981	1978	1969	1979	1971	-	-	
Area (sq.km)	2.00	4.33	4.44	4.05	1.47	16.29	48.75	
Number of Operating Firms	5	29	78	28	100	240	627	
Employment	405	1200	3900	1360	1794	8659	20700	
Average establishment size	81	41	50	49	18	36	33	
Output T.F.P. Analysis								
TEC (%)	-0.8	-6.4	-0.3	-5.2	6.9			
VRS (%)	4.5	14.7	0.4	-0.2	-6.8			
TFP (%)	3.7	8.3	0.1	-5.4	0.2			
Employment Analysis								
Shift - Share								
Relative Competitive Effect	38.9	8.2	1.8	-2.3	16.9			
R.man. index	0.6	0.4	-0.1	-0.1	0.1			
Selection Group	1	1	2	4	1			

firms (over 20 employees) is considerable, at 4,208, in 37 plants, giving a typical large plant of 114 employees that is again comparatively high. The Industrial Area there has only five firms operating but accounts for a total employment of 405 and an average size of 81, again the highest of all other Industrial Areas of the sample. With this profile, Xanthi produced a large positive TFP value, of 3.7% annually, mainly due to economies of scale, (positive VRS) as expected given the above structure, and not due to modern technology (small negative TEC). As for levels of employment, the region had fast employment growth in manufacturing (Rman = 0.6) and the all-round shift-share competitive effect of the region is the highest of the sample. In summary, Xanthi is an agricultural region, housing few large plants, mainly in the food, tobacco and leather processing industry, that increase employment and productivity.

Rothopi : This is a region with 107,957 inhabitants, mainly dispersed over its territory, since the administrative and only city, Komotini, has 37,461 inhabitants. The urbanisation percentage is the lowest of the sample at 35%. Rothopi belongs to well supported 'D' class of assistance. The manufacturing sector is also the smallest of the sample at 4,187 employees giving an average establishment size of 4.3 Large industry in this region has only 1,223 employees in some 21 plants, giving a typical regional large plant size of 58 employees. The Industrial Area is important and houses 29 firms and 1,200 employees. Employment in manufacturing is also here growing faster than the national (Rman 0.4) This setting seems optimal for scale economies to exist in the region since they produce the highest VRS of the sample, leading to the highest TFP. The technological indicator is though negative. The region has a wider range of manufacturing activities in smaller plant sizes and an important Industrial Area, with increased productivity and employment growth.

Magnisia : This is a manufacturing region with 182,222 inhabitants being quite concentrated around its capital, Volos, that has 107,407 inhabitants. The urbanisation percentage is high at some 59%. The manufacturing sector is the second larger of the sample at 14,612 employees giving an average establishment size of 6.0. Employment in large industry amounts to more than half, at 8,191 employees in 67 plants, producing a typical large plant size of 122 employees, the largest of the sample. The Industrial Area here is important and houses 78 firms and 3,900 employees at an average plant size of 50 employees. Employment in manufacturing is growing here just slower than the national (Rman -0.1). The region has a positive TFP, mainly due to scale economies for the region (positive VRS). The technological indicator is though negative. The region has a tradition in metallurgy, metal products and machinery. To sum up, the region has a considerable

manufacturing base and an important Industrial Area; productivity is increased but without associated employment growth.

Achaia : This is the largest region in the sample with population of 275,193 and the largest principal city, Patra, with 154,596 inhabitants. The urbanisation percentage in the region is the highest of all in the sample, at 66%. The region also has the highest total employment in manufacturing (1988) of 21,186, that gives an average manufacturing establishment size of 6.2. Manufacturing employment in large firms (over 20 employees) is again the highest in the sample, at 11,520, in 102 larger plants, giving an typical large plant size of 113 employees which is comparatively high. The Industrial Area here has twenty eight firms in operation, giving a total employment of 1,360 at an average size of 49. Achaia produced a large negative TFP, -5.4% annually, mainly due to inadequate new technology utilisation. On employment levels, the region had employment growth in manufacturing slower than the national(Rman = -0.1) and the all-sectors shift-share competitive effect of the region is the only negative (-2.3%) in the sample. Achaia is an older industrial region housing many large plants, mainly in the textile, chemical and metal products sectors. Closures of plants with some rationalisation have maintained profitability of firms but reduced employment and productivity.

Iraklio : This is an important region of 243,622 inhabitants, quite dispersed in its territory. The main city Iraklio has some 110,848 inhabitants. The urbanisation percentage is low, at 46%. The manufacturing sector consists of some 10,631 employees producing the smallest average establishment size of 2.8 in the sample. Large industry has only 1,842 employees in 50 plants, which produces an average large plant of 58 employees. The Industrial Area is important to the region and houses 100 firms and 1,794 employees. The average establishment size here is the lowest of all Industrial Areas in the sample at 18 employees. Employment in manufacturing in this region is growing faster than national (Rman 0.1) and the all-sectors regional competitive effect is large and positive. This setting proves optimal for economies due to new technology (the highest in the sample) but the small sizes of establishments tend to give rise to scale diseconomies. The TFP is positive. This region has a wide range of manufacturing activities in small plants especially in food processing, plastic and machinery activities. Significantly it also has a densely populated Industrial Area. Such features have generated increased productivity due to technology advance as well as employment growth.

Overall in the five sample regions the average establishment size is 5.0 employees, slightly above that of all Greece is 4.9, while in the twenty Industrial Area regions as a group the relevant size is 5.3. The five sample Industrial Areas

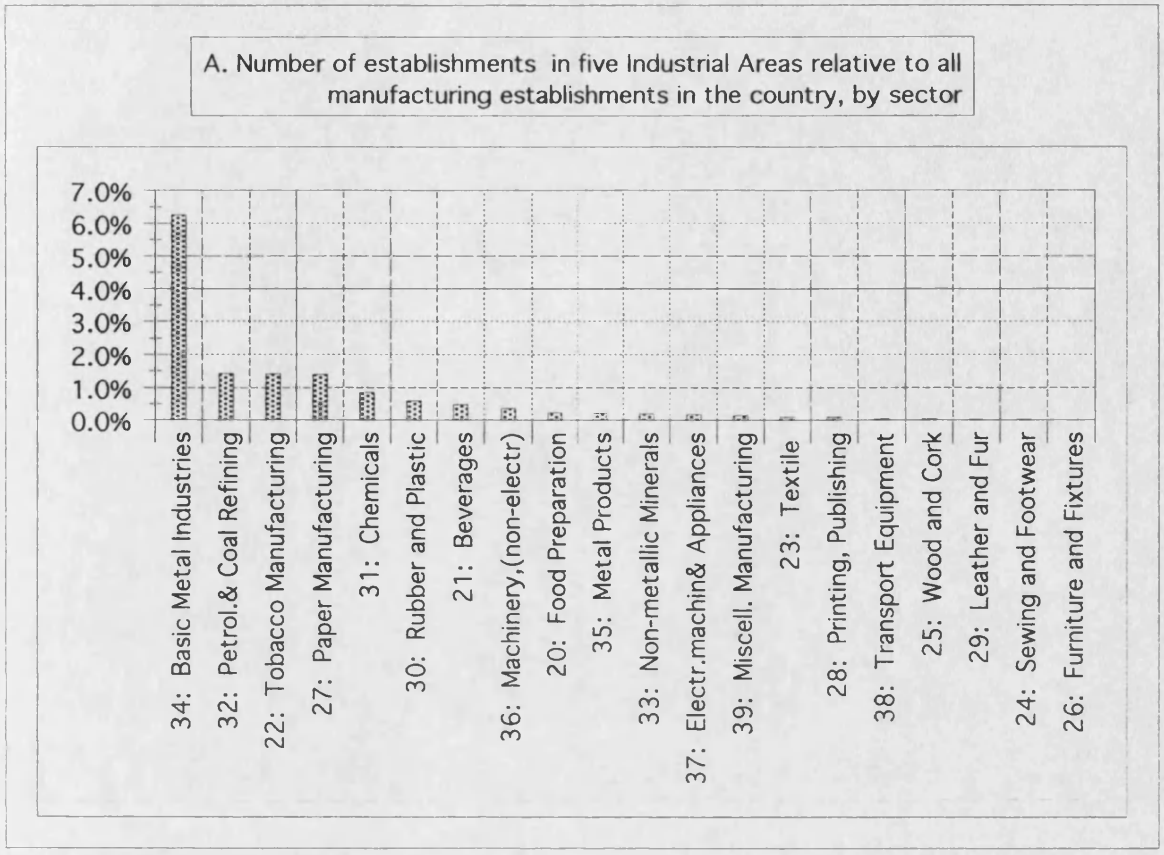
though have an average establishment size of 36 employees which for the twenty Industrial Areas as a group becomes 33. These are sizes much higher than the respective regional or national average sizes. But when the 'large' (over twenty) industry sizes are compared to the Industrial Areas establishment sizes, it can be seen that the latter are considerably smaller, amounting to about half. This shows that the Industrial Areas are not solely designed for large manufacturing, neither are they, somehow, inaccessible to small firms of say ten employees.

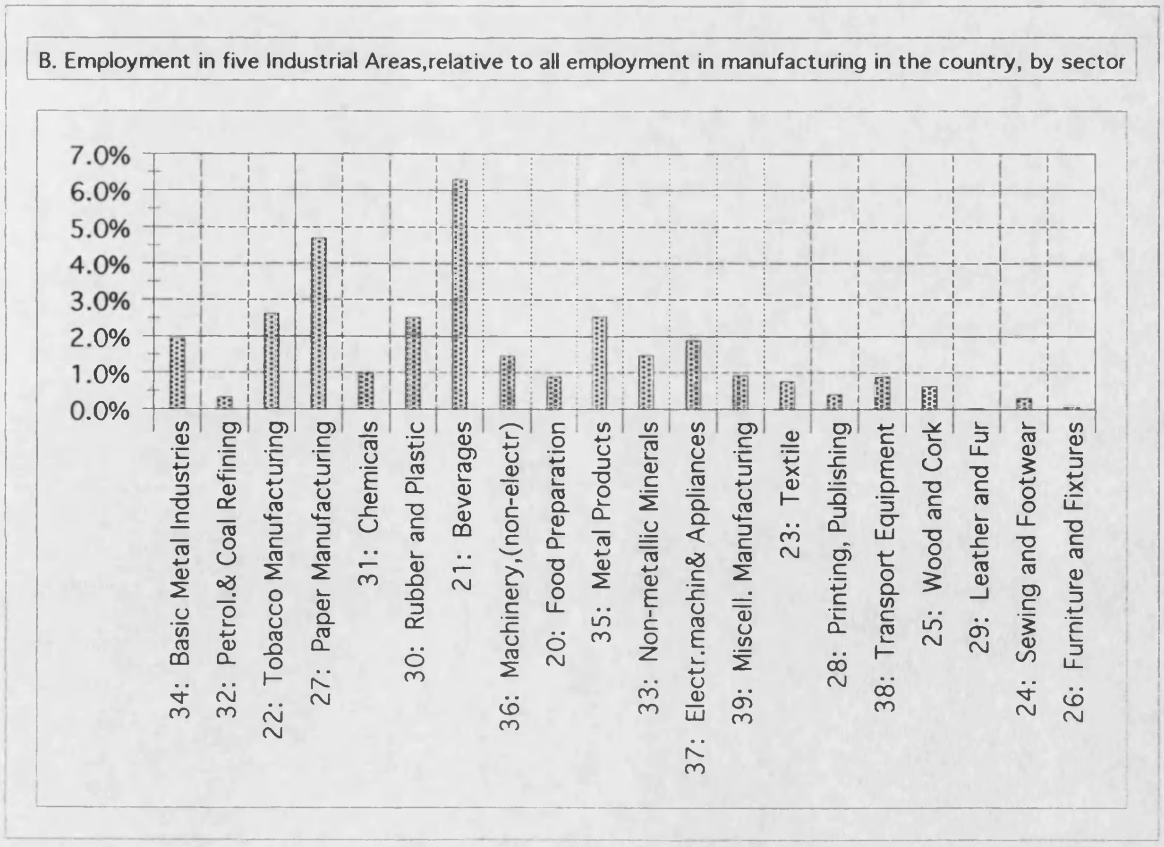
The industrial specialisations that establish in the Industrial Areas is an important characteristic as regards their flexibility in accommodating a variety of industry and their specific attractiveness to various sectors. A sub-sectoral analysis of the firms established in the sample five Industrial Areas can show the manufacturing sub-sectors for which the Industrial Areas have proved most attractive. A complete analysis and evaluation of this kind is made in chapter seven. Here two aspects can be given on this context.

First, the number of establishments, by sector, in the sample five Industrial Areas as one group is shown as a percentage of all relevant establishments in the whole country. Second, the employment per sector established in the sample Industrial Areas is compared to that of the whole country. Figure 5-6 shows the number of the established firms and their employment in the sample of the five Industrial Areas, both as a fraction of the total -respective- figures for the whole country.

The percentages as regards the number of units are expectedly low, but the employment they account for is much higher. The main plant specialisations tend to be in the basic metal industries, oil and coal refining, tobacco industry and paper manufacturing sectors. Additionally, beverages, chemicals, rubber and other metal-related sub-sectors also show some preference to locate in the Industrial Areas of the sample. Textiles, footwear, wood, furniture, leather and printing units are much less attracted to the Industrial Areas. A somewhat different view is given as regards the employment percentages that the above established units generate. The five Industrial Areas of the sample show particular employment concentration in sectors such as Beverages, Tobacco, Paper, Rubber, Metal products, Machinery and Electrical Appliances, as can be clearly seen in Figure 5-6. A combined analysis can show that the beverages units in the Industrial Areas are exceptionally large as are the establishments in the paper manufacturing, the rubber and plastic, the metal products and the electrical appliances sectors. On the other hand, the more important plants in petrol refining and basic metal industries tend to locate out of the Industrial Areas.

Figure 5-6: Activity in the five selected Industrial Areas relative to the whole country





A more detailed presentation of the sectoral specialisations, in absolute terms, of establishments within the five surveyed Industrial Areas is given in Table 5-2 and illustrated in Figure 5-7. There it can be seen that the main concentrations of establishments are in rank order in metal products, food preparation, machinery, rubber and plastic, chemicals, non-metallic minerals and beverages. Food did not come high as a specialisation in the previous relative-to-national presentation due to the large number of establishments in the whole country. But this sector seems to be actively and strongly participating in the Industrial Areas Programme, though it does not have a special preference, as a sector, to establish there.

Details of the coverage by the survey regarding number of establishments, employment and participation of the various sectors is also shown in Table 5-2 and illustrated in Figure 5-7. It can be seen how the survey tried to follow a representation the sample's specialisations. The percentage of the established firms surveyed in each Industrial Area varies from 18% to 60%, with a general coverage of 23% of all firms. The coverage of the survey as regards employment ranged in the selected Industrial Areas from 93% to 42%, with a general coverage of some 59% of all employment.

5.4 The field study procedure

The main frame of the field study was designed to be based on structured questionnaires. Three kinds of questionnaires were deployed for the survey purposes each one addressed to specific actors. The first was addressed to the central administration of the Industrial Areas Programme in Athens. This is the division of Regional Development and Industrial Infrastructure (ΠΑΒΥ-ETBA) of ETBA bank. The second was addressed to the local, on-site Industrial Areas administration, in the cases where there was one, or the relevant responsible ETBA branch in the area. The third and last questionnaire was addressed to the above mentioned sample of established firms in the Industrial Areas of the survey. Finally, for the selected case-study areas, any locally available data source, or actors' opinions and perceptions were utilised by the author to better formulate a perception of the situation.

The central administration (ΠΑΒΥ-ETBA) questionnaire obtained aggregate data for the establishment and operation of the Industrial Areas Programme. It also

Table 5-2 : Sectoral allocation of establishments in the sample Industrial Areas and the survey coverage

Industrial Areas:	Xanthi		Rothopi		Magnisia		Achaia		Iraklio		Sample of all Five	
Established firms(1992) / Surveyed	Establ.	Surveyed	Establ.	Surveyed	Establ.	Surveyed	Establ.	Surveyed	Establ.	Surveyed	Established	Surveyed
Manufacturing Sub-sectors												
20: Food Preparation	2	1	4	3	10	1	3	1	20	5	39	11
21: Beverages			3	1	2	1	2	1	3	1	10	4
22: Tobacco Manufacturing	1	1	2								3	1
23: Textile			2	1	3				3	1	8	2
24: Sewing and Footwear					1				3		4	0
25: Wood and Cork					4		2	1	4		10	1
26: Furniture and Fixtures					2				4		6	0
27: Paper Manufacturing			2	1	2	1	2	2	2		8	4
28: Printing, Publishing			1		1				3	2	5	2
29: Leather and Fur			2				1				3	0
30: Rubber and Plastic			2	1	4	1	1		10	1	17	3
31: Chemicals			2		4	1	2		4	2	12	3
32: Petrol.& Coal refining							1	1	1		2	1
33: Non-metallic Minerals					4	1	2	1	5	3	11	5
34: Basic Metal Industries					4		1				5	0
35: Metal Products			5	3	21	4	8	3	11	1	45	11
36: Machinery,(non-electric)			2		5	1	2		16	2	25	3
37: Electr.machines & Appliances	1	1			5		1		2		9	1
38: Transport Equipment					4	3			4		8	3
39: Miscellaneous Manufacturing	1		2		2				5		10	0
Total number of Firms	5	3	29	10	78	14	28	10	100	18	240	55
% of firms covered by survey		60%		34%		18%		36%		18%		23%
Total Employment	405	375	1200	880	3900	1853	1360	1244	1794	752	8659	5104
% of employment covered by survey		93%		73%		48%		91%		42%		59%

Figure 5-7 : Sectoral allocation of establishments in the five sample Industrial Areas and the coverage by the survey

asked about the criteria for the selection of the firms applying and any auditing or guidance procedures in use. It was also designed to gather estimations of the local response to the Industrial Areas Programme, cooperation with local government, scientific/academic institutions and training or re-specialisation projects and a general political comment about the whole Programme's needs.

The local Industrial Areas administration questionnaire collected information for the specific projects procedures for land and infrastructure provision, the facilities, their maintenance and the services provided now on-site, and the costs and financial sources for these operations. A distinct part of the questionnaire asked for a full list of established firms, their manufacturing branches and their employment. Annual data about the Industrial Area employment and industrial space delivered to firms were not available. The local administration questionnaire also tried to evaluate the subtle local conditions, interactions and implementation differences that possibly create differentiation among the various sites' quality and performance.

The construction of the firms' questionnaire was made in an articulated matter. The main questions of the survey derived from the theoretical and quantitative analysis presented earlier in this research. First, the sector, size and growth of the established firms were collected, and their estimations on the efficiency of infrastructure, facilities and services provided. These show the extent to which the Industrial Areas are acknowledged to lead to localisation and scale economies. Second, the technological levels and attitude towards new technology of the firms was surveyed. These measure the success of the Industrial Areas in concentrating, promoting and diffusing advanced technologies in the policy regions. Third the local interaction of the firms and their perception for the development prospects of the region were assessed. These measure the degree of pervasiveness of the Industrial Areas to the local economies.

The above questions are grouped into relevant parts in the questionnaire. The parts of the questionnaires are: a.'Firm's Identity', providing ownership, employment size and sector of the firm; b. 'Infrastructure Efficiency' providing data, estimations and suggestions on the efficiency of all kinds of infrastructure by the firms; c. 'Technology Issues', where a measurement of the state of the technology in practice is made and the technological orientation of the firms and their technological needs are exposed; d. 'Local Characteristics' where regional government cooperation and existence of skills are evaluated; and e. 'Evaluation of the Industrial Area' where the firms' perceptions on the evaluation of their Industrial Area project and policy in general, on regional development issues, are

collected. Finally, one supportive part of free format collected any suggestions for the better operation and efficiency of the Industrial Areas.

The established firms' questionnaire was constructed in a way that would give a large amount of detail, under two constraints. The first is the actual length of the questionnaire, that should be reasonably easily filled in about thirty uninterrupted minutes. It should not exceed a limit of forty questions, or so. The second constraint was that the questions should be of a kind that would obtain comparable answers among the various firms and among the five case-study areas.

The questions of all questionnaires were derived from a larger set of relevant questions, after the pilot testing of potential answers. The questionnaires in some cases handled qualitative issues, which for analytical purposes had to be quantified. Various techniques were used to derive quantified measurement of these issues. An outline of the questions in each questionnaire can be seen in Table 5-3. The questionnaires can be seen in Appendix One.

5.5 The field study as carried out

The field study and survey was carried out in the summer of 1992. Contact was made with the helpful assistant director of the ΠΑΒΥ-ΕΤΒΑ Mrs. Pagoulaki, for the central administration issues for the Industrial Areas. Besides, basic data were obtained for all twenty Industrial Areas in operation.

Visits to the five sample Industrial Areas took place, (Xanthi, Komotini, Volos, Patra, Iraklio), as planned in the survey design. There, the local administration provided information and data which were collected, not only for the sample five Industrial Areas, but also for others that were under the administrative authority of the interviewed local administrations. Thus in fact, local administration questionnaires for a total of nine Industrial Areas were collected. In the case of Volos a Scientific Research Centre and a Workforce Specialisation Centre were established within the Industrial Area. These were also visited and relevant documentation was acquired. Following the relevant questionnaires, other issues came to the surface, of which notes were taken. All interviews were carried out, by the author of this study, in person. In general, appointments keeping and willingness to cooperate was good.

In addition to the Industrial Area administration interviews, selected firms were interviewed in each Industrial Area, using the prepared questionnaires. A total

Table 5-3: Outline of the field study questionnaires

Central Administration of Industrial Areas (ETBA) Questionnaire: (13 questions)	a. Employment	2 questions
	b. Land	1 question
	c. Financing	2 questions
	d. Responsibility/Accountability	2 questions
	e. Selection/Technology	3 questions
	f. Local interaction	1 question
	g. Central policy	1 question
	h. Evaluation	1 question
Local Administration of Industrial Areas Questionnaire: (29 questions)	a. Infrastructure, Employment:	9 questions
	b. Selection criteria, Technology	8 questions
	c. Local interaction	7 questions
	d. Estimations	5 questions
Established Firms' Questionnaire: (41 questions)	a. Firm's identity	
	b. Infrastructure efficiency	18 questions
	c. Technology lisues	13 questions
	d.Local characteristics	3 questions
	e. Evaluation of Industrial Area	7 questions
	f. Suggestions	

of fifty five firms were interviewed, with employment in them varying from ten to five hundred. The total number of employees of these firms exceeds five thousand. The questionnaires were completed in cooperation and in presence of the author and, where needed, comments besides the answers were written down. The attitude towards the survey varied among both places and firms, from simple answers to the questions, to guided tours around the establishment.

The firms are, in general, established in spacious pieces of land. The physical characteristics of the establishment vary considerably, not only due to the site of each Industrial Area, but also due to the industrial sector of the firms and the personal and qualitative character of each. In all surveyed Industrial Areas a trip around the site was made for personal evaluation of the conditions of the existing infrastructure and landscape, and photographic records were made to illustrate the situation. A presentation and an analysis of the results of the field study is made in the following chapter. The semi-processed results of the firms' questionnaire are shown in Appendix Two.

Chapter 6: A survey of the provisions and operation of the Industrial Areas Programme

6.1 Administration and range of the Industrial Areas Programme, the firms' participation and the employment effect

6.1.1 The administrative setup for the Industrial Areas Programme, strengths and weaknesses

As it was seen in earlier chapters, the state has since 1965 assigned the Hellenic Industrial Development Bank (ETBA) the role of achieving the target of economic development, as regards the manufacturing sector. The bank has designed the Industrial Areas as a network of centres for industrial development, near some of the substantial urban centres of the country. The Industrial Areas Programme is meant to serve "directly, economically and comprehensively" the operation of modern manufacturing units, as the central administrator of the Programme has pointed out in interview. "Directly", since ETBA is the only operator of the Programme, and is responsible for the speedy process of the establishment formalities. "Economically", since the Programme enjoys a preferential position in the national development legislation. "Comprehensively", since the Industrial Areas are meant to provide all necessary infrastructure utilities. In addition, the Industrial Areas are planned to serve the rural areas physical planning efforts, and also to facilitate environmental protection, as claimed by central administration. They are also expected to have a decentralised administrative authority.

The principal responsibilities of the Programme are held by the head of the department of "Regional Development and Industrial Infrastructure" (ΠΑΒΥ), of the ETBA bank which is based in Athens. The department produces and suggests to ETBA the annual and long term Industrial Areas development Programme. Responsibilities include programming, guidance and auditing of all activities that relate to the Industrial Areas. More specifically, responsibility is taken for the land selection and acquisition, the administration, the accountancy and the technical support of the Programme. The Central administration intervenes in any cases in which the local projects' administration may have problems. The head of ΠΑΒΥ reports to the board of ETBA and subsequently to the government through the

Ministries of Industry Research and Technology (ΥΒΕΤ), National Economy (ΥΠΕΘΟ), and Environment, Planning and Public Works (ΥΠΕΧΩΔΕ), on various issues related to development permissions and project funding.

The Programme's administration is decentralised to better serve the needs of the Industrial Areas. Administration can serve at the local level many of the Industrial Areas needs, including the procedures for the selling of industrial land and fixing contracts regarding the construction of infrastructure. A major task of the local administration is to audit the compliance of the established firms to the Industrial Area regulations. For example, all firms that buy land have to start construction work within six months of land purchase and have to start operating within two years. During the operational period, firms should not practice retailing nor have as their main activity simply the storage of goods.

As regards environmental regulations, local administration is assigned with the duties of the relevant audit, where there is such a procedure in operation. Local administration also has to ensure that the firms pay their share of running costs. As regards infrastructure, the local administration's task is to inspect the new provision and check the maintenance of the existing facilities. A technical department is usually responsible for this. The main procedures are programming, organising and auditing of the completion of the contract terms by the infrastructure contractors.

Finally, the local Industrial Areas administration forwards information to the central administration in Athens about firms' compliance with the regulations. It is the central office in Athens that decides on deviations from regulations, on Industrial Areas infrastructure, as the Athens office allocates funds for infrastructure extensions and approves new land sales.

The decentralised administration scheme seems important for the potential clients of the Industrial Areas. The firms can have the ETBA administration near them, and ETBA can be nearer to the firms and the projects themselves. The contact with the local actors can be much better if there are representatives of ETBA on the site. Still though, only eight of the twenty Industrial Areas have a local administration branch up to now. The projects that do not have a local administration on site, have obvious difficulties both in provider-client communication and in local cooperation and interaction. Such features are mostly the case with the small, peripheral and young Industrial Areas. But this defect is important, since these are the projects that need to establish their local appeal. In addition, peripheral and young projects, even when established are still building or

completing their infrastructure and thus are in need of more care and attention from an administrative point of view.

The flexibility and efforts of ETBA are constrained, it was claimed in interview, by the slower moving national administration (the various Ministries), the policies of the Bank of Greece and of course by the general national macro-economic circumstances. As regards the concern about the natural environment, the local administrations in practice do not control industrial emissions and solid waste. The reasons for this are rather complex, in part being lack of suitable equipment especially as regards the emissions, but also the lack of suitable infrastructure as regards the solid waste. However, it may additionally be lack of suitable will by both tiers of administration, as will be discussed later.

Finally, from the field study it became apparent that the relations between the local administration and the established firms can be substantially improved. Firms in general are of varying opinions on the efficiency of the financial spend, as regards the running costs of the Industrial Areas. The physical condition of each area to a large extent determines the running costs expense. It is obvious that on the most populated sites, the cost per firm or per employee decreases. Thus in the smaller Industrial Areas often firms complain about the running cost expenses they have to pay. This means they have more reasons to be reluctant when asked if more facilities should be added in the projects, when the expenses or maintenance costs are included in the running costs. Conditions improve when Industrial Areas become more populated. Other areas of firms' antagonism towards the administration include the rare Industrial Area contact with firms on issues other than those relating directly to the running cost bill, little individual understanding for each firm's needs, and the limited information about the administration's future plans for the Industrial Area. The administration would like to make firms to feel and behave more responsibly towards the whole Programme but it seems from the survey that further efforts are needed to make this a reality.

6.1.2 The range and provisions of the Industrial Areas Programme

The Programme of the Industrial Areas consists of twenty sites in operation, in various locations in Greece as was shown earlier. They are situated in areas strategically selected for the regional development of Greece. The age of the various sites varies from 1969 to very recent. There are plans for more projects to establish. The Industrial Areas are in fact defined land spaces, for industrial use with infrastructure provision, owned by the ETBA bank and sold to selected firms at

advantageous prices to attract them to remote or strategic areas and to concentrate them spatially in industrial clusters. The existing infrastructure varies among the different sites and its quantity is relevant to the age of the site and to the number of the established and incoming firms. According to ETBA, during the planning and the construction of the Industrial Areas considerable care is taken to promote the least possible degradation of the natural environment.

The total area of the Industrial Areas Programme was 47.3 sq.km in 1992, spread over 20 sites. The clear and usable industrial space is 33.3 sq.km. The rest is taken up by roads, free space and other infrastructure. The specific area of each site varies, but the average area of each is some 2.4 sq. km. The average usable industrial space in each is 1.7 sq.km, that is about 70%. This means that infrastructure and open spaces amount to about 30%, demonstrating that the Industrial Areas are of relatively low density and provide ample breathing space for the established firms. The infrastructure generally includes paved streets, area lighting, electricity and telecommunications provision, in most cases water and sewage provision, while in some cases a sewage treatment station is in operation. All the mentioned infrastructure is programmed for all of the sites.

From the clear industrial space of 33.3 sq.km, some 11.9 sq.km was occupied by established firms in 1992. Thus, general average space occupancy rate is some 35.9%. The occupancy, though, varies a great deal among the different sites due largely to the age of the site, its location and the level of infrastructure provided. While the Programme has been constantly expanding and enlarging its total space, this average percentage is in general, not particularly low. Of course there are regional differentiations both in the provision of infrastructure and in land sales.

To provide a general view of the basic features of the Industrial Areas, the operation date, the size and the detailed nature of the infrastructure provision for a selection of nine sites, are given in Table 6-1. These nine sites are under the authority of the local administration of the five Industrial Areas which comprise the survey's sample. This selection of sites has areas varying from 1 sq.km. to over 4 sq.km. All Industrial Areas have medium voltage electricity (220/380 V), telephone lines, paved internal roads and sewage. All have water supply except Iraklio on the island of Kriti. Street lighting is available in five out of the nine Industrial Areas and high voltage electricity in four. Iraklio, Patra and Komotini have a sewage treatment unit. Motorway connection is generally poor with the exception of Komotini, Xanthi and Volos. Finally, only Volos has railway connection. Bus connection and passenger train connection is generally not available to the Industrial Areas or markedly

Table 6 - 1: Some features of the provision levels in a selection of Industrial Areas

Industrial Area	Iraklio	Patra	Volos	Xanthi	Komotini	Tripolis	Larissa	Kalamata	Alexandrupolis
Date of Operation	1971	1979	1969	1981	1978	1981	1981	1986	1983
Total Area (sq.km)	1.47	4.05	4.44	2.00	4.33	1.62	2.50	1.09	2.10
Land Price (million drs/1000m2)	4.0	2.5	2.5	1.5	1.0	1.3	2.0	1.5	1.0
Infrastructure									
Internal Road Network	*	*	*	*	*	*	*	*	*
Water Provision		*	*	*	*	*	*	*	*
Sewage	*	*	*	*	*	*	*	u.c.	*
Sewage Treatment	*	*			*				
Refuse Collection			*		*				
Atmos. Pollut. Control									
Illumination	*	*	*		*	u.c.			
Std. Voltage Electricity	*	*	*	*	*	*	*	*	*
High Voltage Electricity	*	*	*			*			
Telephone Lines Availability	*	*	*	*	*	*	*	*	*
Sports Facilities									
Motorway Connection			*	*	*				
Railway Connection		23 km	*	7 km	13 km	3 km	12 km		15 km
Bus Connection		*	*	*	*				
Adjacence to Port	5 km	23 km	5 km	30 km	36 km				15 km
Adjacence to Airport	2 km	/ 23 km	/ 10 km	/85 km	/80 km		10 km		15 km
Administration - Services									
Administration on site	*	*	*		*				
Bank Services	6 km	23 km	*	6 km	13 km	3 km	3 km	7 km	15 km
Post Services	6 km	*	*	6 km	13 km	3 km	3 km	7 km	15 km
Health Services	*	23 km	*	6 km	13 km	3 km	3 km	30 km	15 km
Exhibition Hall	*				*				
Restaurant/Cafeteria	*	*			*				
Workforce Specialisation Centre			*						
Technological Research Centre			*						
Applicants Consultation staff	1		1						

'u.c.' stands for : 'under construction'

inadequate.

Amongst all twenty Industrial Areas, only two (Thessaloniki and Volos), have a research institute and a technological training and specialisation centre. These are not run by ETBA, but by private entities, with some help from the Greek Industrialists Club (ΣΕΒ) and the state. Seven of the twenty Industrial Areas have an on-site administration building. Where such a building is available the staffing varies from two to about ten. Support for the on-site administration is provided by the nearest branches of the ETBA bank. There are still a few sites where any kind of administration is over one hundred kms away. In the large majority of Industrial Areas, services such as a bank, post office, health centre, exhibition hall or restaurant are not available. A first aid centre is missing or is inadequate in almost all cases.

In none of the Industrial Areas is there a regular monitoring procedure of the levels of atmospheric pollution. Sewage monitoring is in operation in the sites having a sewage treatment units. A small 'green belt' of a few tens of metres is planned in some cases to surround the site and some care of the green features of the site is taken, mostly in the older established areas.

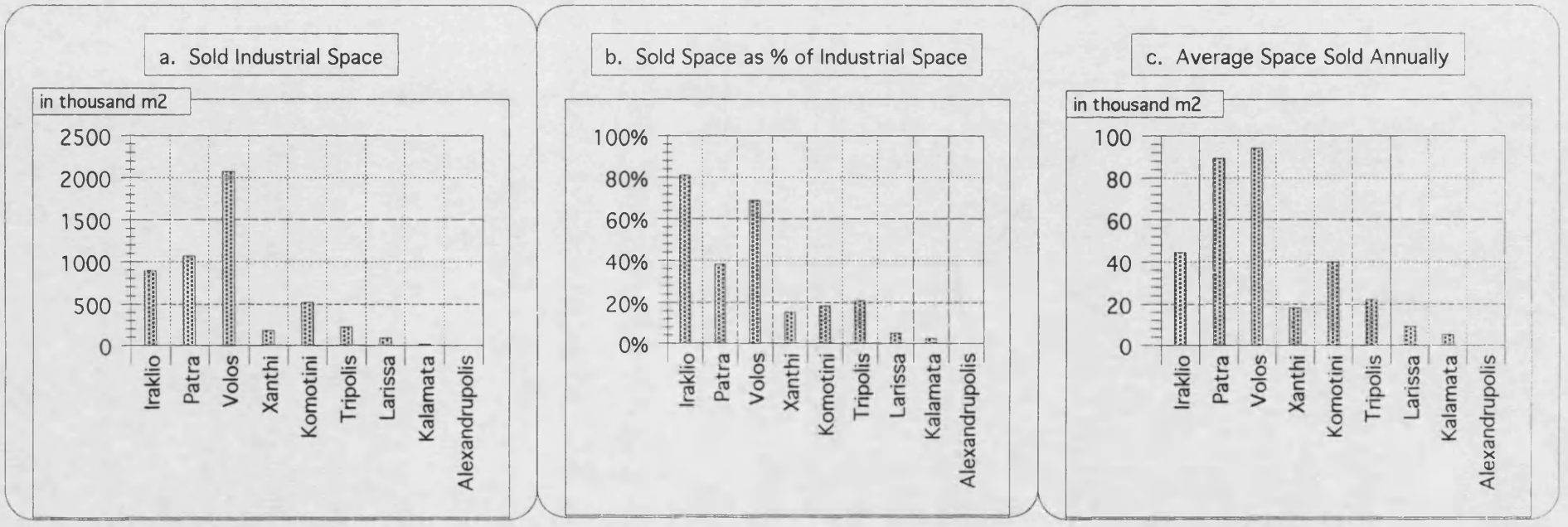
The industrial land prices in the Industrial Areas at present are around two million drachmas (i.e. £ 6000) per 1000 sq.m.; prices though do vary among sites. For example, land prices range from 4 millions in Iraklio, to 2.5 millions in Patra and Volos and down to one million drachmas per 1000 sq.m in Komotini. The main factors that affect the prices of land are the original land values that ETBA paid to buy the land, the amount of infrastructure subsequently provided and the attractiveness of the area and the surrounding land values trends. It should be understood that in cases of rapid increase of external land prices, as in Iraklio, ETBA would tend not to match these increases. Equally, when local land prices are falling, ETBA has to be competitive and follow the local patterns, as perhaps is the case in Komotini. In both cases this is quite costly to the bank. Even so the Industrial Area space in Iraklio is four times more expensive than that of Komotini. But surrounding land market values in the two regions may vary by ten times or more.

The land sales of the above selection of nine Industrial Areas are next presented in Table 6-2. There data show the industrial space available in each site and place the space sold to firms in comparison with the age of each site. Industrial Areas' performance can be measured from three aspects (Figure 6-1). The first measures the total industrial space sold to firms. This shows the importance of Volos, and then of Patra and Iraklio respectively. The second measures the space

Table 6-2: Area, industrial space and land sales in a selection of Industrial Areas

Industrial Area	Iraklio	Patra	Volos	Xanthi	Komotini	Tripolis	Larissa	Kalamata	Alexandrupolis
Total Area (in thousand m2)	1472	4050	4440	2000	4330	1620	2500	1090	2100
Total Industrial Space	1100	2804	3000	1200	2840	1060	1780	800	1460
Sold Industrial Space	890	1070	2070	180	520	220	90	20	0
% Industrial Space / Total Area	75%	69%	68%	60%	66%	65%	71%	73%	70%
% Sold Space / Industrial Space	81%	38%	69%	15%	18%	21%	5%	3%	0%
% of Sold Space, in Operation	85%	79%	93%	94%	85%	100%	59%	100%	-
Years of Operation (incl. 1991)	20	12	22	10	13	10	10	4	8
Average Space Sold Annually	44	89	94	18	40	22	9	5	0

Figure 6-1 : Sales of industrial space in a selection of Industrial Areas



sold as a percentage of each site's capacity. Here Iraklio proves the most advanced with 81% developed, followed by Volos at 69% and then Patra with 38%. The other sites of the selection are all below 20% of developed capacity. The third measures the average industrial space that was sold to the businesses on an annual base for each site. Here Patra is shown to match Volos, and Komotini to match Iraklio in the speed of space utilisation. This might imply that the high percentages of land sold in Iraklio and Volos are much a function of their considerably older age. In general, Volos effectively proves to be the most attractive Industrial Area of the selection, followed by Iraklio, Patra, Komotini, and then the rest. Alexandroupolis on the other hand proves to be a total failure. The reasons for this are not necessarily only geographical (it is in fact the sole prefecture with a land-border with Turkey) but also have to be organisational, since there is some growing industry in the geographical department of Evros, but this is outside of the Industrial Area.

As has been shown, the Industrial Areas are an ambitious Programme which has tried to provide affordable and operational industrial space in the Greek regions. The experience of the Programme shows that time is needed and that success does not come overnight. The conditions, though, in each site that are measured next in this survey may throw some light in the hows and the whys of the successes and the failures.

6.1.3 The Industrial Areas Programme's finances

The total cost of the Industrial Areas Programme from its start in 1968 to 1991 has been, at constant 1982 prices, over 40 billion drachmas, (or about £300 million, at the 1982 exchange rate). The sources of the finances were made up of some 71% (28.4 billion drachmas) from the ETBA bank, some 21.2% (8.5 billion drachmas) the Greek State, through the "National Investments Programme" (ΠΔΕ), and some 7.8% (3.1 billion drachmas) from the European Community (now European Union) through various funds and programmes, mainly after 1981 when Greece joined the EC. Details on the Programme's cash flows through time are analysed in depth in the following monetary evaluation chapter.

The annual running cost of the full Industrial Areas Programme was in 1991 around 500 million drachmas (£1.5 million). The local administration of each project bears the running expenses of the provided infrastructure and services and then allocates costs to ETBA and the firms. The running cost is calculated by each administration and statements are produced on a six-monthly basis. The costs are allocated to firms according to the space they occupy, to the size of their

employment and to the type and volume of their sewage. The running cost, in general, consists of the following four parts: a. Administration expenses, maintenance of infrastructure, landscape care and street lighting; b. Water provision expenses; c. Operational expenses of sewage treatment station, and d. Workshops expenses, where applicable (Table 6-3). In general the firms cover the sewage treatment and the water provision expenses, while the ETBA covers the salaries of the administration staff. The infrastructure maintenance is divided between established firms and the ETBA.

In Industrial Areas that are densely populated by firms, the ETBA proportion of costs is lower and this can be seen in Table 6-3. In Volos ETBA covers 8% of overall running costs, in Iraklio some 9% and in the case of Komotini 12%. For the specific administration and maintenance expenses, the contribution of ETBA becomes smaller in Industrial Areas that are densely populated by firms. Thus, the ETBA covers 8% of these costs in Volos, rising to 18% in Iraklio and reaching a high 69% in Komotini. It can be also seen how the price of water influences running costs, where drilling and pumping is involved, as in Komotini. In this case water expenses alone are almost as high as all of the running costs in Volos. In Iraklio there is no water provision for industrial use.

Administration has to play an important role as regards the interface between the attraction of capital and its allocation in Industrial Areas, especially at local level.

The selection criteria regarding applicant firms are as follows. Initially the fulfillment of the full legal requirements for eligibility according to the Industrial Areas regulation is checked. Subsequently, the economic solidity, credibility and estimated viability of the firm are evaluated. The employment creation potential of the applicant firm plays considerable role in the acceptance of a firm. Firms that already operate elsewhere wishing to relocate in the Industrial Areas also receive positive consideration. In general, applicant firms introduced to national incentives schemes receive positive consideration. In these cases the selection procedure is actually carried out by central or regional government departments. The local Industrial Areas administration generally accepts such firms, to the extent that the firm's needs in limited resources (i.e. water and space) can be covered.

A measure of the selection priorities as given by the local administrations at interview is shown in Table 6-4. What it seems to be the most important is the employment to be created. Almost equally as important, but a second priority of selection, is the profitability of the firm also expressed as expected economic viability. Less important comes the technological status of the firms. Export

Table 6-3: Structure of the running expenses (1991) of three selected Industrial Areas and their sources of finance

Running Expenses	IRAKLIO			KOMOTINI			VOLOS		
	Total	ETBA	Firms	Total	ETBA	Firms	Total	ETBA	Firms
Administration & Maintenance	19448	18%	82%	9821	69%	31%	30917	8%	92%
Workshops' expenses	1045	52%	48%						
Sewage Treatment	22560	0%	100%	19255	0%	100%	0		
Water	209	0%	100%	26132	0%	100%	0		
Total	43262	9%	91%	55208	12%	88%	30917	8%	92%

Values are in thousand Drachmas

Table 6-4: Priorities in the selection of firms for the sample Industrial Areas

	Measure of importance of each priority
Employment creation	18
Viability/Profitability	16
Technological status	11
Export potential	9
Production ties to existing firms	6

Measure is assessed from the relevant responds of the local administrators

Table 6-5: Rejections of applicant firms by reason, for the sample Industrial Areas, 1990 - 1992

Rejections by reason	All 5 sites	Iraklio	Patra	Volos	Xanthi	Komotini
Non-Viable	2	1	-	-	-	1
Incompatible to regulations	2	1	-	1	-	-
Lack of suitable space	1	1	-	-	-	-
Excessively polluting	3	-	-	1	1	1
Total number of rejections:	8	3	0	2	1	2

potential also gets few marks in the scale of priorities. As regards the production ties with any other established firms, administration of Volos indicated that it was the firms' own decision, not their's and this was the general view. As can be seen from the firms' selection priorities of the administration a rather low profile intervention stance and a somewhat tolerant selection process of firms is followed by the administrators.

The reasons for applicant firms' rejections given by the local Industrial Areas administration are grouped into some four main categories. A first rejection category is the 'non-viable' group of firms. Mainly, this has to do with firms not being adequately financed, but also some concern is given to unrealistic marketing and production costs. A second group of rejected firms is the one which requests space that the relevant Industrial Area cannot offer. This may involve large firms that physically would not fit, or others, where the suggested employment or development per area ratio seems to the local administration to be unfavourable. Next in the rejection list comes the polluting firms group. Such firms are usually not admitted to Industrial Areas, except if a special place for them exists. The last group of rejected firms is the one deemed to be incompatible with the Industrial Area regulations. This is a general group, in which belong firms that in regard some of their attributes, either in the nature of the production sector or in the mode of manufacturing, are incompatible with the regulations. (Table 6-5)

An analysis of the firms' rejections can possibly reveal some characteristics of the concerns of the various local administrations. Letting alone the incompatibility to regulations and the non-viability reasons, some indications can be understood from the lack of space and the pollution type of rejections. It can be seen that in Patra there have been no rejection cases lately. Patra is in need of firms. In Iraklio there have been rejections due to lack of space. The Industrial Area there is almost full, and expansion is possibly a too expensive option, due to the proximity to Iraklio itself which is only four kilometres away. In Volos, Xanthi and Komotini, there have been rejections on pollution grounds. The two latter areas seem particularly to be developing concern for their natural environment, during their transition from an agricultural to an industrial way of life.

Finally, an effort is made by administrations at the local level to match firms' specific characteristics and sector of industry spatially within the Industrial Areas space itself where possible. The creation of sectoral clusters is deemed desirable by the administration. The perception of the administrator of the Industrial Area of Volos, indicated through interview, is that 'neighbouring' may either give firms the opportunity to merge in the future thus creating larger and stronger ones, or just

maintains competition and encourages improvements. The Industrial Areas administration is also concerned over environmental pollution. In some cases it consults with and often receives pressures from local environmental activists as regards environmental impact. In other cases there are complaints from certain located firms (often food processing) on unwelcome environmental interactions by other (polluting) industrial establishments.

6.1.4 Employment and participation of firms in the Programme

The total number of persons employed in all the established firms in the Industrial Areas Programme in 1992 was around 20,700. In 1988 it was 19,000 and in 1982 it was 12,600. There were 627 established and operating firms in the Industrial Areas Programme in 1992; in 1988 the number was 477 and in 1982 it was 310. It can be seen that the Programme in general is increasing its size as regards employment. From 1982 to 1992, the total employment increased by 8100 jobs in ten years, or an average increase of 810 jobs per year. (Table 6-6, Figure 6-2 a)

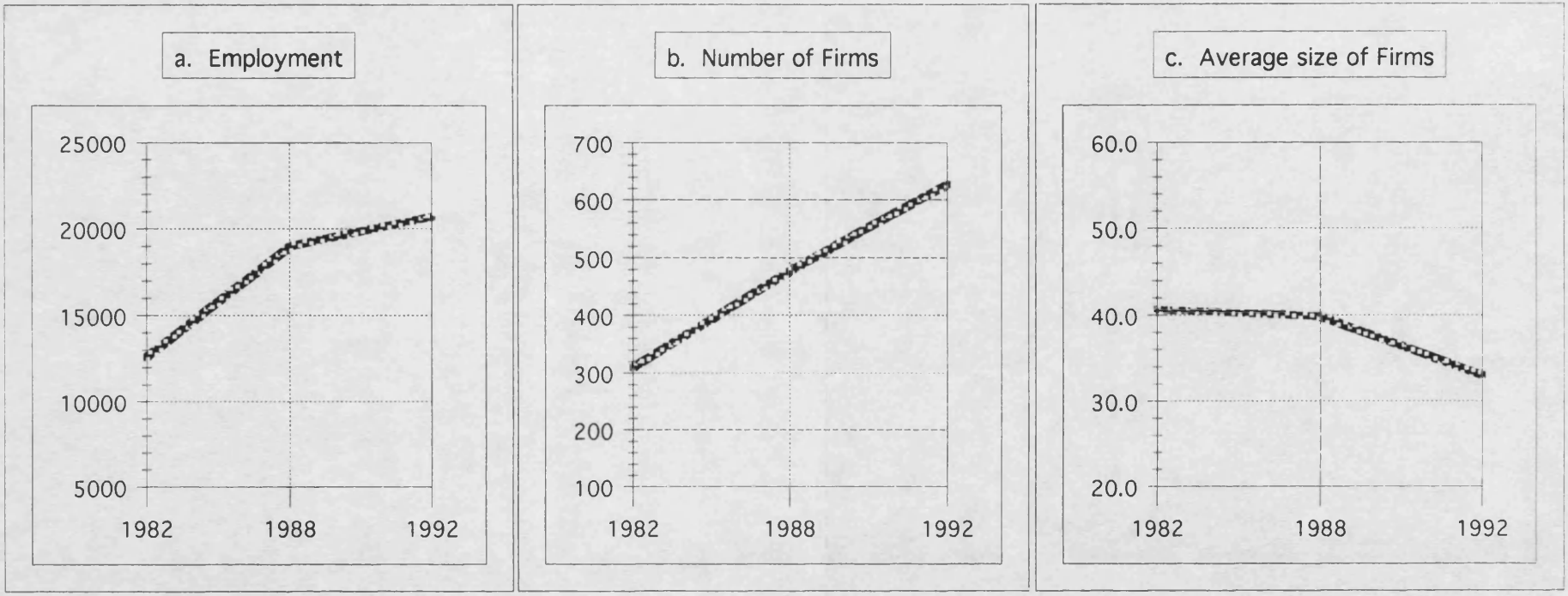
For the period 1982 to 1988 the average new jobs per year, though, was 1067, while for the period 1988 to 1992 the average annual increase was only 425. This seems to be a result of the general recession taking place in the period rather, as shall be shown, than a reduction of the attractiveness, or the efficiency of the Industrial Areas Programme. Put in percentages, an average annual increase of 6.75% was maintained for the six consecutive years of the period 1982 to 1988. This is by far higher than the national rates of increase in manufacturing for the period. As regards the period 1988 to 1992, an annual average increase of 2.14% in the employment of the Programme was experienced at a time of recession with practically no increase in employment in manufacturing at the national level. Thus, as a first evaluation indication it can be said that the Industrial Areas Programme on the whole has been successfully attracting employment to selected developing areas. Much more thorough evaluative procedures are reserved for the next chapter.

As regards the firms that participate in the Programme, there was an increase of 317 in their number, in the period 1982 to 1992, or that some 32 new firms were attracted on average every year. The rate was 28 new firms annually for 1982 -1988, but 37 for the period 1988 to 1992. The average size of the participant firms in 1982 was 41 employees, in 1988 it was 40, while in 1992 it became 33. (Table 6-6 , Figure 6-2 b and c)

Table 6-6: Total employment and firms' participation in the full Industrial Areas Programme, 1982-1992

Years	Employment	Number of Firms	Average size of Firms
1982	12600	310	40.6
1988	19000	477	39.8
1992	20700	627	33.0

Figure 6-2: Employment, number and size of firms in the full Industrial Areas Programme, 1982-1992



These facts give a hint of how the Programme has dealt the recession of the latter period. New smaller firms kept opening, at higher rates, while the large ones, had to reduce their payroll staff. The net employment result was positive, and a basis of more firms is created. This larger base is more modern and supposedly more flexible and given the opportunity, has the potential to expand its employment to much higher numbers.

6.2 Perceptions of infrastructure provision and views on satisfactory operating environments

6.2.1 Perceptions for the land values and transportation infrastructure

In the field survey questionnaire, firms were asked to assess the price of the land they bought in the Industrial Areas, given the infrastructure offered, and in comparison to other sites within the geographical department. The possible answers were: 'cheap', or 'advantageous', or 'competitive', or 'expensive'. An average of some 60% among the 55 firms that were asked characterised the price of the land as 'advantageous'. About 30% of the firms regarded the prices as competitive to other locations. Few firms, some 4 and 5% of all, regarded prices as cheap or expensive respectively. (Figure 6-3). Although most firms found the pricing of the industrial land offered to them by ETBA to be advantageous, many firms commented that at the time they bought the land, price was not cheaper than in other places and also, that they had to wait for considerable period until the infrastructure provision was completed. There are still cases where the planned infrastructure is not yet ready. But in general firms in Industrial Areas were pleased with the pricing aspects of their land purchases.

Various comments were made by firms as to the attributes of the location of the Industrial Area. Perceptions varied among different sites, as they were often considered to be too 'far' or too 'near' the city, or 'up' in the mountains. The fact is that in all three cases of Patra, Volos and Iraklio where a nearby port is available, the Industrial Areas are located several miles distant from the coast, and at a considerable altitude of between 300 to 900 feet above the sea level. Thus it is obvious that the potential advantage of an adjacent port is lost. As regards environment, in some cases the monitoring of the firms' sewage has caused

Figure 6-3: Land prices in the Industrial Areas as perceived* by firms established in the sample Industrial Areas

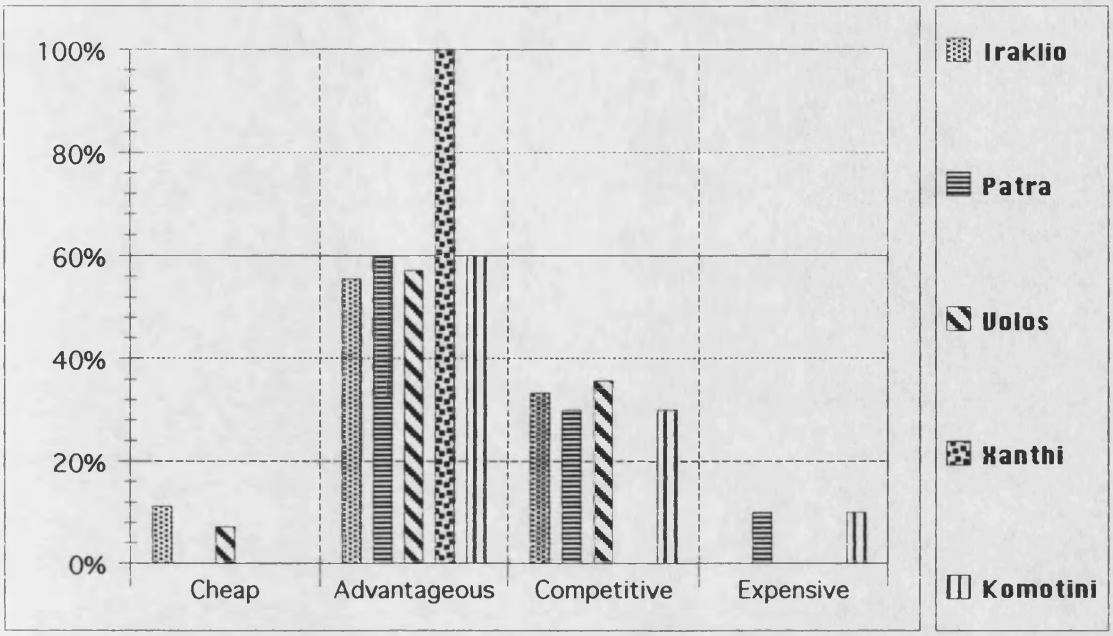
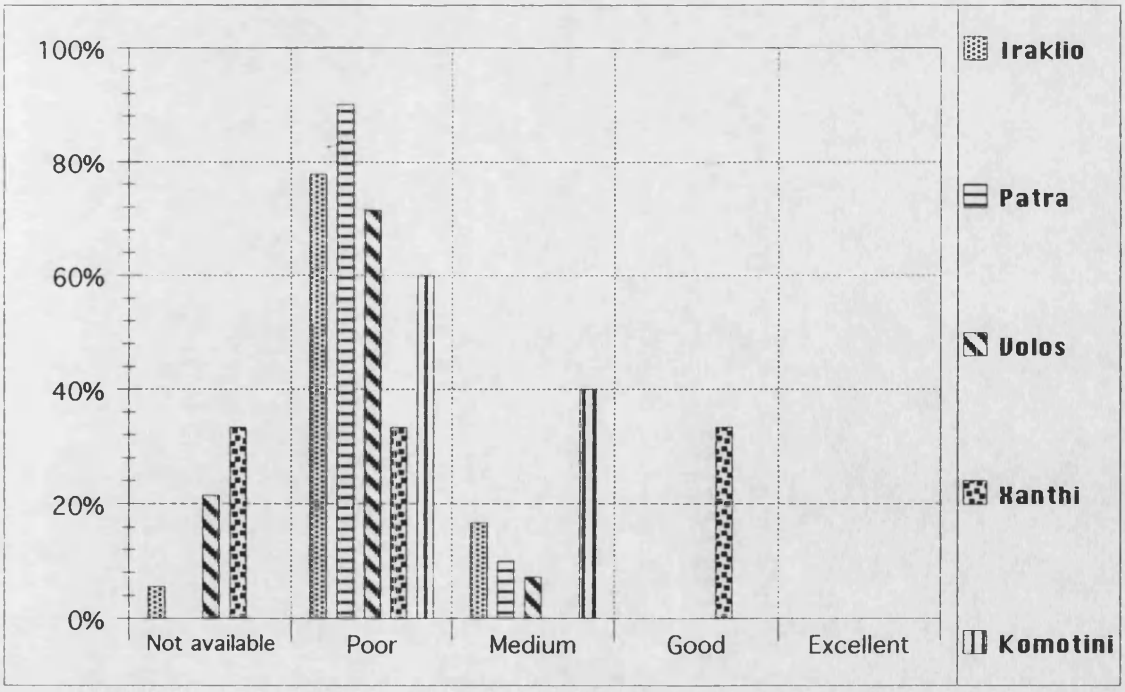


Figure 6-4: Evaluation* of the public transportation serving the Industrial Areas by firms established in the sample Industrial Areas



* Percentages show the proportion of Firms in each site that selected each 'attribute'

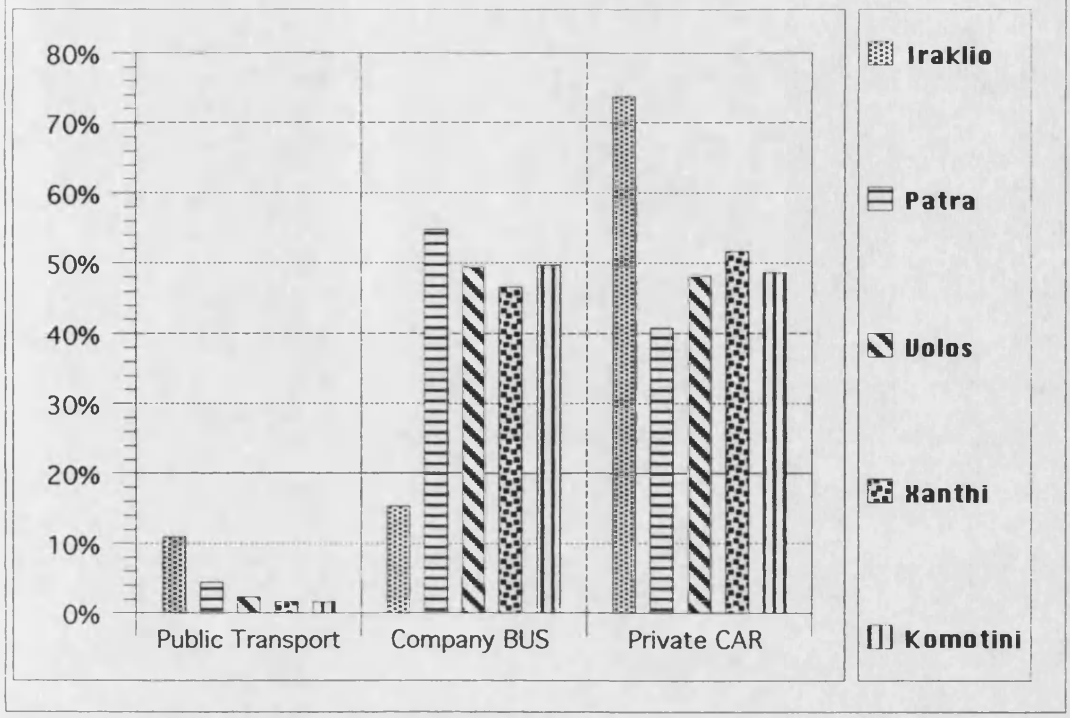
problems among firms and between firms and administration. In general, air pollution levels are perceived to be kept at low levels, though in most cases they are not monitored.

The large majority of the surveyed firms' executives evaluate the public transportation that connects the Industrial Area with the residential areas as poor and few as non-existent (Figure 6-4). The inadequate public transportation can be explained by the fact that the early established firms had to provide company transportation for their workers. The new firms that came had few alternatives but to follow the practice of the older ones. In most cases it has proved to be difficult for the public transport operators to follow the shifts timetables of the firms, or to provide an adequate continuous service to the Industrial Area. The present situation is that one bus may make one or two journeys in the morning and one or two in the afternoon. But in all cases the bus cannot cover extended areas and maybe different localities to collect the workers. Thus the private car becomes a strong option for work journey. Still, though, no congestion or parking problems have yet developed in the sites of the case study. Problems that are caused by this lack of public transportation, according to the firms' views are that the Industrial Areas remain unconnected to the nearby localities' life, in addition of course to the externality of higher transportation cost.

As regards personnel transportation, it appears that the large majority, about 95%, of the employees do not use the public transportation to go to work. (Figure 6-5). Instead, about 45% use the company buses and another 50% use private cars. It was observed that almost all firms with more than 50 employees provide company buses for staff transportation. Some smaller firms remarked that they give petrol allowances to their employees for their travel to work. It can be observed that in Iraklio, with smaller sizes of firms, the private car is the norm. In Patra, the private car is outweighed by buses that the larger firms provide.

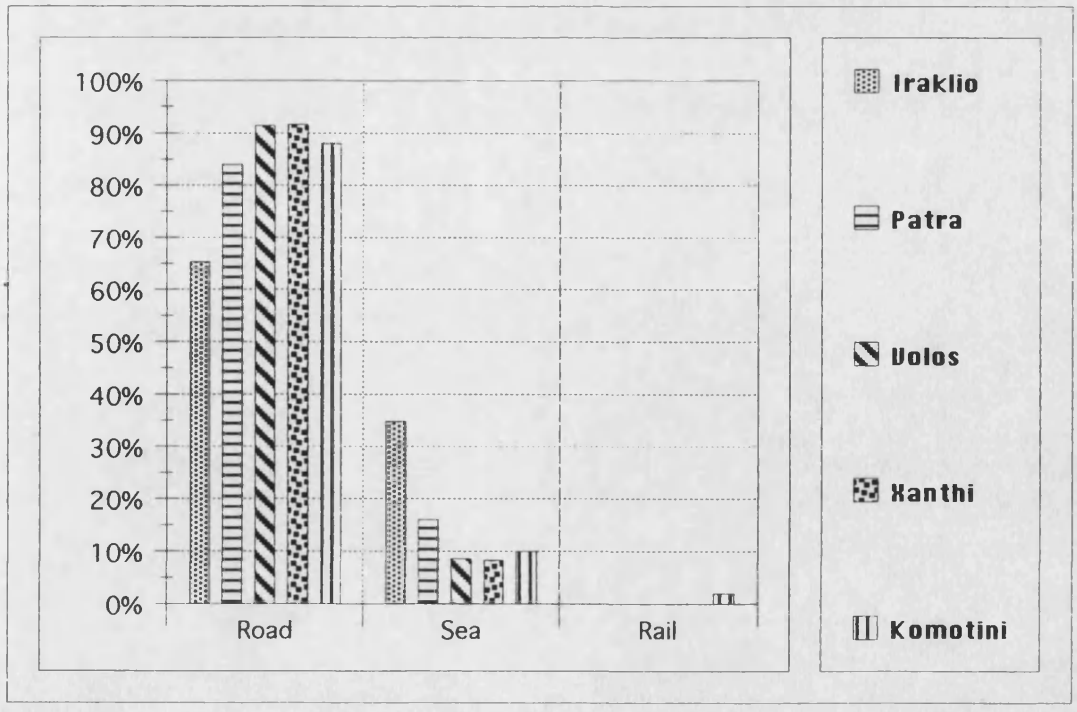
As far as transportation of raw materials and finished products is concerned, the situation is quite clear. The large majority of the products, that is on average 80%, are transported by road. The sea transportation is the second option and this varies from 10 to 35% according to the location of the Industrial Area. The largest percentage expectedly of necessity belongs to the island-based Iraklio. The railway is not at all favoured, and only in Komotini did it reach a two percent preference. Air transport is not used for goods in any case (Figure 6-6). Goods transportation modes are in all Areas road oriented, in part because the only Industrial Area with proper railway connection is Volos. But even there, the one main reason for not using the train that came up from the survey is the totally

Figure 6-5: Modes* of employees transportation to the sample Industrial Areas



* Percentages show average use of each mode, based on number of employees in each area

Figure 6-6: Modes of products transportation* from the sample Industrial Areas



* Percentages are computed as average (on Firms basis) use of each mode in each site

inadequate handling speed. In Volos, firms were asked to evaluate first the proximity to the firm's site to rail facilities, and second the speed and safety of products' handling by rail. Answers regarding railway proximity varied a lot from firm to firm. Numerical values were attributed to qualitative characteristics in order to be able to derive average opinions, in the following way. Zero score relates to inexistent facility, one to very poor, two means of low use or quality, three corresponds to moderate, four to good and five to excellent quality of the facility. This way an average score of 2.21 was produced, five being the best. Answers as regards quality of handling proved lower and more concentrated around the average score of 1.64 again out of five. In the other Industrial Areas, without railway connection, reloading to the train at the nearest railway station was almost never considered, given the inadequate local stations' facilities, on top of the above reservations. It also transpired from the survey, that railways have too limited a network for many firms' distribution necessities. Sea transportation practically is used only in cases where there is no other possible option.

The evaluation of roads infrastructure was made in three stages. First, the firms had to assess the roads quality within the Industrial Area, second, the existence of the roads connecting the Area with strategic points, and last the speed of the connecting roads. The five-sites' average of the internal roads evaluation is 4.04 points out of five, or quite 'good'. Figure 6-7 shows the detailed regional scores with their relation to the qualitative attributes. Scores of inside roads vary from 3.67 points in Xanthi to near 'excellent' 4.36 in Volos. As regards the Industrial Areas connecting roads, the five-sites average mark is 2.53, or 'moderate', with considerable variation from 1.33 points in Iraklio to 4.07 in Volos. The speed of the connecting roads is also generally evaluated at 2.66 points, or 'moderate', but widely varying from 1.44 points in Iraklio to 4.21 in Volos. The roads' evaluation question shows some real problems for the Industrial Areas. While the roads on-site are good, the connecting roads are often old, narrow, or going through residential areas and are thus congested. The result is that journeys are slow and travel times unreliable. This causes real problems in Patra and Iraklio. In contrast, Volos' connecting roads are very good.

Consequently, a hypothetical railway versus motorway comparison was set in the four mainland Industrial Areas that could have train connection. Iraklio is excluded since it is on the island of Kriti where there is no railway. Firms are offered five financial tokens to spend for improvements on the roads or the railway. In the four-area context, an average of 4.26 tokens went for the roads and 0.74 to the railways. Patra gave only 0.4 tokens out of the five for train improvements, Volos

Figure 6-7: Evaluation of roads by firms established in the sample Industrial Areas

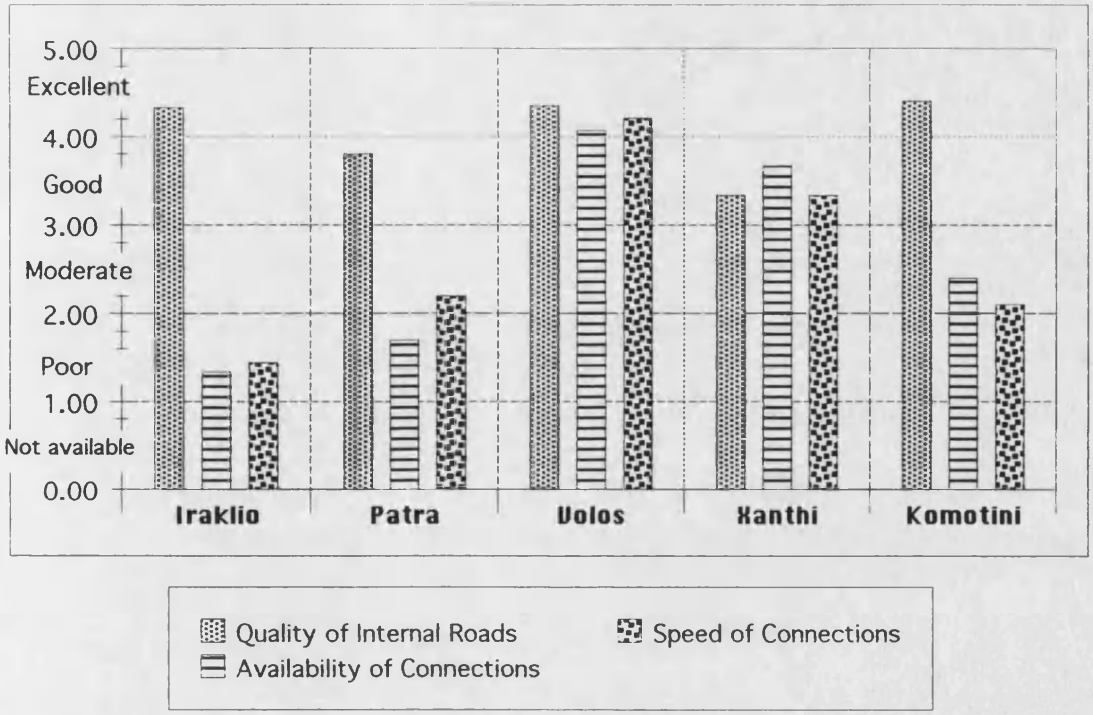
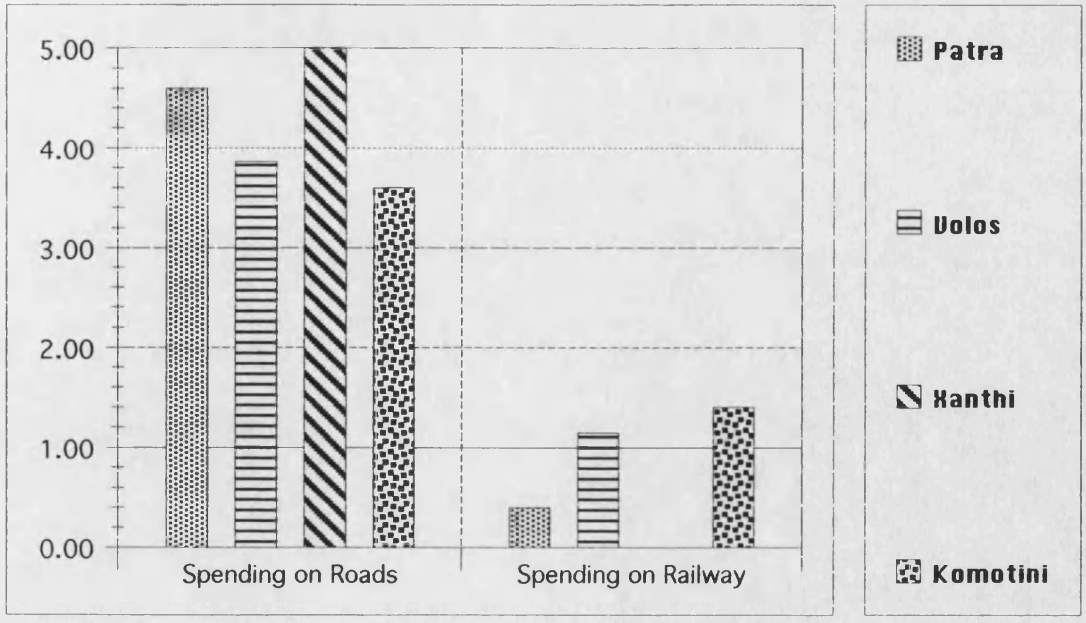


Figure 6-8: Hypothetical future spending on road and rail by firms established in four of the sample Industrial Areas



* Each Industrial Area's average spending of the five financial tokens available by each firm.

1.14, Komotini 1.40, and Xanthi zero (Figure 6-8). The roads versus rail improvements question reveals some of the firms' needs in different Industrial Areas. In Patra for example, where the site's road connection has proved to be inadequate, firms strongly demand improvements in roads. Relevant to this is that the railway gauge (width) in Patra, and the whole Peloponnissos, is narrower than the rest of Greece and Europe and further expenditure on this infrastructure is perceived of limited potential. Besides, Patra is rather southerly located and also has a port. In the case of the distant Komotini, with average road conditions, the need for better railways is relatively more strongly put. Firms using their own trucks perceive their transportation cost as being rather high. But in Xanthi, with slightly better roads and a hundred kilometres nearer to Thessaloniki, no money at all is allocated to the railway in the hypothetical analysis. Interesting enough is that in Volos, where road conditions are the best, firms start to consider railways improvements for cost reduction. The larger firms put this forward, as regards raw materials and especially exports and imports from Europe. (the situation in former Yugoslavia was not as serious at the time of the survey).

As a conclusion, in all cases roads have the main priority but the arguments about the railway are interesting and point to some potential contribution. Comments made in the survey suggest a better organisation of the railways as a prerequisite, but several firms are pessimistic as regards the chances of creating a reliable and cost-effective railway service.

6.2.2 Telecommunications and power infrastructure

Firms were asked in the questionnaire how many telephone lines they have and how they are spread among telephone, fax, telex and datalines. From this, an index of the 'number of telephones per firm' shows the firms' orientation to the telephone, but without considering the employment size of the firm. To achieve this, an index of 'employees per telephone line' was computed. It shows the intensity of the use of telephone in each Industrial Area, without being affected by the size of the established firms. It also gives an indication of the type of industries that are established in each area, and their telephone orientation.

It appears from the survey that the average 'number of telephones per firm' index was about seven lines per firm and did not vary much among the Industrial Areas that were surveyed (from 5.2 in Komotini to 8.6 in Xanthi). The 'employees per telephone line' index though, varied considerably, from 5.4 in Iraklio, to 19.1 in Volos (Figure 6-9). This shows that the larger firms as regards employment make more 'economic' use of the telephone. For example, the average

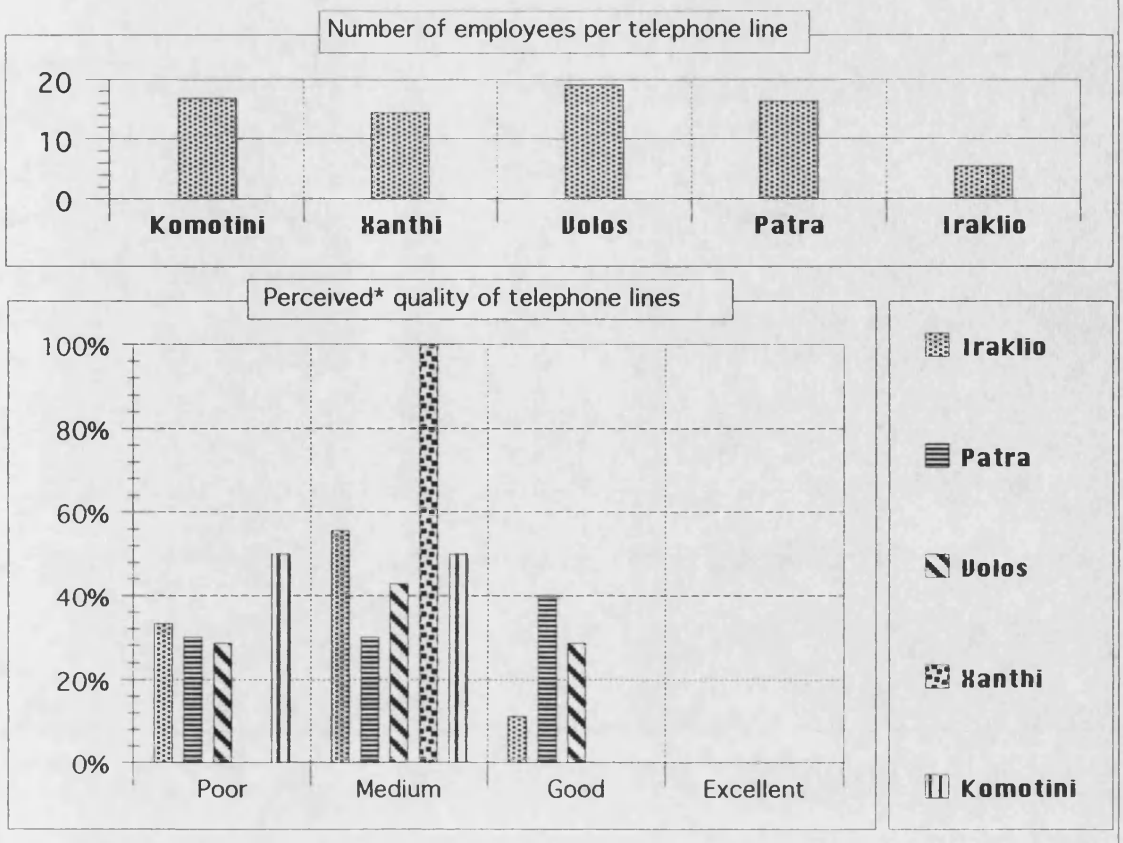
firm size in Iraklio is much smaller than in Volos, or Patra. Iraklio needs 3.5 times the lines Volos uses, or three times those of Patra, for a given amount of employment, thus loading analogically the local networks.

After these quantitative questions, an evaluation of the quality of the telephone connections provided was attempted. Firms were asked to give an average number of failing attempts for one long distance call. From this, a 'long distance call success' percentage was extracted. It proves that the best quality of telephones is in Patra, with 63% success rate, Volos follows with 58%, Iraklio 37%, Xanthi 31% and Komotini with only 22% of success. The indication of 'economical' use above, is currently justified. In Volos and Patra the efficacy of the telephone connections is higher than the equally developed but overloaded Iraklio. Of course economic use of the telephone by the industry could never countervail the low quality of the lines in some areas including the distant regions of Xanthi and Komotini. The average success rate among the surveyed Industrial Areas is only 42%. On the same issue, perceptions of overall quality were collected, with results relevant to the above. In Patra 40% of the firms regard telephone lines as 'good', for Volos the percentage is only 30% and in Iraklio even lower at 12%. Lastly it is an important finding that no firms perceived telecommunications as 'good' in Xanthi, or Komotini. Figure 6-9 provides the perceptions in detail.

Firms were also asked if they suffered operational and entrepreneurial problems due to the general inadequacy of the telecommunications provision. In general, 30% answered 'no', 26% declared 'small' problems, 41% 'considerable' and 3 percent 'serious' problems. Considerable problems were declared by 80 % of the firms in Komotini, 33 % of the firms in Iraklio and Xanthi, 30% of the firms in Patra and 21% of the firms in Volos. In the case of Komotini, one firm owner commented that if they need about four attempts to make a long distance call and they need to make fifty a day, they need all the staff of their offices to do nothing but deal with the phones and the fax all day. But even in the other areas, such difficulties are a considerable unnecessary handicap to the efficient operation of business.

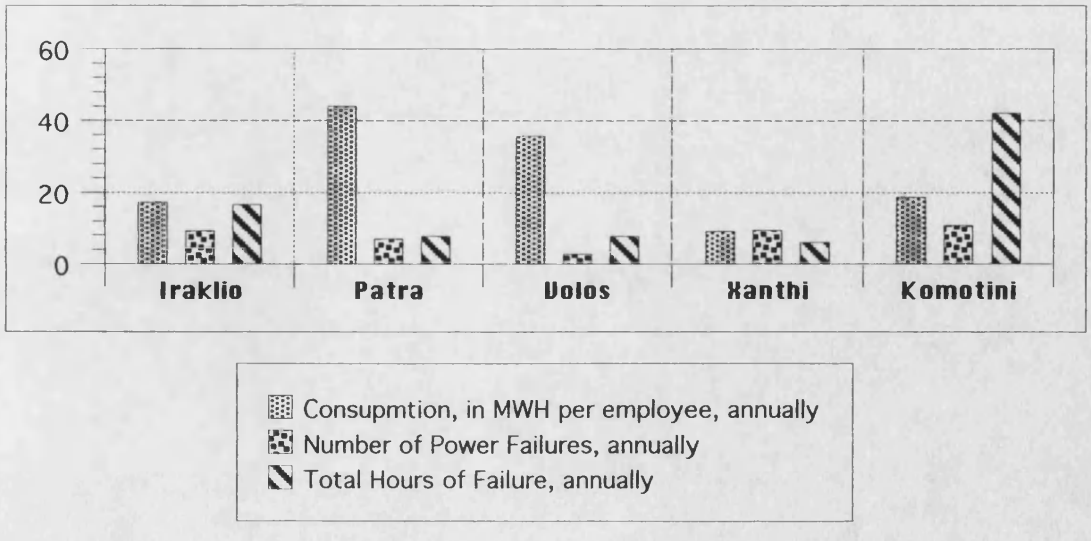
In terms of power infrastructure, the firms were asked about their monthly electrical consumption. This magnitude of use, of course, varied a lot from firm to firm. Figures reveal consumptions from 1.5 to 1740 MWH per firm, per month, and the general average of the sample is 232 MWH. It was found out that the average firm in Iraklio consumes some 60 MWH monthly, whereas in Xanthi the figure is 93, in Volos 393 and in Patra 456. Subsequently, in order to produce a less company-size biased measurement of electricity consumption, each firm's employment was used and an index of electricity consumption per employee was produced. The

Figure 6-9 : Use and quality of telephones, as perceived by firms established in the sample Industrial Areas



* Percentages show proportion of Firms in each site, that voted for each attribute

Figure 6-10: Electricity consumption and reliability of provision as perceived by firms established in the sample Industrial Areas



measurement unit is made to show MWH per employee, annually. Thus, it turns out that in Xanthi 9 MWH per employee are consumed on average, in Iraklio the figure is 17.2, in Komotini 18.6 , in Volos 35.6 and in Patra 43.9 (Figure 6-10).

From the electricity consumption questions it can be seen that there is a considerable difference in the types of firms and their activities, amongst the different Industrial Areas. The typology shows that the Area in of Iraklio, occupied predominantly by small firms, gives the smallest average energy consumption per firm. But the energy per employee is not the lowest, actually it is double than the lowest scoring Xanthi. This gives a hint that small firms can also have capital intensive production methods, in some cases to a much higher extent than in larger firms. The power consumption data also characterise the Industrial Areas according to their modes of industrial production as can be clearly seen in the cases of Volos and Patra. In these areas large capital intensive industries have been established, and the power consumption is several times higher than in the light industry of Iraklio, Xanthi and Komotini, either measured on a firm or on an employment basis.

The reliability of the electricity supply was also assessed. Firms were asked how many times per year they have electricity cuts and how many hours these last. It turns out from survey that in general, there are 8 power cuts per year and these amount to about sixteen hours, in total. But results vary among the different Industrial Areas (Figure 6-10). Thus, in Volos there are three cuts per year summing up to less than eight hours; in Xanthi and Iraklio six power cuts, lasting in total for six and sixteen hours respectively; in Patra seven, lasting less than eight hours; but in Komotini though, these are eleven, lasting forty two hours in total. Firms have installed electricity generators for emergency use, ranging from 11 to 60%, among areas and at an average of 40% for all five areas. From the data it proves that in the distant area of Komotini and to some extent the islandic Iraklio, this part of the infrastructure base is causing some problems. As a matter of fact, it also demonstrates that where the largest electricity customers are established, there the electricity supply proves to be more reliable. An interaction of supply and demand can be clearly seen. The large heavy industries using a large amount of power tend to establish in areas with proven efficacy of such provision and this in turn means that the National Electricity Enterprise invests more and better maintains the lines feeding these substantial demand clusters.

6.2.3 Site safety and security, work safety, landscape and environment

Firms were asked to evaluate the safety of their respective Industrial Areas

as regards fire safety, night security, organisation of safety drills and seminars. In Xanthi all kinds of such infrastructure are not in operation. In the one to five scale described above, the situation in Iraklio is rather similar, with fire at 1.11(no water), night at 1.33, and drills and seminars at 1.0 (only planned). In Komotini there proves to be adequate fire infrastructure, getting a mark of 4.0. In Patra there is some fire infrastructure producing 1.4 marks out of five. In Volos, there are some safety seminars indicated by a mark of 2.71 but drills get 1.14 out of five. Fire infrastructure is indicated by 2.57 marks and night security by 1.29, all out of five. **(Figure 6-11)**. Existence and quality of such infrastructure is in general limited. As regards Iraklio, for example, there is no fire piping or plugs for the simple reason that there is no water available in the Industrial Area. But also there are no fire brigade or fire engines available on site. In all Areas there is no night security; the only relevant infrastructure provided is the night illumination of the estate. The common situation of either non-existent or low capacity or quality security and safety infrastructure causes several problems to the established firms. They all have to undertake the security and safety measures for themselves, and presumably at substantial cost. This is regarded by many firms to be a considerable disadvantage of location in the Industrial Areas, compared to firms located in the urban agglomeration, which influences their operating cost equation.

Subsequently, firms were asked to evaluate the efficiency of the on site first aid / health facilities. In Xanthi and Komotini there is no such facility at all. Overall, care of the employees health proves in general inadequate. It can be seen that the best perception of such provision is in Iraklio, and to a lesser extent in Volos. But in both places such facilities are mainly characterised as inefficient (Figure 6-12). At best, there is a small surgery with a nurse and a visiting doctor for four hours in the morning (Volos, Iraklio). In other cases there is just an ambulance on site (Patra). There are also cases, like at Xanthi and Komotini, without even an ambulance on site. Large firms there, undertake the cost of a surgery and a full time doctor on their premises. But small firms can not undertake these provisions. Firms in all cases claim that a health station, operating for twenty four hours, providing health counselling besides the first aid in case of an accident, would improve considerably the quality of the operating environment.

Landscape care and recreation facilities, as is demonstrated from the firms' answers are either not existent or firms do not recognise them, since in general firms declare by 93% that there is no such provision in their respective Industrial Areas. In Iraklio, Patra, Xanthi and Komotini, firms are by 100% convinced of the absence of such provision. In Volos the same index is 71%. Firms tend to be positive

Figure 6-11: Site safety and security perceived by firms in the sample Industrial Areas

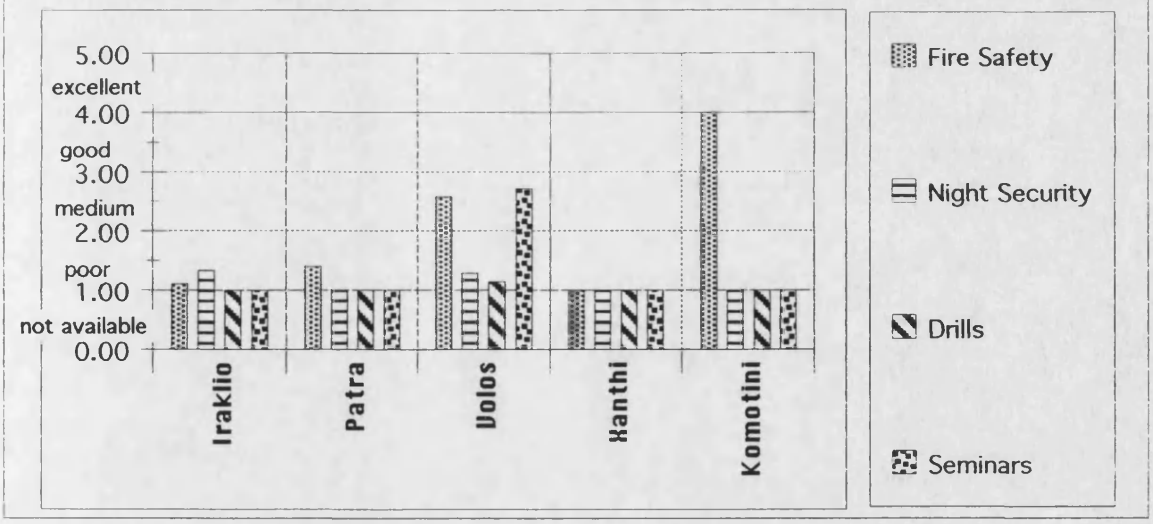
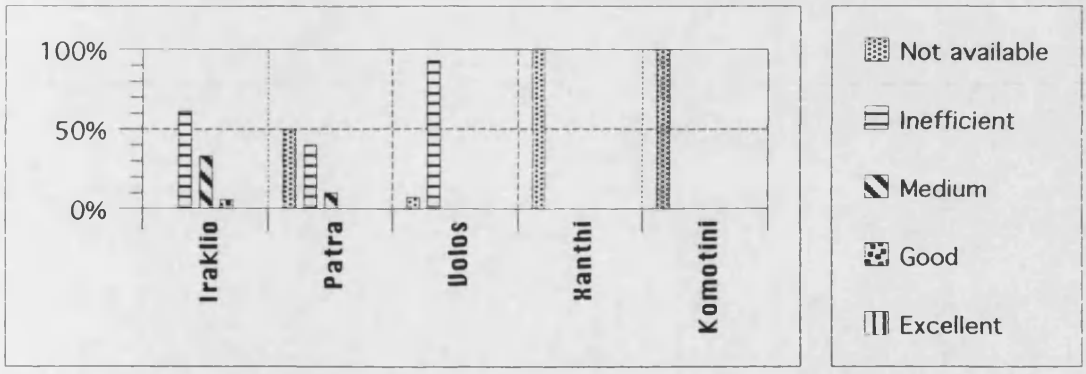
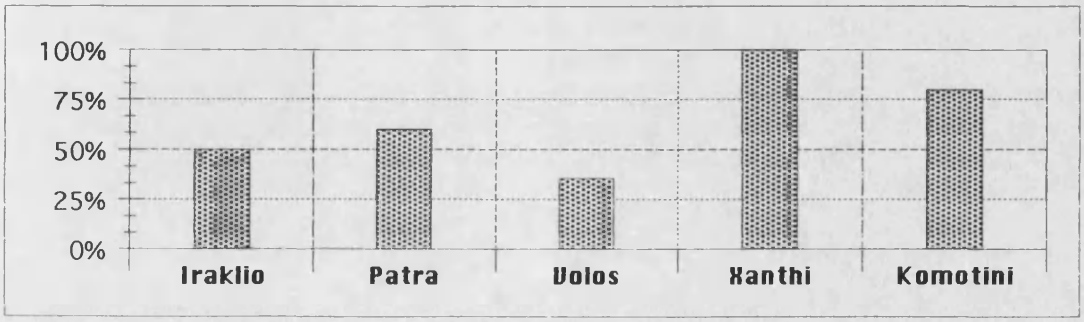


Figure 6-12: Efficiency of First Aid / Health Centre as perceived by established firms in the sample Industrial Areas



Percentages show proportion of firms, in each site that voted for each attribute

Figure 6-13: Firms willing to share costs of seminars on safety of work in the sample Industrial Areas



Percentages show proportion of firms in each Industrial Area

for landscape care and recreation facilities provision in the Industrial Area. In total, some 68% of the firms declare a willingness to pay a share for such provision; percentages though vary, from 100% in Xanthi, to 79% in Volos, 64% in Iraklio, 60% in Komotini and only 40% in Patra. Regarding to the issue of landscape care and sports facilities, some firms are very keen for such provision. One firm in Iraklio indicated that it would construct some common-use recreational provision itself, if required, implying fears that the administration would charge higher rates for this. Larger firms sometimes provide such facilities in their own grounds and would not want to contribute for such infrastructure for common use, partly due to their larger percentages of the Industrial Area running costs.

Lastly on this theme, firms were asked if seminars on safety of work are organised in their Industrial Area. Answers were negative, by one hundred percent in all cases with the exception of Volos. There 21% of the firms participated in some way on such seminars. The follow up question of whether firms would share the cost of such seminars had a positive answer by 65% overall. In Xanthi 100 % of the firms would be willing to share the costs, in Komotini 80%, in Patra 60%, in Iraklio 50% and in Volos only 36% where there already was some provision (Figure 6-13). In some cases, large firms especially, (Patra, Volos) organise their own safety of work seminars. This is one reason for a few of them not being willing to contribute for such seminars. Other reasons given from smaller firms (Iraklio) are that their production is too specific for general seminars and that they are afraid that such seminars might prove a failure. But still, some of the large firms, and some of those established in Volos, where some seminars took place in the past, are willing to contribute.

The levels of atmospheric pollution are not officially measured in any of the Industrial Areas. This is also what all firms declared in all cases. To the follow up question about whether it should be measured, firms generally gave a positive answer in 65% of the cases. In Patra, all of the firms agreed that measurements of atmospheric pollution should be made. Firms in Volos agreed by 93 %, in Iraklio the figure was 61 %, in Komotini 60 %, but in Xanthi it is interesting that no firm considered it necessary. It is interesting that the more environmentally concerned firms prove to be the larger ones and the ones near the larger urban centres (Patra and Volos). Firms in distant areas or in regions with little industry, do not see the need. In the latter areas firms gave the reason that industry at the moment is not enough to cause damage. But also it can be assumed that not enough pressure exists from the neighbouring urban centres on this issue and that the distant areas may be more dependent on the little industry they have (Xanthi, Komotini). The

small, individualistic type of industry (Iraklio) is less keen on being controlled.

6.3 Encouraging technological change and deployment of new technology by the participating firms

6.3.1 The efforts and limitations of administration in promotion of new technology

As described earlier, the Industrial Areas provide developed space for industrial use on the outskirts of regional agglomerations. The market for such space is by no means a one-sellers market, since peripheral regions do not have serious space limitations, and because the establishment of industry anywhere in their territory is also supported. In such a situation a firm's preference for establishment in the Industrial Areas is often based on two reasons. First, on the proportion of incentives for establishment in the Industrial Areas that exceeds the regional amounts, and second on any operational advantages that the Industrial Areas offer. In the cases where the above are not considered important, demand is bound to be moderate and the Industrial Area's administration has little power to enforce controls and of course to impose technological level requirements.

The firms' selection procedure made by ETBA does not include specified technological standards as a condition for admission to the Industrial Areas and relevant evaluation is not made. The current set-up of the Industrial Areas Programme does not centrally incorporate any technological department and there is no centrally organised technological guidance or help scheme. Such efforts are left to other central public entities, to the local actors' and firms' initiatives, and to the local Industrial Areas' administration. As regards the latter, field research showed no staff or resources for this purpose. According to the answers of the Industrial Areas' administrators the selection procedure for new establishments does not seem to give high priority as regards the state of technology to be used. What it seems more important is that employment be created. This seems to be their principal policy criterion, but up to an extent it can be seen that a more strict policy might prove costly. A possibility of empty Industrial Areas could well harm the bank's actual cash flows. As it was shown earlier, in Patra there have been no rejections of firms at all; in Xanthi only one. These projects are not full by far, as was shown previously.

Administration at the local level was asked of any specific efforts they make

in an attempt to improve the technological status of the established firms. None of the local administrations can provide technological consultation to firms. In Patra there is an agreement between the Industrial Area and the local University for cooperation on technology matters. The progress is slow, if any, as no results were mentioned by the administration. In Iraklio there is a late effort to promote contacts of the Industrial Area with a private technological institute, and the local University. The scheme is recent and does not have a clear setup and organisation. Here, the Industrial Area administration possibly lacks the organisational capacity for a well structured cooperation of this kind. In Volos a technological institute specialising in metallurgy and related fields is successfully operating. In most other Industrial Areas, excluding Thessaloniki, cooperation with technological institutions is non-existent.

Local administrations are keen on educational visits to the site. These are organised from time to time in cooperation with local schools and universities. (Table 6-7). The aim of the organised educational visits is familiarisation of students with industry and possibly fruitful interactions between firms' engineers and students of relevant research interests. Again, here arrangements are made on occasional rather than on a regular structured basis.

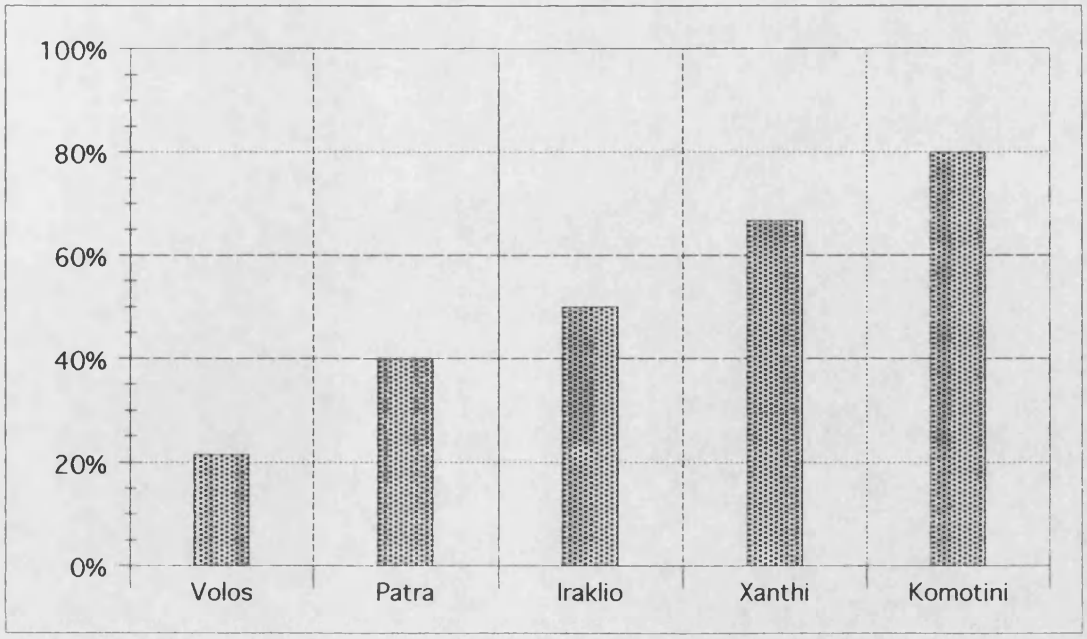
However the local administration does regard the technology used in the Industrial Areas as equal or superior to the rest of their respective regions. In Iraklio, Patra and Komotini, the interview answers suggested 'superior' and in Volos and Xanthi, 'equal' levels to the surrounding region in this respect. Consequently administrations estimate that in all cases, except that of Xanthi, that the Industrial Areas by far attract the technologically developed firms. (Table 6-7). From these estimations the following can be marked. In the recently industrially declining region of Achaia, the firms in the Industrial Area of Patra are regarded to be technologically ahead. In the case of Iraklio the perception shows that even in rapidly growing areas, still the Industrial Area manages to be technologically ahead of surrounding counterpart activities. The same happens in the distant and less developed Komotini, where any new or relocating firms would establish in the Industrial Area. By contrast, in Volos, equal levels mean that several technologically advanced firms are also out of the Industrial Area. The region has an old established extensive industrial base which is currently making restructuring efforts. In Xanthi, the Industrial Area is at an early development stage, perhaps too young to gain technological leadership from older established firms. In no case though, the Industrial Areas are concentrating technologically lagging firms.

It seems as if it is too difficult a task for the Hellenic Industrial Development

Table 6-7: Local administration efforts and perceptions about technology in the sample Industrial Areas

	Educational visits to Industrial Area per annum	Local Administration perceptions of technology in Industrial Area, compared to rest of Region	of Industrial Areas attraction to technologically advanced firms
Iraklio	4	Superior	High
Patra	6	Superior	High
Volos	6, including 1-2 international	Equal	High
Xanthi	4	Equal	None
Komotini	4	Superior	High

Figure 6-14: Local conferences on technology as perceived by established firms in the sample Industrial areas



Bank (ETBA) to offer the privilege of location in the Industrial Areas mainly to technologically advanced firms. If it were able to operationalise this, it could prove an incentive for innovation for all firms. The reasons of this lack of influence can be due to financial and other constraints as explained. It must be concluded that there is a marked inadequacy in provision of technological assistance for the part of the Greek manufacturing industry ETBA accommodates in the various Industrial Areas. There is a questionmark on whether the potential effects of such a policy realisation are not yet estimated, or not appreciated as a determining priority by the central decision making bodies.

6.3.2 Technological levels and innovation in practice

While the Industrial Areas offer limited technological assistance, an average of 81 % of all the firms do receive external, private technological consultation. In the case of Volos there is a technological consultation and research institute specialising in metallurgical issues actually located in the Industrial Area. In Volos metal and related industries are the dominant sectors. Some 36 % of the firms have received technological help from the institute, while 29% of the firms had longer term cooperation, that is hiring the institute for specific research on their behalf. Given the institute's specialisation constraint, the percentage of firms taking advantage is significant. The firms in Volos found it useful to have this technological research institute available on site. But as regards the total sample surveyed (fifty five firms in five sites) a mere 7% were receiving technological assistance within their Industrial Area, and all of these were in Volos.

The technological consultation costs vary, of course, according to the firms' sizes, sectors and orientations, but the general average costs per firm, amongst the firms that gave data for this cost, was 3.9 million drachmas, (or £ 12,000) annually. It transpired from the interview answers that the firms receiving technological consultation generally belong to one of two categories. First are those that buy such services independently. Second are others that cooperate with larger firms, often abroad, or are subsidiaries of such firms, both receiving technology as packages from their supervising firm. Other, mainly smaller firms, do not receive technological consultation by specialising experts, but by their machinery dealers or suppliers. This is a common situation in the cases of minor changes of their machinery. The new technology installed should be compatible with the older and usually is of the same brand, or simply installation and compatibility is guaranteed by the same dealer.

Firms in general, attend on average between one and two conferences or

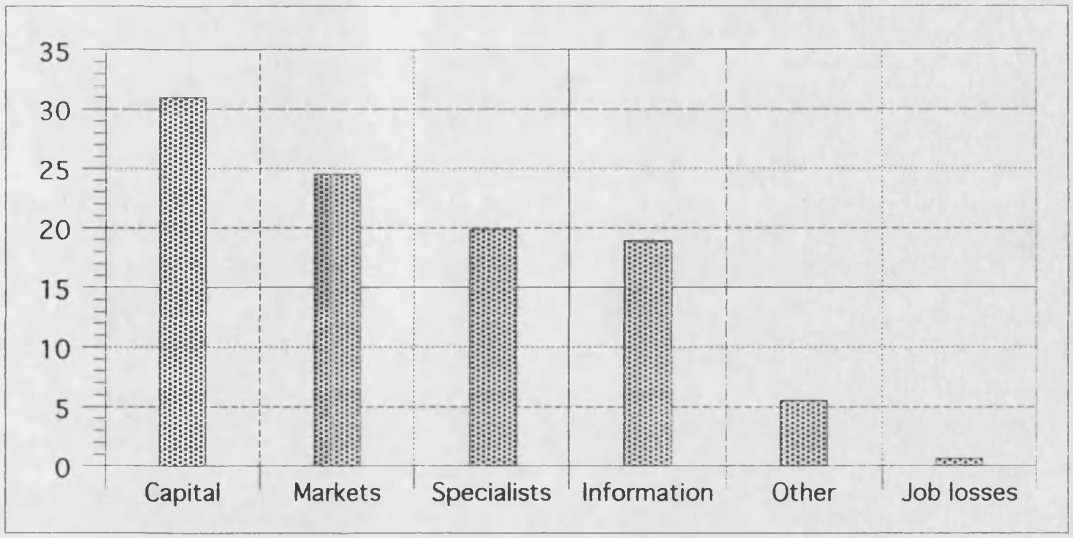
exhibitions on technological issues annually. But this does not apply to all, since 21 out of the 55 firms normally do not attend such meetings. In the question how important would it be for the firms if the Industrial Areas organised sectoral conferences, 52% of all firms answered 'very important'. This was 80% at the distant Komotini, 67% at the nearer Xanthi, 50% in Kriti, 40 % in Patra and 21% in Volos (Figure 6-14). Some 30% of the firms in Patra surprisingly declared 'not interested'.

It becomes clear that the smaller firms want conferences more than central and large firms do. In peripheral areas, firms unquestionably would like to see conferences in their own region. The reasons are that smaller firms want to externalise the information costs as much as possible. These costs are for small firms comparatively higher, especially if they are independent and do not have a technology flow from master firms abroad. This is even more evident in firms trying to export their products. Larger firms, in Volos and Patra would be less interested, since they often have an oligopolistic situation in the Greek market and usually use unrivalled technology within the Greek boundaries. They usually cooperate with specialists abroad and many of them are not export oriented.

The most important prerequisites for the latest technology adaptation and use were then traced. Firms were asked to indicate the necessities if they were to install or utilise leading edge technologies. The question proposed five structured answers and one open, while the firms had two votes. From the answers of all fifty five firms 'capital' is regarded as the most important prerequisite and collects some 31 votes. The second most important factor, with 25 votes, proves to be the existence of 'markets', for the products to be produced. Lack of 'specialists' for the latest technology adaptation, including lack of skilled labour for its handling is also put forward, with 20 votes. Lack of information on technology issues gets 19 votes and the issue of job cuts as a necessity is only proposed by one firm. Other suggestions were made in six more cases; an interesting one is international cooperation in technology matters and the other can be related to the information or capital (such as state support) broad categories (Figure 6-15).

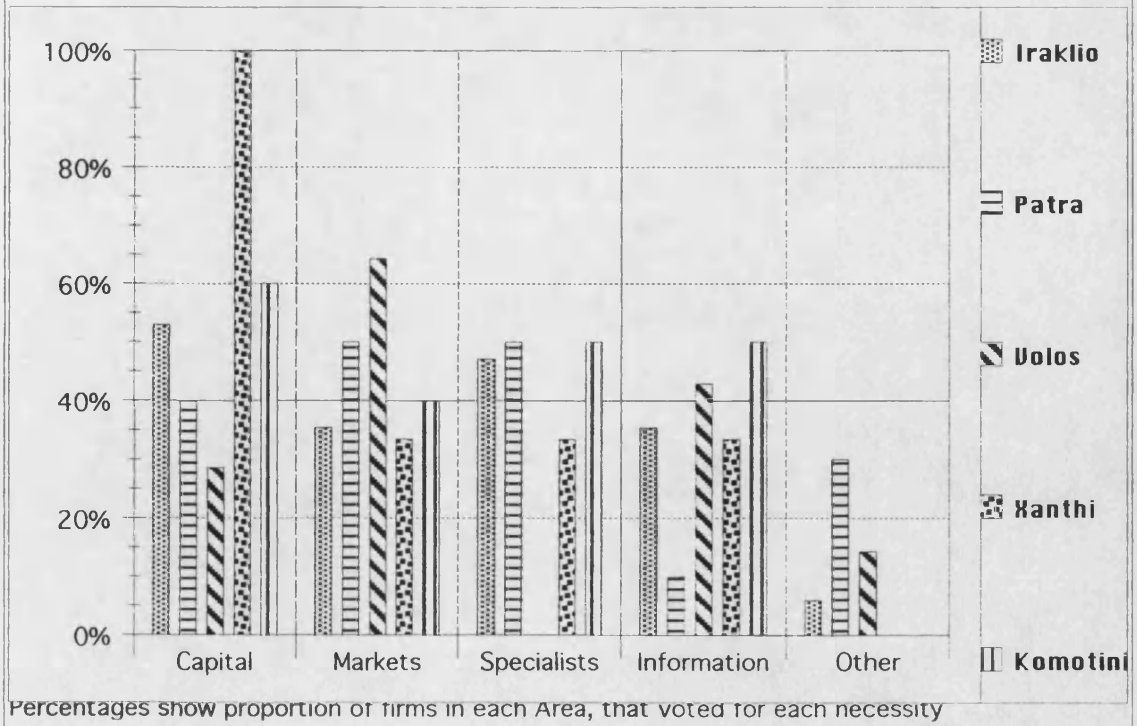
The above preferences show interesting variations among the different Industrial Areas as shown in detail in Figure 6-16. For example, in Xanthi capital is suggested by 100 % of the firms. Iraklio also needs capital, recognised by 53% of establishments. In Volos the prime necessity is markets for the products, by 64% of respondents. In Komotini the issues of 'information' and 'specialists' abundance both get 50%. Patra needs 'markets' and 'specialists' both mentioned by 50% of the firms, but little 'information' (only 10%). The question reveals the firms' concerns in

Figure 6-15: Necessities for use of latest technology as perceived by all sample firms



Number of votes for each necessity; from all 55 firms, two votes per firm.

Figure 6-16: Necessities for use of latest technology as perceived by firms established in the sample Industrial Areas



Percentages show proportion of firms in each Area, that voted for each necessity

the different areas. Firms in industrially developed areas (such as Volos or Patra) claim to be using quite modern technology. In Volos, from the interview discussion it came out that a costly marginal change towards the edge technologies, would lower the production cost only a little and would only be justified if large contracts were undertaken. Thus the operators here mainly seek markets for their products. In Patra, industries feel they are also in need of markets, but also of specialists, that are not available to the extent that the industrialists would like. Patra compared to Volos has no technological research institute on site. The local University, while rather oriented towards technology, has not proved to be adequately linked with the industry of the region. In Iraklio there is predominance of small industry. A strong indication formed here is that smaller firms often can not find the capital needed for operationalising the latest technology. In distant, less developed areas, such as Komotini, besides the lack of capital, information proves slow to penetrate, and specialists reluctant to establish themselves in such locations.

An assessment of the state of technology that the firms currently use was attempted. Initially firms were asked about their technological status in comparison to their competitors. Those admitting that any of their competitors use later production technologies were asked to give two reasons. Overall forty firms of the fifty five, (or 73%) declared that no competitors in Greece use more advanced technologies. The spatial distribution of firms claiming use of latest technology is in Iraklio 94 %, in Komotini 70%, in Xanthi 67%, in Volos 64% and in Patra 50% of the firms. It can be seen that firms established in distant regions tend to give higher rates. This could be to a certain extent an overestimation of their attainments, due to these firms supremacy over their neighbouring competitors, and the long distance from the centrally located competitors. It happens that the 'better than competitors' percentages are analog to their distance from Athens. It may be that distance from the centre still gives some monopoly confidence and power to a regionally dominant firm. Interestingly though, the above perceptions are quite in line with the technological efficiency estimations made earlier (chapter four) where Iraklio is found to be the technological frontier region of the country.

The average figure of 73% mentioned above, may not provide full evidence but it is a strong indication that the Industrial Areas concentrate firms that use comparatively advanced technology, at least within the Greek industrial manufacturing environment. The reasons for this may be that most of the firms are comparatively young, with an average age of less than ten years and also tend to operate comparatively new machinery. Also, as seen, the size of the established

firms is in all cases much higher than the respective average regional size. Furthermore, to the extent that new firms continue to establish there, technology used will tend to be continuously updated. An important question is though if, and how well, the conditions and procedures for a continuous flow of innovation are structured in the Industrial Areas.

Of interest are the views of the remaining 27% of the sample, (or 15 firms), that claimed that other firms, in Greece, use better technology. Each gave two reasons. These 30 responses have been turned into percentages and are shown in Figure 6-17. Some 33% claim that other firms have a generally larger scale of production and 23% suggest that other firms have more capital. Thus those industrialists' main perception is that mass production seems to allow for the use of highest technology. Alternatively only intense capital investment in an industry would allow for latest technology use. The third reason, with 20% of the votes, is the claim that other firms are branches of multinationals; the latter obviously provide the former with modern production technology. Only 13% believe that other firms use better technologies because they are nearer to the centre. Thus, there is evidence that scale, capital intensity and international links are critical for the use of latest technology use.

To obtain information on one aspect of technological status interpreted as a flow of innovation, the firms were asked about the frequency of their innovation as regards various operational processes. On average over all Industrial Areas, firms had their last innovation in production method 4.0 years ago; their data processing major upgrade was on average 4.1 years ago; their telecommunications expansion was 4.3 years ago; their office equipment renewal was 4.6 years ago and their internal communications, where existed, were renewed 5.0 years ago (Table 6-8). The overall average on technology facets and Industrial Areas gives a technological age of 4.4 years. This is not a poor result in relation to the national levels although there is no proper and detailed comparison available.

The spatial variation of the innovation rates is considerable and can lead to some indications on the national competitiveness of the Industrial Areas. The average age of the all-facet technology used varies from 3.5 years for Volos, to 5.4 years for Komotini. As regards the production method, it can be noted, that in Iraklio it is 2.6 years old; in Volos the figure was 2.7; in Patra 3.3; in Xanthi 5.3; and in Komotini 6.1 years. (Table 6-8). It can be seen that in Iraklio the small firms certainly proved to be the most innovative, and quite consistently had earlier claimed, by 94%, a lack of more advanced competitors. Earlier, the distant Komotini and Xanthi, provided perceptions of lack of more advanced competition immediately

Figure 6-17: Reasons for use of more advanced technology by competitors perceived by fifteen of the sampled firms

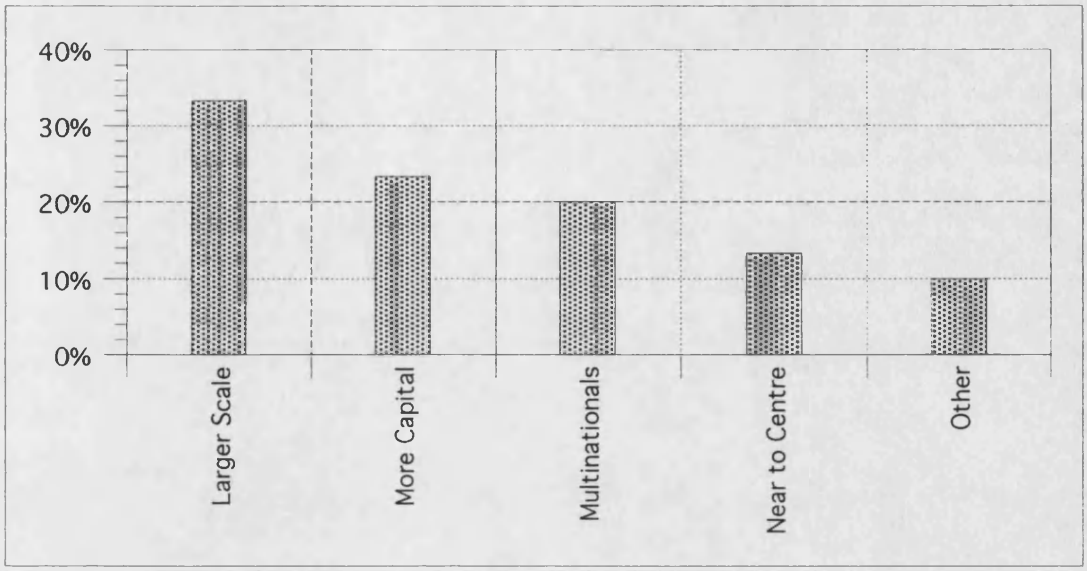


Table 6-8: Renewal periods of technology used in the various sections of Firms in the sample Industrial Areas, in years

	Production Technology	Internal Communications	Data Processing	Tele-communications	Office Equipment	All section average
Volos	2.7	4.6	2.9	3.8	3.8	3.5
Iraklio	2.6	4.2	3.0	4.7	5.4	4.0
Patra	3.3	5.6	3.5	4.7	4.1	4.2
Xanthi	5.3	5.0	6.0	3.3	4.3	4.8
Komotini	6.1	5.6	5.2	5.0	5.2	5.4
Average	4.0	5.0	4.1	4.3	4.6	4.4

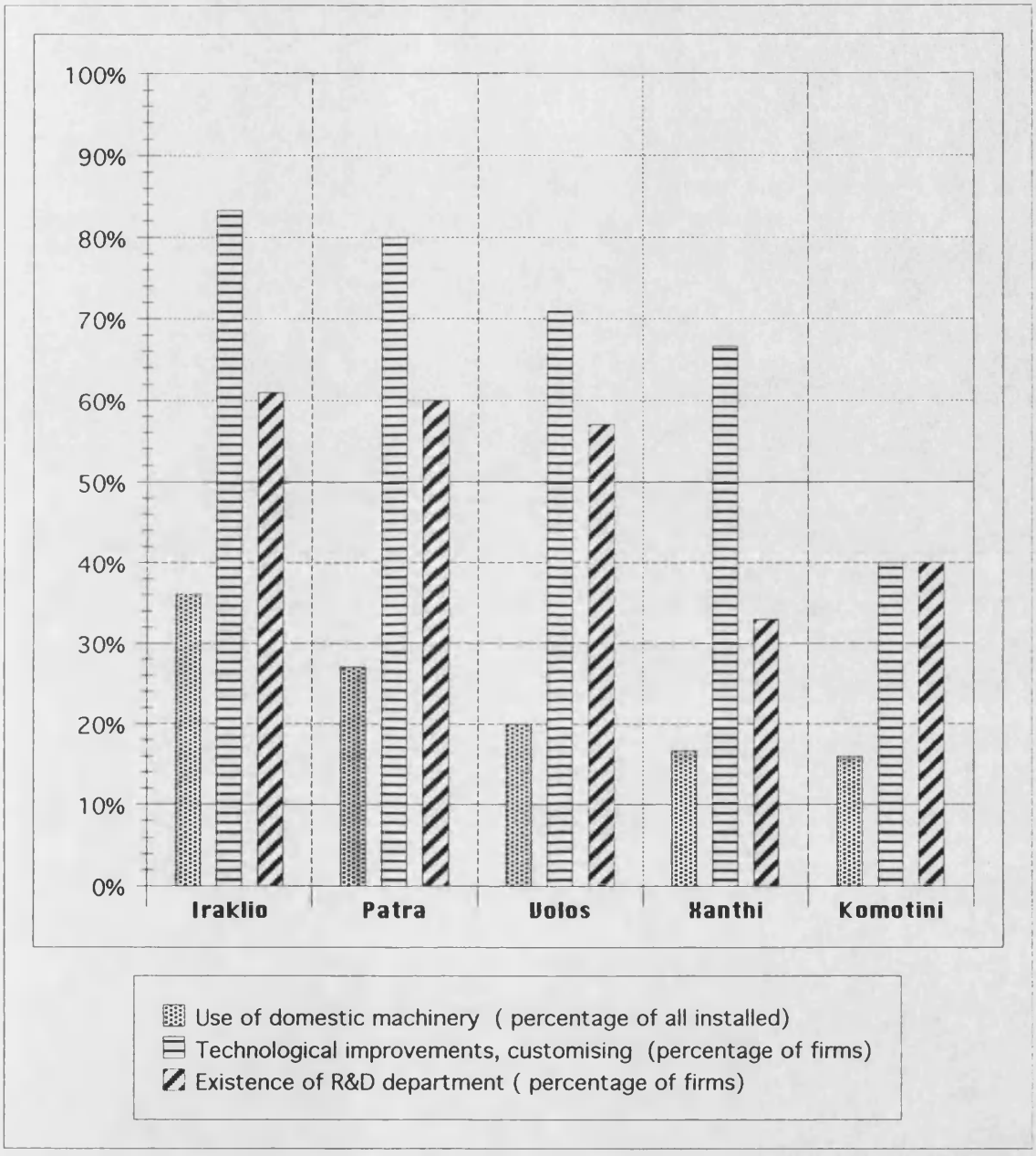
below those of Iraklio. But it appears from this further enquiry that they have the lowest innovation rates. In proves that in these cases the distance, as evidence was also found before, is protecting these firms from competition. But also, the lack of information flow to these areas that was earlier proposed, now appears to be the case. Volos at 2.7 years and Patra at 3.3 years of production technology age are well aware of their competitors. The newest data processing age is found in Volos with average of 2.9 years of age, the newest telecommunications in Xanthi, at 3.3 years and the newest office equipment also in Volos, at 3.8 years.

Stemming from the theoretical analysis, the levels of facilitation of domestic technology and the ability to adapt or customise new technology were considered to be of interest. To this end, an index of the use of domestically produced machinery was created and firms were asked if changes were carried out in order for technology to better fit their production needs. Consequently firms were asked about any research and development they carry out on the technology or production methods they use.

In general, the 77% of the machinery used in all industries is imported, while the rest 23% is domestic technology. Firms in Iraklio have on average 36 % of domestic machinery, in Patra 27%, in Volos 20%, in Xanthi 17% and in Komotini 16% of the machinery is domestic. Regarding the 'change to fit' procedures, in general 68% of the firms have carried out such engineering work. In Iraklio it was 83%, in Patra 80 %, in Volos 71%, in Xanthi 67% and in Komotini 40%. In general some 50% of the firms do not work on research and development. A further 13% declared they do some research and development work, being part of the job of the firm's engineers. Finally, some 37% of the establishments have a small department, in most cases one or two specialists, concerned with technological issues. Only one firm has a larger-staffed (ten persons) research and development department. In Iraklio, firms declaring research and development activities of any type are 61%, in Patra the figure was 60%, in Volos 57%, in Xanthi 33% and Komotini 40%. The figure of 50% of all firms undertaking some research and development activities might seem rather high, but up to an extent can be justified by the overall 68% of 'change to fit' work. The answers of the firms on the issue of research and development seem related to the changes in technology rates. Efficiency of research, though , is rather controversial to evaluate. Details are given in Figure 6-18.

From the set of the above measurements it appears that the use of domestic technology is closely related to research and development. This tend to lead to customising technology to the needs of firms, to high innovation rates and

Figure 6-18: Use of domestic technology, improvements, research and development by firms established in the sample Industrial Areas



to the achievement of an advanced position against competition. For example, the Industrial Area of Iraklio, giving the fastest innovation rate, also uses the highest rate of domestic machinery, at 36%. The same area also gives the highest rate, by 83%, of local 'opening of the technology box' and adjusting it to the specific needs of their own industry. The area gives an example of high innovation rates, comparatively high locally produced technology and high tailoring of technology to specific needs. All this implies quite good interaction between local industries, higher internal multipliers and of course better competitiveness. It is based on a smaller average size of innovative flexible firms. It now becomes more clear why Iraklio achieved a high positive total factor productivity and also a faster employment growth, in the measurements given earlier in this research, in addition to its technological efficiency.

Higher research and development activities and higher percentages of domestic technology seem to interact the following way. Concentrations of development specialists in firms maintain ties with their colleagues of domestic technology-creating firms, and possibly prefer these domestic products. They also have the potential of influencing, cooperating, or even hiring the domestic technology-producing firms maintaining a feedback of their specific needs. On the other hand, areas with the highest percentage of imported technology happen to have lower rates of research. In the case Komotini, 84% of the machinery is imported and only 40% of the firms have made changes to their machinery. There, it seems as if the 'box of technology' is still 'black' and firms' operational advantages are mainly based on incentives. In Volos and Patra, firms also seem rather actively changing technology to fit their needs.

To identify the main prerequisites for creating and sustaining a research and development department a structured but open-end question was deployed. Firms were allowed to make one or more suggestions, and resultant views were spread. Some 35% voted for financial support by the state, which can be available for such activities. The issue of information availability produces a 32% vote. The need for specialists in the region achieves a 24% response. A variety of 'other' necessities gets 23%. Suggestions vary among the different sites, the most striking being a 67% of 'state financial support' in Xanthi, a 60% for 'information' in Patra and a 40% for 'specialists' in Komotini. The claim for more financial support is obviously an easy way, though not at all without importance, to show research difficulties. But Iraklio having declared the highest research percentage is, as is often the case, the one that puts first the need for more money. It seems that money is needed not only to set up but also to maintain any research advantage.

From another point of view, Volos, with possibly the largest population of research staff, suggests mainly better flows of information. Similarly, Patra, the only city among the five boasting a technical university, also gives the highest percentage to information requirements. The highest percentages on the issue of 'specialists' availability is not unexpectedly given by Xanthi and Komotini, the distant regions. Other issues that were brought forward on this debate are the size of the firm and to a substantial degree the ties with multinational firms. Several firms declared that they do not have an adequate size to carry out any research, others mentioned that they seek external specialists' advice when needed, and some declared that research is done on the premises of their counterparts abroad that in cases are their master companies.

Finally, firms were asked if they feel that innovations spread in the Industrial Areas faster than in the non-organised space, this being one of the main suppositions of the purpose of the Industrial Areas. The answers were negative by a firm 86%. Firms said that they cannot see organised channels for technological diffusion in the Industrial Areas. They stressed that this may happen on a random basis. But still the perception of the firms is possibly ignoring or underestimating that not only the effects of cooperation but also those of competition between firms in the Industrial Areas are probably boosting technology diffusion and innovation.

To specifically test this last idea, and the assumption of external economies of industrial agglomeration, firms were asked if they cooperate with other firms in the Industrial Areas and in what modes. Interestingly some 35 of the 55 firms of the sample, or 64% of them, declared some form of cooperation with others in the Industrial Area. In Volos and Komotini this figure was 70% of the firms; in Iraklio and Patra 60% claimed cooperation and Xanthi the figure was 33%. The most significant mode of cooperation is in production, followed by marketing as it turned out from the survey. Other modes of cooperation are in the ordering of raw materials, or on site security.

From the comments that firms made, especially in smaller industrial concerns, it seems that there is competition along with cooperation amongst the firms in the Industrial Areas. Physical proximity within the Industrial Areas plays its proper role as it seems. Interestingly there is a considerable divergence between perceptions of faster technology diffusion in the Industrial Areas and the rates of cooperation between firms. Figures 6-19 and 6-20 show this 'mis-perception', with special focus on Iraklio where though, the greatest innovation rates were found. Large firms, though, were more positive when there were cooperation

Figure 6-19: Proportion of established firms that perceive faster spread of innovations within the sample Industrial Areas

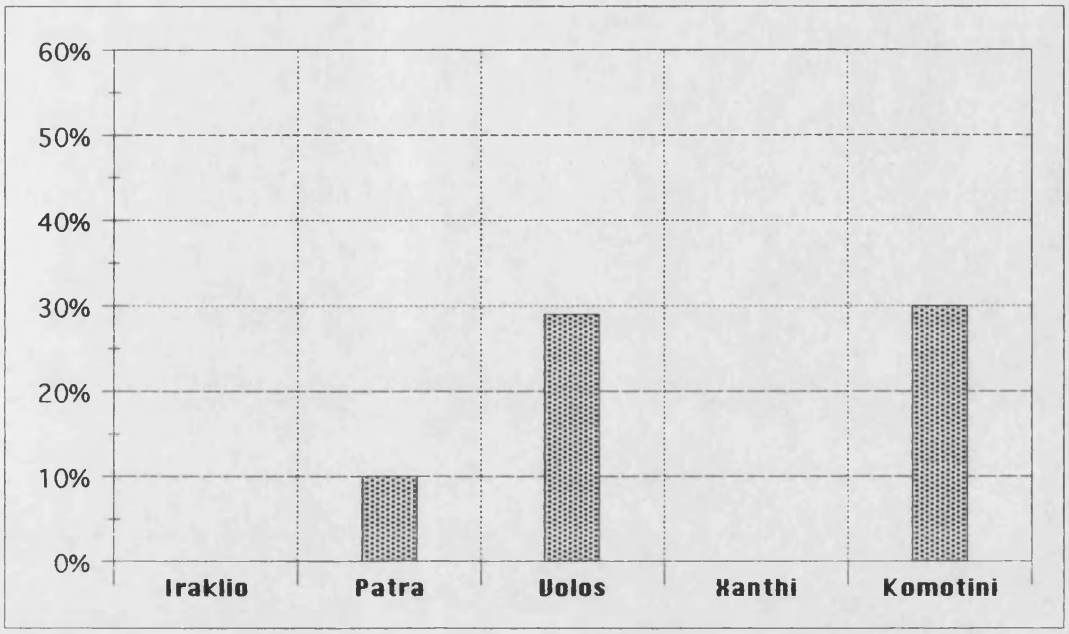
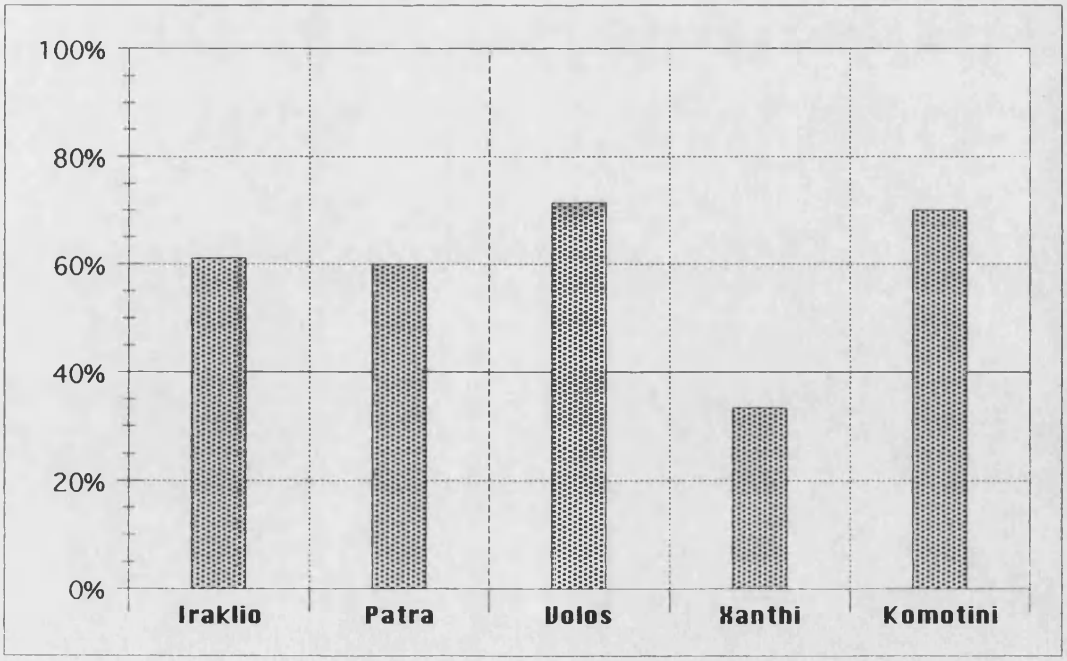


Figure 6-20: Proportion of established firms declaring cooperation with other established firms in the sample Industrial Areas



possibilities, while some of them were established in the Industrial Area, as they declared, solely on that purpose. In the latter cases the external economies are evident. In smaller firms, as it proved, competition along with cooperation rises overall competitiveness of the businesses located there.

6.4 The markets of the Industrial Area businesses and their needs for assistance

6.4.1 The range of target markets in the surveyed Industrial Areas

Among the firms that are established in the Industrial Areas Programme there are some that solely serve their own geographical department, but there are also others that have a strong international export orientation. The representative marketing destinations for each surveyed Industrial Area are illustrated in Figure 6-21. They are calculated on value of sold goods as were obtained from the survey, and vary as follows. Komotini exports to destinations abroad some 32% of its production; for Patra the export figure is 18%, in Iraklio it is 16%, in Volos some 15% and in Xanthi it is 12%. The Industrial Area best connected with the market of Athens is Xanthi, with 39% of its production sent there. Almost equally strong in this respect are Patra and Volos, with 31% of each one's products serving Athenian markets. On the other hand Iraklio sells only 9% to Athens, having some 53% of the value of its products being marketed within its own geographical department. Magnisia absorbs 13% of the Volos Industrial Area products and Achaia only consumes 8% of its local Industrial Area (Patra) products.

Iraklio is the Industrial Area with the strongest local market orientation. It is in distant location, as is Komotini, but being on an island proves to be a hinderance to high volume of exports. Local firms, and several local branches of larger multi-site firms, have been mainly created to serve the local markets. Only a few companies, mainly in the speciality foods business could possibly penetrate into the main European markets. Here, there is a large urban centre and a considerable surrounding population, of considerable economic strength, to sustain a demand for a wide range of industrial products. Many of these products can be produced locally and thus the locality has seen the emergence of the Industrial Area. Considerable local interaction and multiplier effects also occur here, as demonstrated by this research.

Figure 6-21: The destination markets of the firms established in the sample Industrial Areas, based on sales value

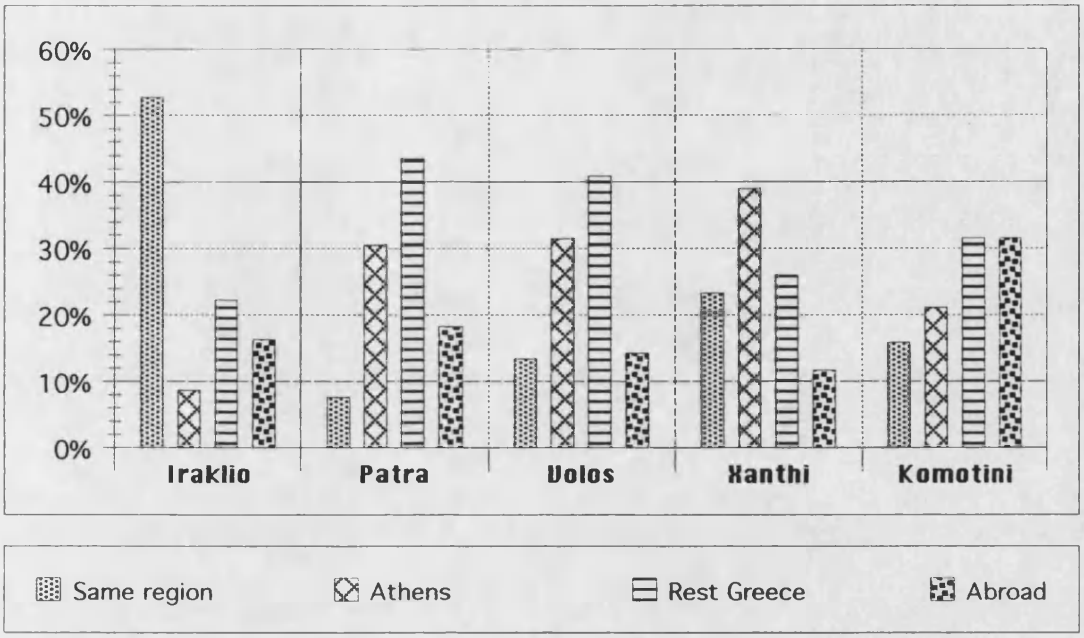
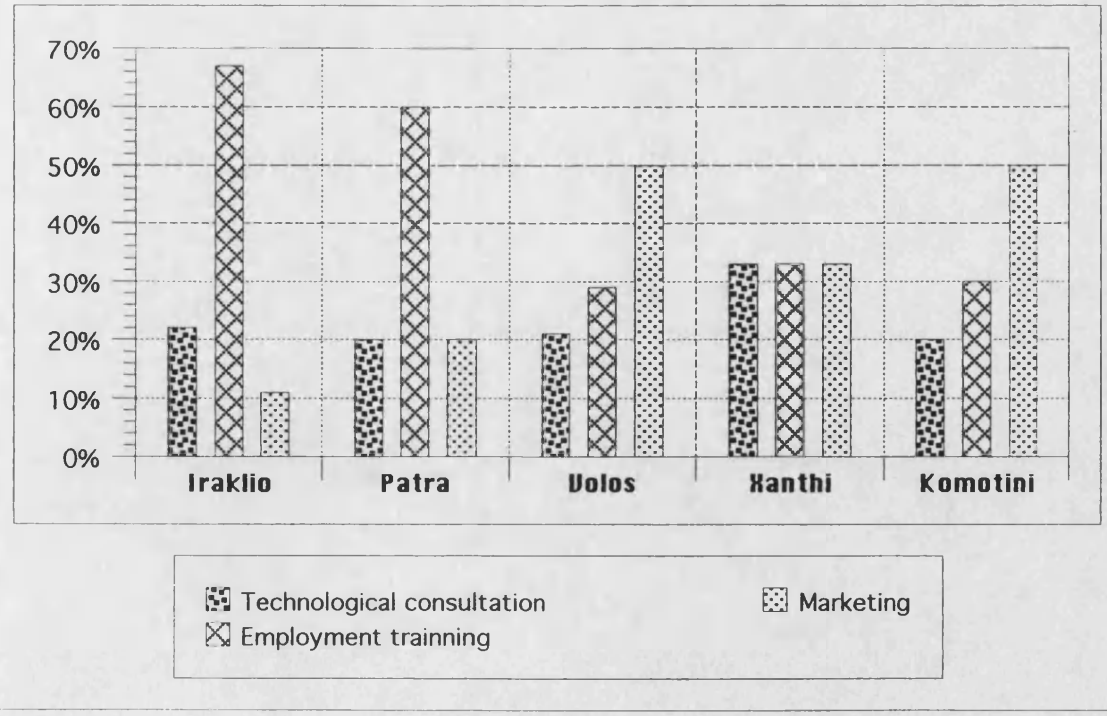


Figure 6-22: Assistance preferences of firms established in the sample Industrial Areas



A second type of Industrial Area, typified by Komotini and Xanthi, has populations dispersed and largely agricultural. Possibly, they are least likely to sustain local demand for an Industrial Area. Accordingly, Komotini is the most export oriented of all. It exports internationally more products than those sent to Athens, or than those marketed within its own geographical department of Rothopi. Firms deciding to locate in a distant area of this type do not aim to target the central inland markets, especially Athens, since competition from other more centrally located industries would be too intense. Many firms deciding to establish there are either export oriented or are franchising foreign firms' products aiming again at markets other than the local. Often firms are simply acquiring the advantage of the locational incentives and infrastructure of the Industrial Area rather than intertwining with the local industrial base. This type of development may not be as socially beneficial as that of Iraklio, but nevertheless it still transfers some resources to remote regions.

6.4.2 Assistance provided for marketing

In general the administration of the Industrial Areas provides only limited help, if any, as regards the marketing of the firms located there. Administration at a local level usually does not have the staff and/or the capacity to offer such help to the firms. Active advertisement of the products produced in the Industrial Areas, and consultation services on marketing issues though are not offered even at the central level, either. The firms themselves recognise this inadequacy, although with some degree of understanding. One provision of the Programme on this matter existing in some Industrial Areas is an on-site conference / exhibition centre for the firms to promote their marketing needs. In the sites of Iraklio and Komotini, a conference / exhibition hall is provided. The local administration in Komotini believes that the exhibition / conference hall can play an active role not only in helping the established firms to promote their products, but also in accommodating several other business needs or festivities in the region. They believe that this centre soon shall be able not only to finance itself but also be profitable as well. On the contrary in Iraklio no beneficial use is credited to the centre. But in both cases the numbers of days of operation of these centres are limited, as suggested by the firms, being only about three days per year in Iraklio and not more than five days in Komotini. In Iraklio the perception is that they do not have any economies realised in their marketing or public relations expenses; only 17% of the firms declared that they achieved some savings due to this centre. In Komotini though the picture is different, where some 80% of the firms declare some cost economies due to the

existence of the centre. In Volos, Xanthi and Patra, there is no such centre in operation, and firms do not have the opportunity of such cost savings.

Firms in general accept that the Conference / Exhibition centre is a positive idea, but feel their result cost savings would be rather limited anyway. One argument for this proved to be the distance of the Industrial Areas from the city, amounting to about 23 km in the case of Patra. Another argument, especially of the larger firms, is that the industries are not retailing oriented and their customers are far distant. Thus they would rather take part in exhibitions held in large national or international exhibition halls, and organise conferences in centrally located hotels. The case of the distant Komotini though, shows that in remote regions having only a small urban centre, the conference hall of the Industria Area may prove useful to the firms.

6.4.3 The firms' preferences for assistance

To obtain information about the firms' preferences for financial assistance, as distinct from the infrastructure provision, they were asked about their needs in terms of financing and about ways in which the administration of the Industrial Areas or the state could help. Three questions were deployed which all had a technology component in them, the aim being to measure the firms' orientation towards technological upgrading. The relevant financial needs of the firms were revealed.

At first, firms were asked to choose one, amongst three policies that the Industrial Areas Programme could potentially put into action. a. assistance in marketing operations; b. training of the workforce in relevant skills; c.technological consultation. From all answers to this question, the technological consultation was only favoured by 12 of the 55 firms (22% of all), the help in marketing by 17 firms (31%), and interestingly the employment training by 26 firms (47%). Details for the preferences among the regions are shown in Figure 6-22. Iraklio and Patra mainly voted for the workforce training, while Volos and Komotini for the marketing assistance. Several firms made the comment that the Industrial Area could not possibly offer them effective technological consultation. They either had their own technical information, or had international connections, or in cases felt that they were too big, or too specialised to be assisted. But experience has shown that the Industrial Area can successfully house sectoral technological centres, as is the case of Volos. There were also firms that indicated that the Industrial Areas can not provide business services such as marketing; at the best it can only perhaps train some workforce in relevant skills in cooperation with other existing institutions.

These perceptions may in part be correct, but the potential in these respects perhaps should not be underestimated.

Firms were then asked to put in order of preference the following three potential (in theory) financing policies of the state. a. employment subsidies; b. exports subsidies; c. new technology subsidies. In general, the 'new technology subsidies' are in the first place of the preferences of 29 firms, (or 53% of all). The rival policy of 'export subsidy' is the first choice for 15 firms (27%) and 'employment subsidy' for only 11 firms (20%). At a regional level, the new technology subsidies get more votes in all Industrial Areas except Komotini; there, export subsidy gets most preferences. Details are given in Figure 6-23. It seems then that state subsidisation for new technology purchases by the firms, obtains by far the highest preference rate, compared to possible subsidisation of labour costs or export prices. Thus, it seems that, in contrast to the first question, firms are oriented towards the implementation of technological innovation. Firms this way provide a hint, based on their experience, that both markets are conquered and costs are compressed with the use of the latest technology. The case of Komotini is the sole exception, where the firms would be keener for export subsidising, which anyway is not a current practice. This is an interesting finding that relates to the product and profit cycle theories reviewed earlier. Komotini having already a particularly high rate of exports would prefer to realise profits than to innovate its utilised technology.

Given the principal result of the last question, it was investigated if firms wanted 'money for technology' or just money. The third question enquired about the firms' favourite delivery system of state financial support. They had to choose among a. subsidies for new technology; b. state capital for company shares; c. soft loans. On average, some 47% of the firms preferred soft loans, 35% subsidies for new technology and 18% were willing to give shares for state capital. At the regional level, Volos and Xanthi prefer strongly the option of technology subsidies, Patra Iraklio and Komotini would rather choose the soft loans (Figure 6-24). Only a small proportion of the firms declared they would like a state partnership and subsequent control, fearing perhaps that this might lead to lack of flexibility. The results overall proved that more firms would prefer the flexibility of soft loans, rather than receiving subsidy for installation of new technology. This gives a hint of the necessity for operational capital by many firms, in some cases also concealing more serious liquidity problems.

There were several firms that quite frankly proposed that the central incentives system should be reoriented. Rather than supporting new firms, the

Figure 6-23: Preferences on potential state subsidies of firms established in the sample Industrial Areas

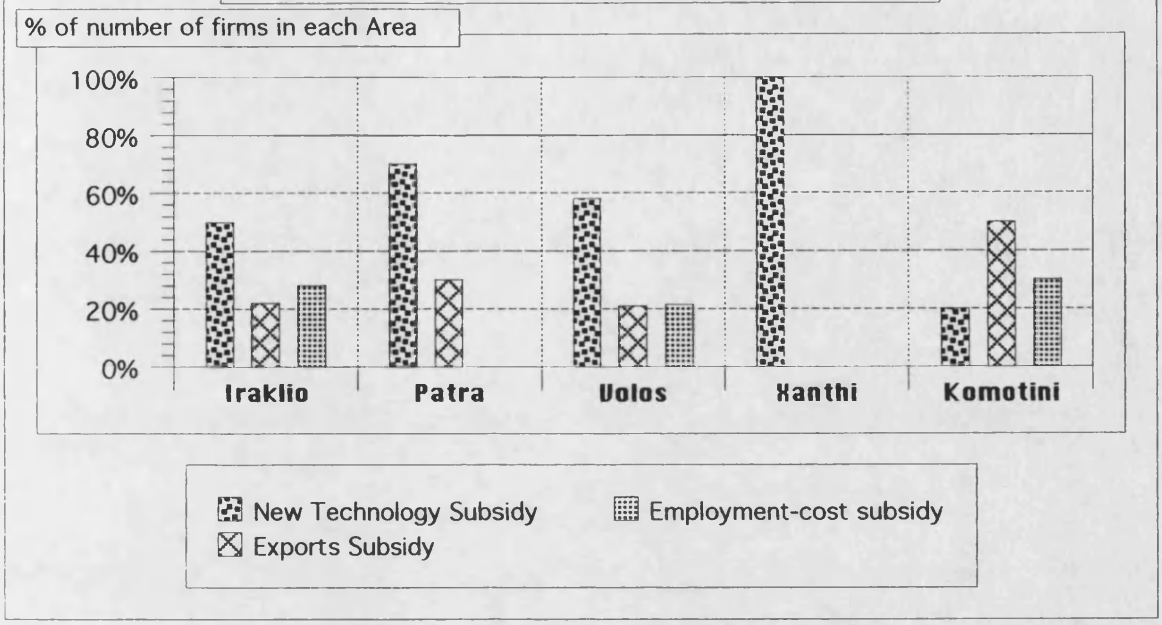
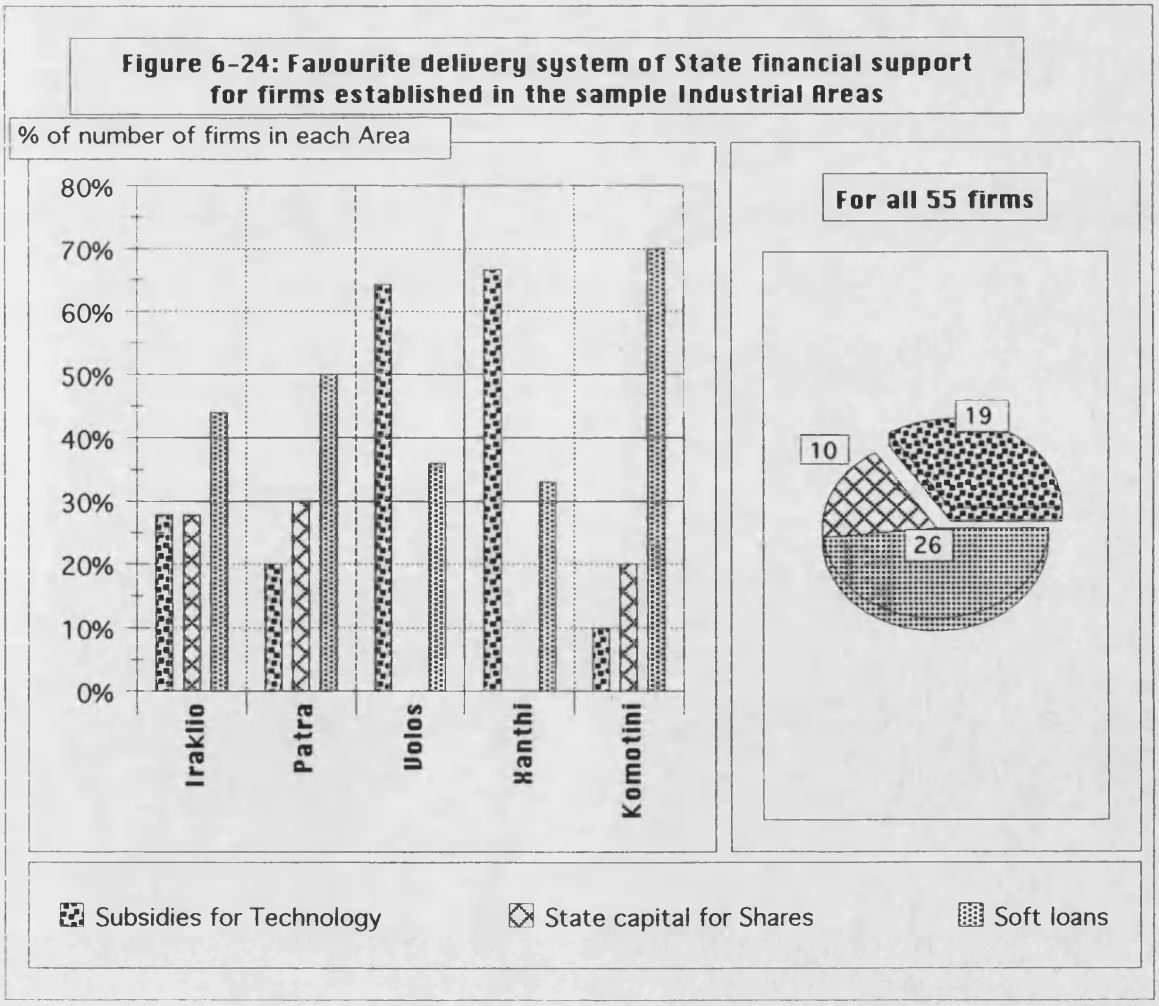


Figure 6-24: Favourite delivery system of State financial support for firms established in the sample Industrial Areas



state should try, it was argued, to maintain and strengthen the existing firms to survive the crisis This could be done by financing shift to new technology, or by offering to viable firms more and affordable capital.

It turns out that in Greece a substantial number of firms are aware about the need of new technology, and do some research, but in many cases they lack the resources to install it. The majority of firms are somewhat afraid of state intervention and less often ask for such activity. Technology financing proves important but not first priority for the surveyed firms. There are not a few cases where the struggle for survival has held back those firms' technological upgrading.

6.5 Local economic linkages and effects

6.5.1 Perception and support to the Industrial Areas by the local actors

A basic aim of the Industrial Areas Programme is to help and promote local economic development. The emergence of an Industrial Area in a region generates employment and activates economic life, but it also brings in more competitors to the older established business interests. In most recipient regions local actors were of varying opinions of how the Industrial Areas would affect their region, especially in the early stages. Cases were identified in the field research where conflicts with certain local vested interests had emerged. Local interaction varied considerably between different sites in different times and on different issues.

Local reaction to the Programme initiative has varied from wholehearted cooperation to dynamic opposition. In some cases a sort of 'moral' support was provided by the locality involving mainly good relations, school visits or occasional sports events (Iraklio, Komotini). As regards tangible support from local communities to the Industrial Area, in none of the cases was this financial. Most often it involved sharing of infrastructure, as in the case of connecting roads. In some cases the shared use by the Industrial Area of resources perceived as belonging to the community was conceded, such as underground water stock, not without some dispute though.

However infrastructure was never built by local governments to serve the Industrial Areas specifically. The limited local government finances tend to be mainly spent on inner city development and redevelopment. On the other hand, local government do attempt to capitalise on the fact that ETBA eventually will provide

all necessary infrastructure for the Industrial Areas. In other cases the use of the Industrial Area's infrastructure, such as the sewage treatment units of few sites, was offered to the local communities. In cases of opposition to the programme the main causes involved environmental issues and planning issues.(Patra, Xanthi). Time does however seem to bring reconciliation, but there are odd exceptions involving cancellation (Egion), or total failure, (Alexandroupolis).

Firms on the surveyed sites were asked to what extent they felt that the local government had supported the Industrial Area. The question includes both particular actions of the local government in support of, or against the project, or just the morale towards the Industrial Area. Firms answered in a semantic differential mode, which was then converted to a 'percentage' to produce the regional average and allow for interregional comparison. The results are illustrated in Figure 6-25. Thus, on average, the firms in the five Industrial Areas feel that the local government support is at the 'low' end of the scale. Estimations of support varied among areas. For Iraklio and Komotini practically no support is perceived, in Patra and Xanthi the rating of support was only low and in Volos support was perceived as comparatively higher. In general firms expected more from their respective local governments. Comments the firms made regarding the local government, included cases of allegations of inefficient handling of funds, lack of organisation and professionalism, and lack of interest for the region's industrial development. In Volos, the oldest established Industrial Area of the sample and the larger one, firms felt that a comparatively better cooperation with the local government exists. It seems as time and effort is needed to engender such a level of cooperation.

6.5.2 Perceptions of local labour productivity and attractiveness

In general, the local administrations estimate that the Industrial Areas have brought rather important expansion of the industrial base and its diversification as well as employment specialisation to regions. The strength of such effects are estimated to be high in Iraklio, Volos and Komotini, the regions where the projects are rather successful. Less strong is the effect in this respect in the new project of Xanthi. Patra already had an industrial base but the Industrial Area, though well equipped, has not yet managed to play the leading role that it was designed for, for various reasons. But as regards provision of specialised training, it is only in the project at Volos where there is a training centre for the local workforce. Here they offer specialised skills training tailored to the local industry needs. This centre

Figure 6-25: Local support to the Industrial Area as perceived by firms established in the sample Industrial Areas

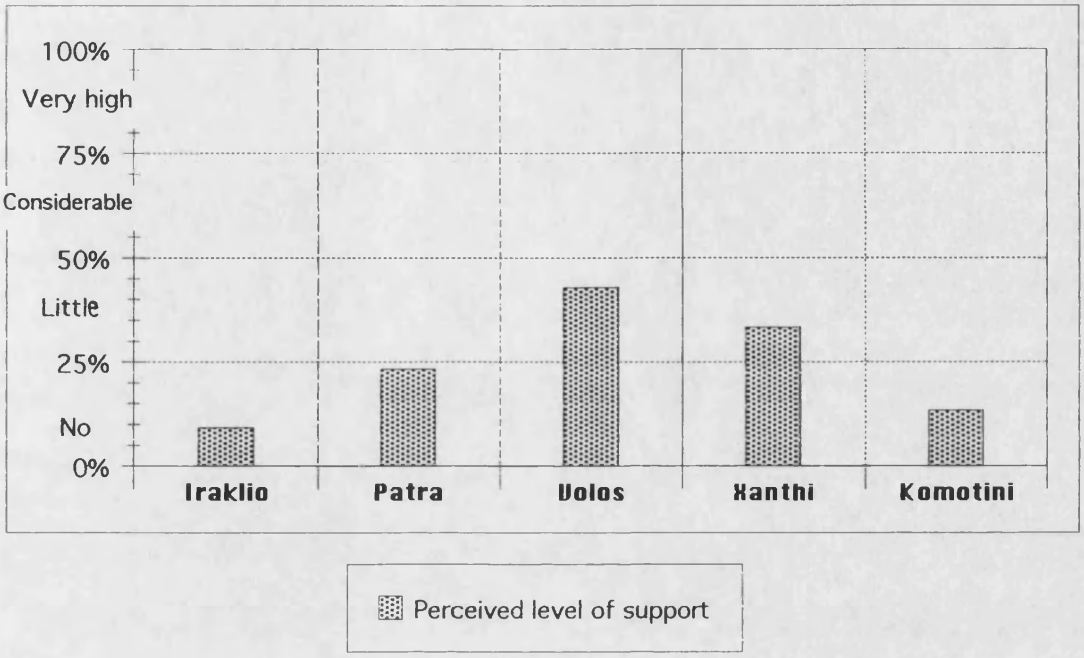
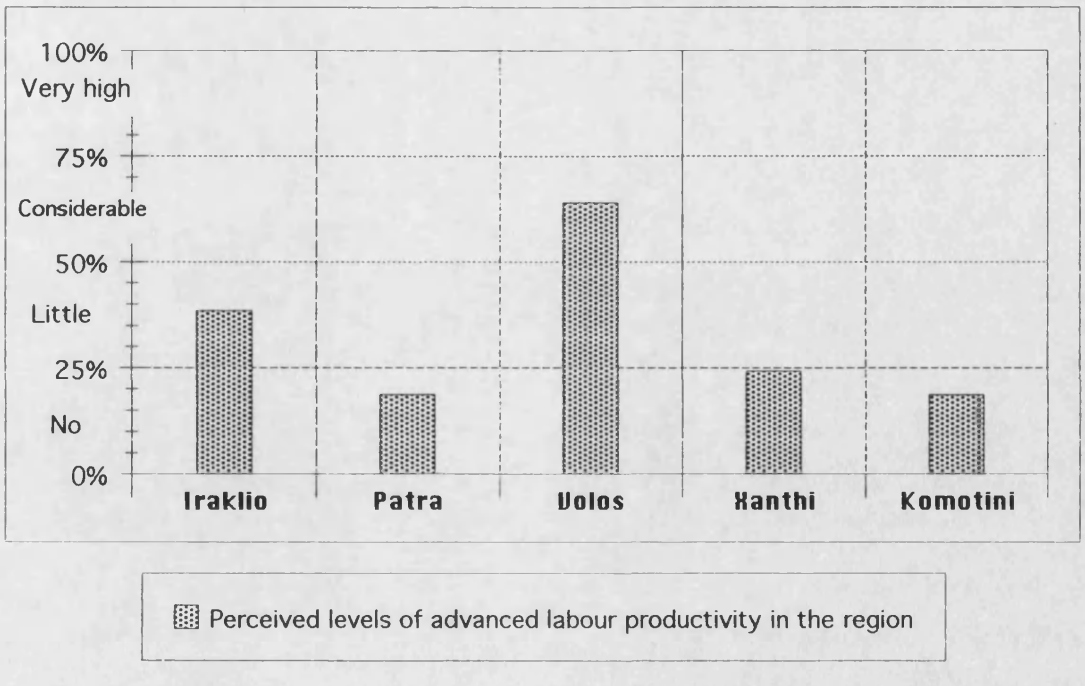


Figure 6-26: Advanced labour productivity in the region as perceived by firms established in the sample Industrial Areas



is run in cooperation with the Industrial Area and is established in the administration building.

On the above issue, firms were asked to evaluate the extent to which their respective geographical departments have developed the advanced industrial skills and practices, thought of as prerequisites (together with infrastructure) for a high productivity of industrial investments. Answers here were also converted into percentages to show the average intensity of the perceived situation at each site (Figure 6-26). The average level for all Industrial Areas is 31% of 'best' or 'low'. Variation across sites is considerable, and in Volos firms regard that the labour in the region has achieved a 'considerable' (64% of 'best') level of advanced industrial productivity. In Iraklio the same figure is 38%, in Xanthi it reduces to 24% and in Patra and Komotini 19%. From these perceptions of regional labour efficiency it can be seen that firms in general, except in Volos, are not satisfied with the available industrial skills and practices in their regions. This argument is consistent with the preference mentioned by most firms earlier, for the need of training of labour undertaken in or via the Industrial Areas Programme. It also shows that firms are oriented to the use of modern technology which requires higher labour specialisation. Volos is a marked exception to the above perception. Here firms comment that the industrial tradition of the region offers, besides physical infrastructure, skills and industrial application in abundance and this is also related to the local labour-training centre there. This is not the case with Patra though, where, although tradition exists, at the present firms do complain about the general attitude of the local labourforce. It seems as during the recent de-industrialisation crisis, skilled labour has tended to out migrate, while at the same time the local unions have tightened their stance. In Iraklio the situation seems slightly better. But there, firms indicate that the local manufacturing workforce has strong employment alternatives, mainly in the tourism industry, but also in part time agricultural activity. This makes the labour costs and the number of days absent days rate higher than other places in Greece.

The attractiveness of the Industrial Areas to the local investors as distinct to external capital was evaluated next. Measurement was based on estimations of the investment 'attractiveness' of each project, obtained by the established firms. Answers were again given in a semantically differential mode and subsequently converted numerically to show the average for each region, as percentage of the 'best' possible attractiveness. Figure 6-27 shows the scores of the various projects and relates them to their qualitative characteristics.

In general, the Industrial Areas are estimated to be attractive at the rate of

Figure 6-27: Attractiveness of Industrial Areas to local and external capital as perceived by firms established in the sample Industrial Areas

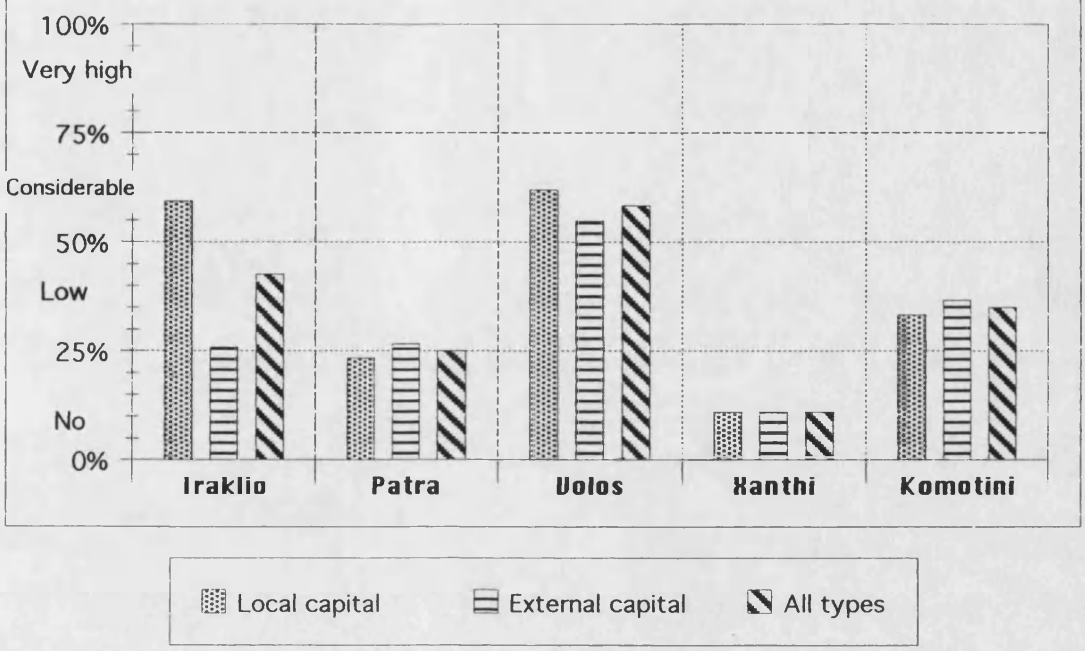


Table 6-9: Effects of the Industrial Areas to the local communities as perceived by the local administrations of the sample Industrial Areas

	Positive effect to local communities due to the Industrial Area					Common use of Infrastructure			Community Businesses	
	Social	Female employment	Wealth	Demo-graphy	Education	Streets	Sewage	Other	In Region	In I.A.
Iraklio	no	little	little	little	no	Yes	-	-	Yes	No
Patra	no	moderate	much	much	no	Yes	Yes	-	-	-
Volos	no	moderate	little	little	no	Yes	-	-	Yes	No
Xanthi	no	little	no	no	no	-	-	-	-	-
Komotini	much	much	much	much	no	-	Yes	-	Yes	No

some 38% of the maximum to the local capital and 32% for the external capital, or 'low'. On average, the firms' perception of attractiveness of all Industrial Areas to all types of capital is estimated to the 34% of the maximum, but perceptions vary among sites. The more attractive Industrial Areas to the local capital prove to be Volos with score of 62%, followed by Iraklio with 59%, both 'considerably' attractive. Volos is also the most attractive project to the external capital, with score 55%, but in this case it is followed by Komotini with 37%. Most attractive to any type of capital proves to be Volos, scoring 58%. The least 'capital-attractive' projects are perceived to be Xanthi at 11% or 'not' attractive, immediately followed by Patra, that offers 25% of the maximum, or only 'low' attractiveness, as was indicated by the firms.

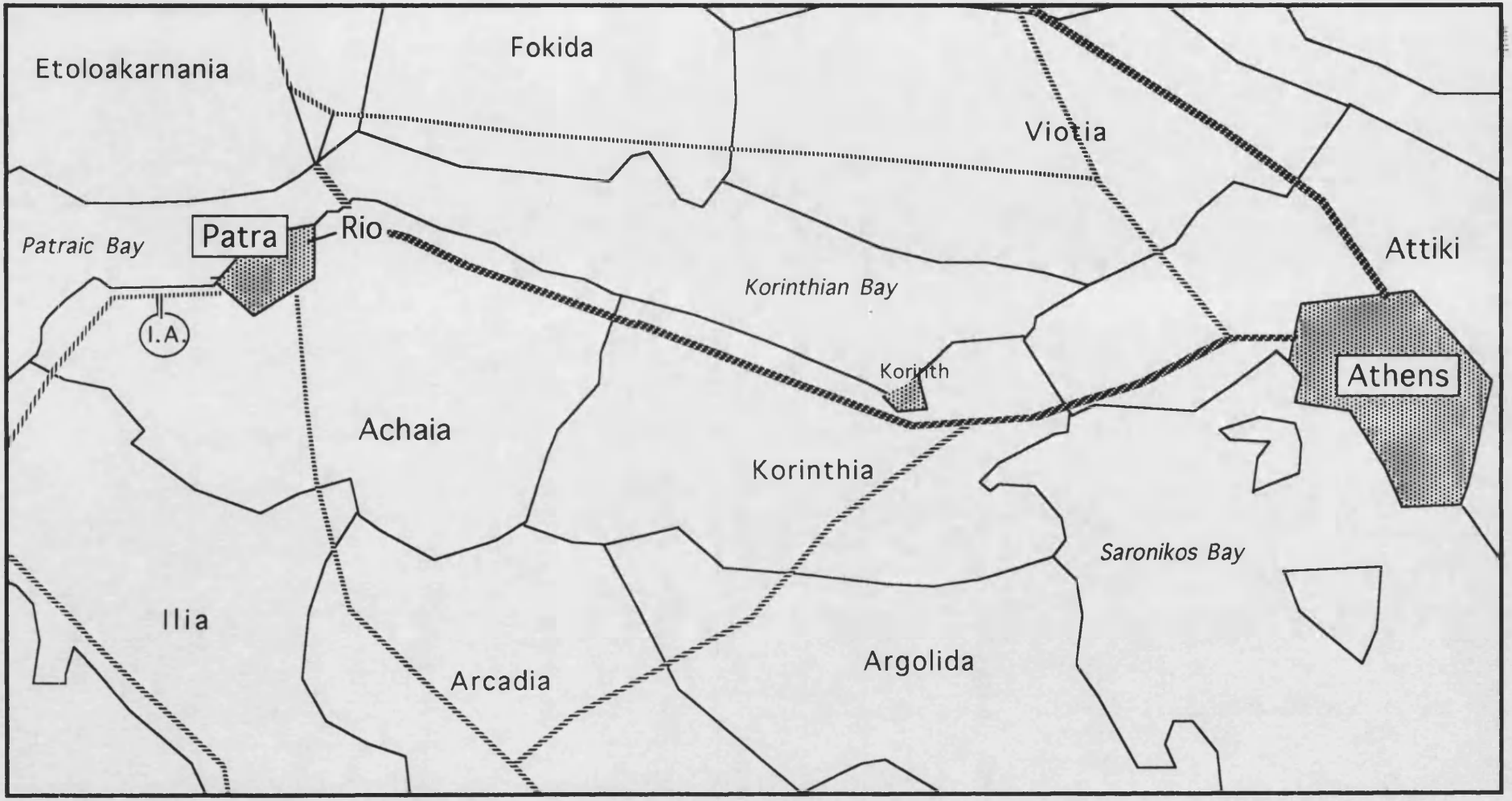
From the presentation of the Industrial Areas' attractiveness for capital estimations, it can be seen that the appeal to investors varies amongst the different sites. Apart from the locational incentives, the actual location, the infrastructure and the labourforce available in the region are issues that firms consider. Iraklio seems only to be locally appealing, due to the higher transportation cost (shipment), and higher labour cost. Volos has wider national appeal due to the good infrastructure and strategic location in the country's map. Xanthi has the lowest appeal, being a younger project with minimal and incomplete infrastructure and has competition from the nearby more developed Industrial Area of Komotini.

The appeal of the project in Patra proves to be low in the sample. The first reason is clearly locational. The city is not on the Athens - Thessaloniki motorway and developing corridor. The Industrial Area is located 23 kilometres west of Patra which is too far from the city. The actual location of the Industrial Area is shown in Figure 6-28. In addition, the project is in the opposite direction of the motorway axis that connects Patra to Athens. It is not convenient (some 30 kilometers away) to the ferry-junction to central Greece, at Rio, which is adjacent to the eastern fringe of Patra, as shown. A second, related reason is poor connections. The Industrial Area has a congested road connection to the city of Patra. Traffic has to pass through the city of Patra, as there is no direct road connection to Rio and to the Patra to Athens motorway. There is also no railway connection of the project. A third reason is that Patra also has comparatively high labour costs as has been seen.

6.5.3 Perceptions of economic and social effects of the Industrial Areas at the local level

According to the aims of the Industrial Areas some substantial positive

Figure 6-28 : The Location of the Industrial Area of Patra and the road connections to Athens and rest of Greece



effects for the local economies and societies should emerge. Thus, estimations of any positive effects to the local communities due to the emergence of the Industrial Areas were collected. The perceptions of social effects were generally on the mild side (Table 6-9). In summary there were no marked effects on the improvement of the social life of the localities, with the exception of Komotini. In this location it was argued that industrial tradition was being developed in the area, largely through the effects of the Programme. No betterment was perceived in the local educational levels in any of the areas due to the Industrial Areas. As regards increase in female employment, effects and implications are perceived to be rather strong, with Komotini most influenced and this is not irrelevant to the social life improvements issue. There were also some more widespread perceptions of the projects bringing wealth into the regions and of stabilising of the previously diminishing population. In Komotini and Patra the Industrial Areas were credited with positive demographic effects, that is keeping population from migrating to Thessaloniki and Athens respectively, and also with bringing wealth into the local communities. Similar was the case in Volos, only to a lesser extent. In Iraklio, manufacturing is thought to have had only small effects since perception of wealth is connected mainly with the tourism industry.

Enquiring on the issue of the community businesses and the attraction of them to the Industrial Areas, it was found that it is non-existent. In none of the regions having community businesses, (Iraklio, Volos and Komotini), are any of them are established in the Industrial Areas. The reasons for this are probably the extremely localised nature of community businesses. As regards their industrial sectors, they mainly are in the wood and textile manufacturing. It seems as if such industry is more suitably located in the urban environment and sees no benefits of relocating to the Industrial Areas.

The next area of enquiry involved the question of whether or not the Industrial Areas can satisfy their employment requirements locally. A measurement of the percentage of the employed in the Industrial Areas was attempted, according to whether they were living in the same geographical department (within a radius of 40 km on average) before their employment in the respective firms, or they were attracted to the department due to their employment. Attraction can be used to show to what extent Industrial Areas have utilised all locally available skilled labour. On average, 78% of the employees are local. The local workforce defined in this way in Iraklio and Volos amount to 84%; in Komotini the figure is 82%, in Xanthi 77% and in Patra 65% (Figure 6-29). Consequently an average of 22% of the employed have been attracted from other regions to the Industrial Areas

Figure 6-29: Percentage of local-origin employees in the Industrial Areas

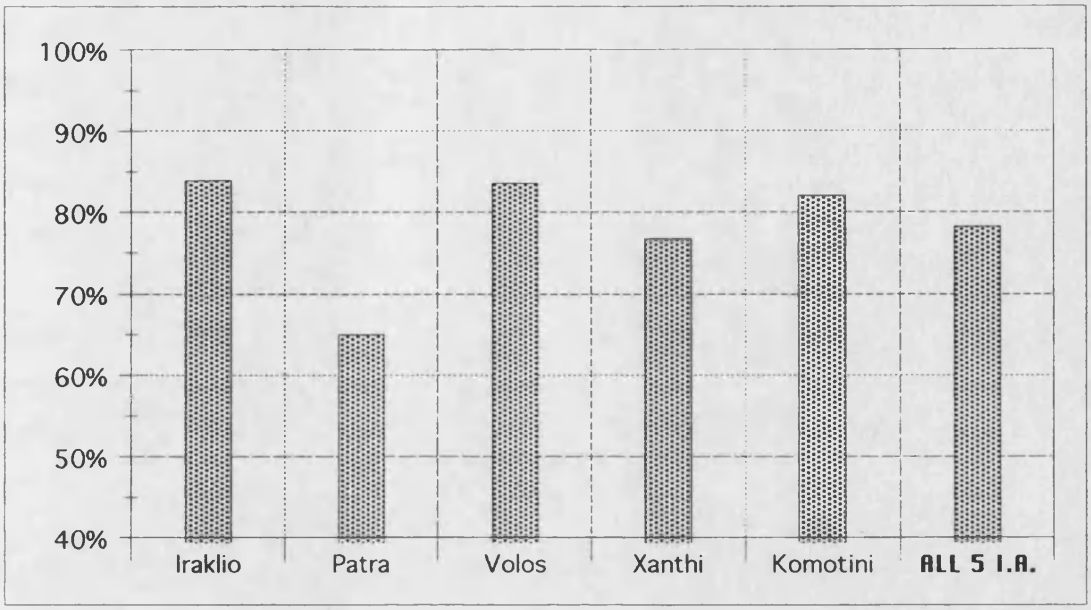
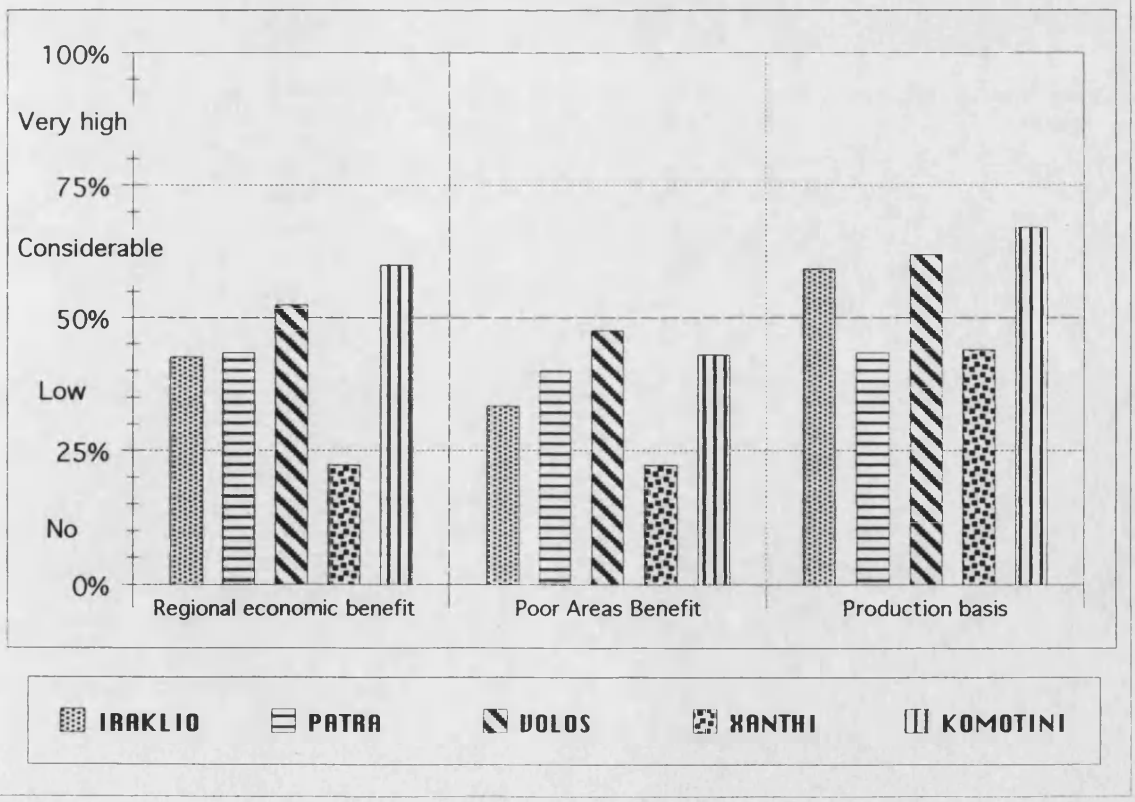


Figure 6-30: Regional benefits due to the Industrial Areas as perceived by firms established in the sample Industrial Areas



surveyed . A markedly higher 'labour-attraction' percentage can be seen to occur in Patra. Up to an extent it is due to the presence of larger firms that carry out recruitment procedures over wider areas. It is no coincidence that the firms there, have declared the greatest shortages of local skilled employees. The ties of the Industrial Area with the city of Patra seem not to be the close. Overall in summary it appears that interregional migration due to jobs seems not to be high. On the other hand the significant figure of 22% of this type attracted labour shows that to a considerable extent all suitable local labour has been offered an opportunity.

A measurement of the extent of differentiation of the regional production bases with the emergence of the Industrial Areas Programme was next attempted. Differentiation involves two basic issues. First, it involves the attraction of new industrial activities to the region and second the restructuring of the existing economic activity. This is undertaken in an attempt to estimate subsequent economic benefits to the region. Percentages are calculated to show the intensity of the perceived effects and these are given in Figure 6-29. The general overall outcome is 'considerable' (or 55%). This is much the case for Komotini which achieved 67% on the scale, for Volos at 62% and for Iraklio at 59%. The effect is lower in Xanthi 44% and in Patra at 43%. Differentiation of the regional production basis, due to the presence of the Industrial Area project, gives some hints about the past and the present of the recipient regions. For example, in the cases of Komotini and Iraklio, the Industrial Areas have created two brand new industrialising areas. Volos has become a rather rapidly restructuring industrial area. In Patra on the other hand the Industrial Area is still rather static. It has had only modest results in attracting new industry, and much less than expected effects on 'saving' the existing largely declining industrial basis of the region. Still though, the restructuring which has taken place has created some benefits to the region.

Consequently, respondent firms estimated the regional benefit due to the existence of the Industrial Areas. Distinctly, the benefit for the poorest, rural or deprived parts of the region was estimated. Perceptions are illustrated in Figure 6-30. On average, regions seem to have had benefits reaching the 44% level, or rather moderate. Overall the poorest parts in the sample regions are thought to have benefited somewhat less, by some 37% of the maximum, in other words 'little'. At regional level, in Komotini the region seems to benefit 'considerably' by 60%, and 43% for the poorest parts as does Volos by 52% and 48% for the poorest. Patra benefits less, at 43% and 40% respectively and Iraklio at 43% and 33% . In Xanthi the figure is 22%, or too low for both the whole region and the poorest or deprived parts.

All regions are perceived to have had some considerable benefits as the estimations show. The poorest parts of the regions in general, have benefited less than the whole region but this could difficult be else. The poorest, rural or deprived parts of the regions would probably be less appealing for jobs or investments spinning off by the Industrial Areas than each region's capital city. Such parts, would only be better of, if care was taken that a favourable sectoral distribution of the Industrial Areas activities would create economic links with them. In the case of Komotini it seems that what the Industrial Area has offered is so important to the region because the likelihood is that otherwise there would be very little, if any industry there. The low benefits for Xanthi are due to the limited participation, partly due to the more recent start of the project. The region with the highest positive effects on the poorest parts due to an Industrial Area, is Volos. Here, although the specialisation of the project is anything but for food or crops processing, the high appeal of the Industrial Area for capital has offered the poorest regions ample employment possibilities.

The availability of the infrastructure provided by the Industrial Areas for use by local communities was also checked out. This shows the extent to which communities receive such an indirect benefit, irrespective of employment generation or other main aims of the projects. As regards such use, it turned out that the road network of the Industrial Areas are used by the local communities, where this is helpful. (Iraklio, Patra and Volos). The local dynamics are such, that although Industrial Areas carry all provision and maintenance, they would not prohibit public use. Additionally, the sewage treatment when provided by the Industrial Areas, is used by the local communities at a nominal or zero charge. (Patra, Komotini). However, as described, use of water by industry, (paper, textiles) causes need of new costly deeper drilling for water, that cause dispute with local communities. (Patra, Komotini, Iraklio). Again the local dynamics are such that the Industrial Areas usually give-in to the local demands.

In all cases the Industrial Areas are perceived to moderately help the local self-reliance in terms of economic and social development. The Industrial Areas Programme itself has been shown to be important as regards the process of regional industrialisation. The Industrial Areas appeal to investors is not low, and more important still, is the potential to encourage better penetration to the local economic networks and more beneficial local interaction. As a conclusion, it seems that with time the regions gain and the local populations tend to realise the benefits from the Industrial Areas. Industrialisation of rural areas causes some environment disturbance and sometimes leads to dispute over resources.

6.6 Perceptions of success or failure, operational and efficiency issues

As regards the perceptions of the administration on the issue of levels of success of the Programme, the head of the Regional Development and Industrial Infrastructure division (ΠΑΒΥ) of the ETBA bank is of the opinion that three sectors need more effort and development. These are, in order of importance, the policy for improvement of the expertise of administration executives and officers, the regional planning and land use policy, and the policy for the adoption new technology. The answer to the question as to whether the Industrial Areas actually attract technologically developed and competitive firms was that the authorities did not know. The fact that there has not been any research in this field and there are no data available was emphasised but the authority was keen on having relevant evidence. The central Industrial Areas administration though, as expected, believes that whatever has been achieved is done with much effort and is the best that the conditions allow.

Any critical evaluation of the Industrial Areas Programme should consider this sort of statement of limitations by administration. The situation shows that although some attractive results have been attained in some cases, several further steps have to be made for the Programme of the Industrial Areas to be more efficacious. Greater efforts in improving the functional efficiency of administration and planning for better provision of the infrastructure are of course both necessary and desirable. However it seems clear that distinct policy oriented towards technological improvement would be one that would maintain and enhance the competitiveness of industry. Competitiveness is the key to providing market share. For many respondents in the survey the latter was assessed to be the most vital factor for their businesses development.

To estimate the local disadvantages in the Industrial Areas, a question was posed to the local administration regarding the reasons of firm closures. The first reason put forward was the bad administration of the firms themselves. This is clearly a problem, especially with small and family companies. The second reason advanced is the relatively high re/location cost and the consequent lack of operational capital by the firms. Related to this is the comment concerning the lack of financial sources or venture capital and the high cost of money. However these last mentioned reasons may, in some cases, simply hide some propensity for

speculation. The national industrial incentives system supports the establishment or relocation of new or existing firms to assisted areas and especially in the Industrial Areas. Thus there can be interest by relocating firms to make larger expenses on this field than those rationally needed, since they bring in large amounts of cash from the state. These can reach 20 -50% of the new investment. Building a new factory at half the cost is always interesting, even if later in cases it proves it can not profitably operate. A third main reason arises from the relatively high transportation costs and lack of specialised workforce in distant regions. Peripheral areas seem to suffer unavoidably higher transportation costs and also have access to a less specialised workforce as well as rather limited local demand. But they also often suffer infrastructural disadvantages and somewhat less information that the Industrial Areas should reasonably provide.

With regard to the above reasons given by the administration for firm closures, it is interesting to see that none speaks about lack of competitiveness or technological status. It may be that administration has not perceived the need for competitiveness and the technological status needed for this. But it also may be, as was indicated earlier, that such levels are usually above average in the Industrial Areas anyway, certainly compared to the surrounding region. In any case the rate of closure in the Industrial Areas is perceived to be considerably lower than that of firms nationally.

No overt cases of pure property speculation were given by administration, possibly because firms cannot sell their land and premises at the first instance, if they shut down. But eventually they can, if they are free of any other financial obligations and if the buyer is acceptable to the Industrial Area. This might be a field that needs more attention since there can be some scope for private speculation, within such an expensive social project as that of the Industrial Areas. Even simple occupation of valuable but idling industrial land in the Industrial Areas is considerably reducing the efficiency of the Industrial Areas as they were planned.

As regards the firms' perceptions, a measurement was attempted on how important was the existence of the Industrial Areas in their decision to locate in that specific region. Firms in Volos gave the highest importance to the existence of the Industrial Area (69%), understandably due to the good infrastructure and the large firms that seem to use it more than the smaller ones. Volos is closely followed by Patra,(67%) also due to the predominance of large firms. In distant Komotini importance was somewhat lower (53%) being spread amongst the smaller firms that would be in the region anyway, and the larger ones mostly attracted due to the higher incentives. But in Iraklio and Xanthi the importance of the Industrial Area

in location in the region was low. Thus to better measure the above indication, the established firms were asked if they would be in the region, irrespective of the existence of the Industrial Areas. In general it turned out that 31 out of the 55 surveyed firms (or 56%), established in the Industrial Areas would be in the same region anyway. Thus, something less than half (44%) of the established firms were attracted to the region due to the Industrial Areas themselves. Regional percentages of course do vary in this respect. In Volos some 71% of the firms can be said to have been attracted to the region by the project. In Patra the figure is 70% and in Komotini 60% of the firms have been similarly attracted. But in Iraklio only 6% and in Xanthi none of the firms would have established in a different region had the local Industrial Areas not existed. **(Figure 6-31).**

The function of the various Industrial Areas seems different. It seems that firms in general took quite seriously into consideration the Industrial Areas Programme as regards their location decisions in Volos, Patra and Komotini, where firms are mainly not local. In these cases firms are usually attracted due to the infrastructure offered by the Industrial Areas and the locational financial incentives, and they give rather minor importance to the local demand for their products. On the contrary, the Iraklio and Xanthi Industrial Areas mainly serve local industry, although each for different reasons. In Xanthi the infrastructure offered up till now is not adequate and the financial incentives are the same in its neighbouring Komotini where firms are offered better industrial environment and cooperation potential. Thus, firms relocating from the centre to this part of the country would normally opt for Komotini. In Iraklio, the fact that the Industrial Area is on an island, twelve sea-journey hours away from the capital, has adverse effects on its wider location appeal at national level. In comparison, Patra is only 2.5 hours away from Athens, and Volos only four hours from Athens and three hours from Thessaloniki. On the other hand, Iraklio and Kriti in general can dispose sufficient demand for few branches of larger firms to operate there and serve specifically the island. The attraction, though, of the Industrial Area of Iraklio is not minor, since it has attracted so many local firms and has the highest occupancy rate of all areas surveyed.

Finally, firms were asked if, after their establishment in the Industrial Areas, they enjoy locational and operational advantages or disadvantages. The question was considered by the firms as a most important one. Here, although possible answers were structured, firms tended to give longer comments or discourses as answers. Still, though, the structured answers show that in general, the five surveyed Industrial Areas offer to their firms some 38% of the maximum possible

Figure 6-31: Proportion of the firms attracted to the region by the Industrial Area

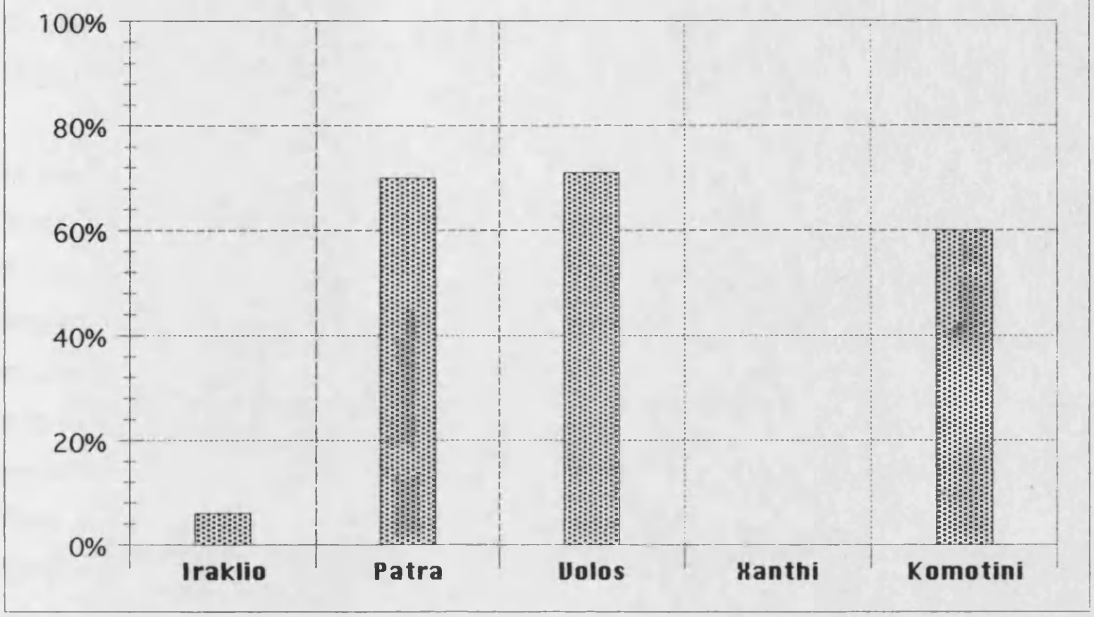
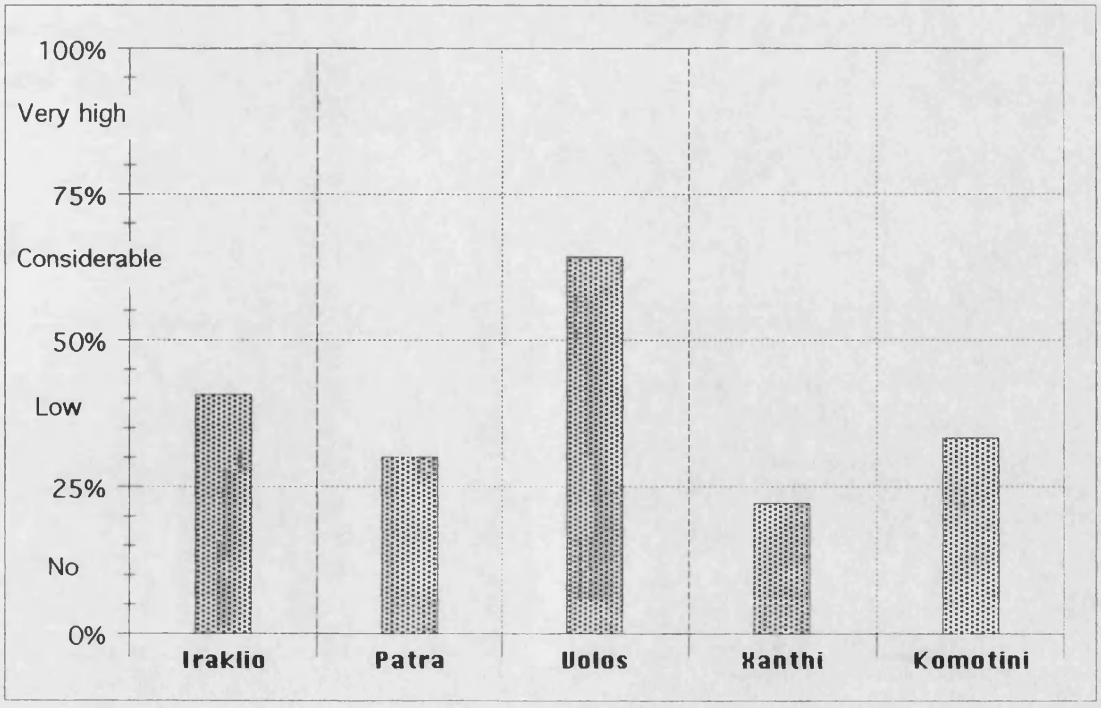


Figure 6-32: Locational and operational advantage in the Industrial Areas as perceived by firms established in the sample Industrial Areas



expected advantages. Volos is shown to offer 'considerable' advantages, or 64% of the best expectations of the established firms. Such perception elsewhere is weaker, in Iraklio being 41%, in Komotini at 33%, in Patra at 30% and finally in Xanthi at 22% which is quite low meaning no advantage, to the moment at least. (Figure 6-32).

The above scores actually show the firms' own evaluation of their own location decision, and reveal what their benefits from the Industrial Areas are. Additionally it is a general evaluation of their local Industrial Area project. Industrial Areas that accommodate firms experiencing operational advantages are bound to attract and concentrate more firms, and create even more employment and local income. The answers also include the feelings of the firms for the local factor, as was made clear with comments on this subject. The Patra versus Volos distinction is important. Although both areas have almost equal proportion of 'attracted' firms, firms after ten years of establishment feel that in Patra they have half the benefits compared to those in Volos. Patra's project is not well connected and it also seems the area has an industrial relations problem. Komotini scores rather well for its distant location, being slightly above Patra. Firms in the Industrial Area of Iraklio in reality ought to declare higher advantages. There a majority of local firms, without moving from their region, receive incentives to be in the Industrial Area. The project there is regarded as a success. But some inefficiencies in infrastructure that persist even now that the project is full, is the cause of some regret by the firms. There may well be a case for some more money to be put into this project to increase its efficiency, before a soon-to-be-needed second Industrial Area is planned on the Island.

6.7 Conclusion

The Industrial Areas Programme, financed mainly by the state with some support by the European Union, is growing steadily, both in number of participant firms and in total employment, on various sites amongst the peripheral regions of Greece.

The firms established in the surveyed Industrial Areas seem to enjoy advantages of an adequate and affordable operational space, good on-site roads, mostly good power supply, vehicle parking, sewage treatment and, to some extent, cooperation with other firms established there. On the other hand, established

firms believe, in cases, they still have some operational disadvantages compared to their more centrally located competitors. These are due to some persisting problems with the infrastructure provided, such as inadequate connecting roads, water provision and in cases poor telecommunications. Also, lack of on-site services, such as post, bank, school, nursery education, railway station and other transportation facilities, proves to be affecting quite seriously the established firms, as is the lack of on-site administration for some projects.

The local effects of the Programme are mainly related to some moderate net employment creation and increase in local income and some land use benefits. It is understood that services provision within the Industrial Areas and workforce training schemes would also improve the local quality of life. It can be said that sites attract their targeted attention of industry slowly, in ten or even more years of operation. This slowness of integration of the projects in the regional economic life is also due to the lack or ineffectiveness of administration at the local level. Reason, though, is not incompetence, since efforts are evident, but rather a lack of participation of the local factor in the planning and development of these projects.

Last, but not least, technological levels of firms in the Industrial Areas seem to be higher, and the closure rates lower than average. In the surveyed Industrial Areas a substantial number of firms are aware about the need of new technology, and do some research. Financing technology is important but not first priority for most firms. There is a marked need for administration to start actively promoting orientation to technology and innovation in the Industrial Areas. This will help to maintain and enhance the competitiveness of the firms in the surveyed and the other Industrial Areas.

Chapter 7 : Evaluation of the effectiveness and the costs of the Industrial Areas Programme

7.1 Outline of policy evaluation procedures

A number of methods have been used in the field of the evaluation of assisted-area policy effects. The methods can be broadly grouped into three broad classes.

The first is the time series evaluation group, using differential trends as regards the effects of the policy. The methods are based on distinguishing differential growth rates during selected policy 'on' and policy 'off' periods. The concepts of the factual results and the counterfactual condition are employed. The factual refers to the observed results given the policy, while the counterfactual is the potential results had the policy been not in existence mainly described through effects net of those nationally expected. A fundamental problem emerging from the division of results on the basis of policy 'on' and policy 'off' periods is that internal regional conditions for each period and regional / national performance trends external to the model are difficult to account for. This is due to the timing orientation of the methods.

Alternatively, cross sectional methods try to distinguish differential performance related to areas targeted and not targeted by the policy. These may be thought 'on' and 'off' regions or intra-regional clusters. One advantage of the cross-sectional method is that it seeks the counterfactual conditions in simultaneous timing with the factual, thus it is not affected by national or market trends, and migration trends external to the model. Difficulties may arise in such models in the counterfactual condition estimation due to linkages of policy 'on' and 'off' regions or clusters, as well as trying to control for the different conditions existing in different regions. To these methods also belong the various analyses of industrial specialisations.

The third group of analyses involves those couched in cost benefit structures. Here, the costs of a project or policy and benefits stemming from it are

compared through various schemes. The measurement of intangible costs and benefits and perceptions of time spans and time preference are known difficulties of these methods.

In this stage of the present study, analyses representative of each of the above classes are to be attempted. The time series process attempt to distinguish between employment growth trends in specific regions before the Industrial Areas policy , comparing them with trends after the policy is considered 'on'. The cross sectional evaluation has the potential to make a further comparison, within policy recipient departments, using defined policy 'on' and 'off' clusters. It evaluates the differential performance of these clusters, eventually attempting to relate the policy to the achieved regional performance. The specialisations analysis evaluates the comparative growth rates of manufacturing sub-sectors attracted in the projects in relation to the national and other rates. The final part of the evaluation shall be the application of a cost-benefit analysis. The cost benefit analysis will explore different types of costs and benefits, monetary and intangible (social), in the form of two methods. The first one is of the pay-back type and the second constitutes a full-life evaluation. Both produce results on the efficiency of the Industrial Areas Programme and can provide a sensitivity analysis assuming different economic conditions.

7.2 Evaluation using time-series models

7.2.1 The main approaches of the time-series evaluation

A significant amount of research is available on evaluation of effectiveness of regional policy. A short review emphasising the main methodologies of evaluation using time-series based methods is provided next.

MacKay (1972) makes an analysis of industrial performance in development areas in the UK during the sixties. The comparison is based on projects' approvals (footage and expected employment) and is made using annual percentages and annual growth rates amongst types of development areas and between development areas and national figures. These annual rates are more meaningfully juxtaposed to their contemporary regional policy measures than projects' completions and reflect the impact and the response to the various policy measures in the correct timing. A conclusion of this work had been that assistance in the form of grants had been more effective than the more modest and widespread

subsidies.

In a later piece of work on the same context, MacKay (1975) admits two limitations of the 'approvals' dataset in that they overestimate expected employment and miss out some small projects. Thus the movement of firms statistics are suggested as an alternative while also recognising the shortcomings. Finally review is made of the classic shift-share-based actual minus expected employment comparison. The assumption made in theory is that a regional deviation from the national growth trends is either a result of the inherited structure of industry, the regional industrial mix, or the result of regional policy. He suggests that the method, although more precise than the others reviewed, has complex and variable time-lags between implementation of the policy and its effects on employment. This is understandable because of the different life-cycles of the production methods and plants that have been suggested later. MacKay also suggests that the impact of the macroeconomic situation of the country is also reflected in the impact of the regional policy, and this is not accounted for by the method. Results of this paper again conclude to that 'blanket' subsidies do not bring expansion.

Moore and Rhodes (1976) also analyse the effectiveness of regional policy in the UK. Their approach has been to relate the number of industrial moves to the changing strength of the regional policy. They initially measured the new factory openings. Then, using as a guide the number of moves to development areas at a period when regional policy was in abeyance, they predicted moves into the same areas during active policy periods and made comparisons. To do this they fitted regression equations, where the moves to the development areas were regressed against the intensity of various policy instruments. The derived estimated moves were compared with the actual, for different periods and regions. Subsequently, using average jobs per move indices they come to encouraging conclusions suggesting that the regional policy package has generated substantial number of manufacturing jobs.

Ten years later, Moore, Rhodes and Tyler (1986) on the same context of policy evaluation use again the classic (shift-share-based) methodology. The evaluation is based on comparing the regional industrial mix alternative or 'expected' position to the actual. Consistently, the expected regional position was constructed as if each industrial sub-sector had grown at the same rate it grew nationally. By subtracting the expected from the actual the resultant shift is regarded to be due to policy. With this methodological framework they proceed to divide firms to indigenous and immigrant and subsequently disentangle the effects of individual instruments of policy as in their previous work. Two main findings to be

mentioned here are that, first, about one third of sub-sectors responded to policy in a way that jobs were destroyed. Second, that three quarters of the policy assistance was channelled to one quarter of the sub-sectors, among the latter being some of the least job-creating.

7.2.2 Basic assumptions for the time-series procedure

The analytical procedure here is a chronological trend estimation of growth trends belonging to national and sub-national spatial divisions, before and after certain time points, all to be specified in relation to the Industrial Areas policy. The growth rates and trends of the later periods are to be analysed in the light of, and in comparison to the trends in the former periods.

First, the relevant periods are defined. The critical time point is the year 1978 which is used to divide active and inactive policy periods. This date is convenient due to the availability of the National Industrial Census of the same year. The 'off' policy period is taken to be from 1978 back to 1969, for which date detailed data are also available from the Industrial Census of that latter year (sources: ΕΣΥΕ-3, various). By 1978 the Industrial Areas Programme was at a very early stage of operation. There were five Industrial Areas in operation, but only two of them were of a substantial size. The regional development legislation was first introduced in 1978 and became comprehensive only in 1981/1982. Thus, from 1969 up to 1978, the growth patterns and characteristics will be regarded as belonging to a 'passive' policy period.

From 1978 onwards, a larger batch of Industrial Areas gradually started operations, and began to produce some effects in the recipient regions. The period from 1978 to 1984 can be regarded as a transitional period, or as a 'partially on' period. By 1984 there were sixteen Industrial Areas in operation and the financial and other incentives of regional policy were in full deployment. Thus, from 1984 until 1988, a benchmark due to the latest National Industrial Census of 1988 (ΕΣΥΕ-3, unpublished), produces a period which can be regarded as 'fully active' in policy terms, or the policy 'on' period.

Second, the terrain of the policy has to be defined. All regions of Greece are first regarded as one large region, to form the national policy terrain, on which the effects of policy 'off' and 'on' periods are to be demonstrated. Subsequently, a sixteen-region cluster is to be examined, to be called 'Sixteen', that constitutes the regions that had an Industrial Area in full operation after 1984. This sixteen-region cluster can be further divided to two others. The first is a five-region cluster, the 'Five', where the Industrial Areas were operating between 1978 and 1984, for

which cluster the transition period (1978-1984) can be regarded as policy 'on'. The second is an eleven-region cluster, the 'Eleven', where the Industrial Areas were active only after 1984. A final cluster can be distinguished, as the national 'terrain' minus the sixteen-region Industrial Areas-cluster, named 'Greece - Sixteen', to show the fortunes of the regions not affected by the Industrial Areas policy.

7.2.3 Evaluation using two classic time-series arrangements

Initially the actual change of manufacturing employment is traced among regional groups and periods. Manufacturing employment figures for the defined regional groups, showing also their construction, and for all periods are given in detail in Table 7-1. The actual effects of the policy are demonstrated in Figure 7-1, where the growth path of a typical sample of 100 employees in 1978, in each of the above distinguished clusters, is traced through the policy 'off' and 'on' periods. The actual average annual growth rates for each period and cluster are also given in the first part of Table 7-2.

From this analysis it appears that for Greece, the national average annual growth rate for manufacturing during the policy 'off' period of 1969-1978 was 3.3%, while for the transitional period (1978-1984) it became 0.3% and in the policy 'on' period (1984-1988) it became 0.8%. This assigns few credits of positive effects to the policy on national level. However an analysis of the details of this shift needs to be made. For example what happened in the 'Sixteen' group -the Industrial Areas cluster? There it can be seen that for the policy 'off' period of 1969-1978, the annual growth rate was 3.9% annually, that became 2.3% during the transitional period and further fell to 1.6% in the policy 'on' period. The analysis suggests a continuous worsening of the growth rates of the specific policy-recipient regions.

If the sixteen-region cluster is decomposed to the five older Industrial Area regions cluster, and the eleven new Industrial Areas cluster, the following arise. The 'Five' grew at 3.7% annually for the policy 'off' period, which became 2.3% during transition period (policy-'on' for this cluster) and 2.2% for the last period (1984-1988). It seems then that the 'Five' were somewhat worse-off with the policy. But also, the 'Eleven', the regions that mainly received the policy after 1984, continued decreasing their annual growth rate from 4.2% at policy 'off' to 2.3% at transition and 0.9% at policy 'on'. This means, following the logic of this analysis, that the regions which specifically received the policy aid experienced the gravest decline at policy 'on' period. Interestingly, the 'Greece - Sixteen' region, the non-recipient

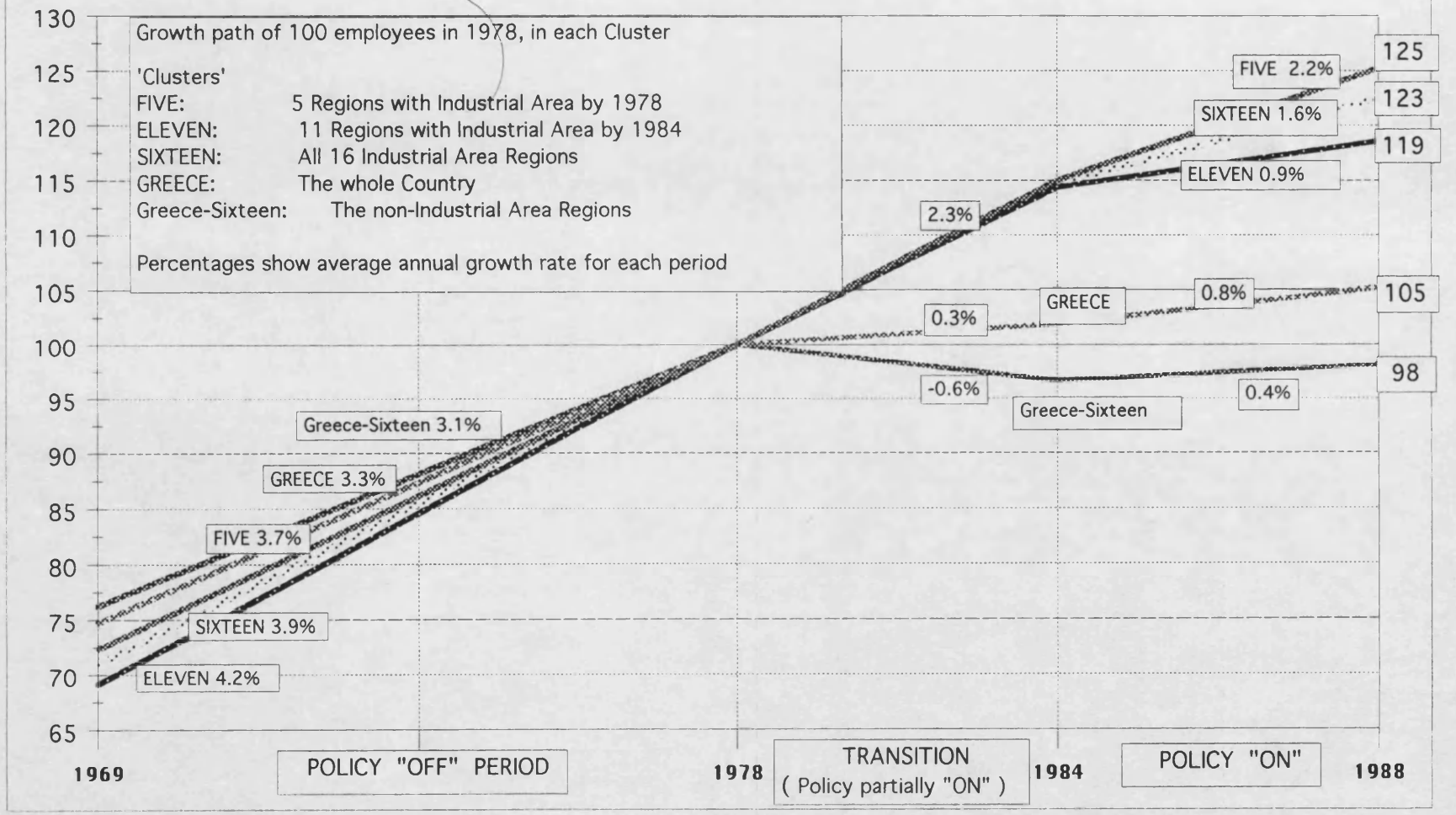
Table 7-1: Regional employment in manufacturing of selected regions of Greece, 1969 - 1988

Regions	1969	1978	1984	1988
1. Thessaloniki	59282	82886	96726	106919
2. Magnisia	10170	14788	15507	14612
3. Iraklio	8988	9124	9783	10631
4. Preveza	1252	1821	2216	2064
5. Drama	2854	5542	6987	8673
Sum FIVE	82546	114161	131219	142899
1. Ioannina	3897	5634	6605	6397
2. Rothopi	2463	2839	3893	4187
3. Kavala	6947	8053	9730	11279
4. Achaia	16425	21119	22507	21186
5. Fthiotis	4639	8529	8672	8480
6. Xanthi	2009	4268	6338	6949
7. Serres	5873	8273	9077	10208
8. Larissa	8626	14731	16503	17171
9. Arcadia	2460	2629	2709	2956
10.Florina	1106	1195	1402	1208
11.Kilkis	1525	3721	5164	6002
Sum ELEVEN	55970	80991	92600	96023
Sum SIXTEEN	138516	195152	223819	238922
GREECE	501522	671496	684147	706306
Greece-Sixteen	363006	476344	460328	467384

Table 7-2 : Average annual growth rates in manufacturing of selected regions of Greece, 1969 - 1988

Groups of Regions	Actual employment growth rates (average annual)			Actual - expected (expected: unweighted national manufacturing rate)			Actual - expected (expected: weighted by subsectoral national rates)		
	'69-'78	'78-'84	'84-'88	'69-'78	'78-'84	'84-'88	'69-'78	'78-'84	'84-'88
Five	3.7%	2.3%	2.2%	0.4%	2.0%	1.4%	0.7%	1.9%	1.7%
Eleven	4.2%	2.3%	0.9%	0.9%	1.9%	0.1%	1.3%	2.0%	0.0%
Sixteen	3.9%	2.3%	1.6%	0.6%	2.0%	0.8%	0.9%	2.0%	0.6%
Greece	3.3%	0.3%	0.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Greece-Sixteen	3.1%	-0.6%	0.4%	-0.2%	-0.9%	-0.4%	-0.4%	-0.9%	-0.3%

Figure 7-1: Regional manufacturing employment; annual growth rates in different periods



regions, shifted from 3.1% annual growth at policy 'off' to -0.6% during the transition but up to 0.4% at policy 'on'. The result then would appear to show that the policy much worsens the growth of the recipient regions, while the non-recipient manage to slightly improve their position.

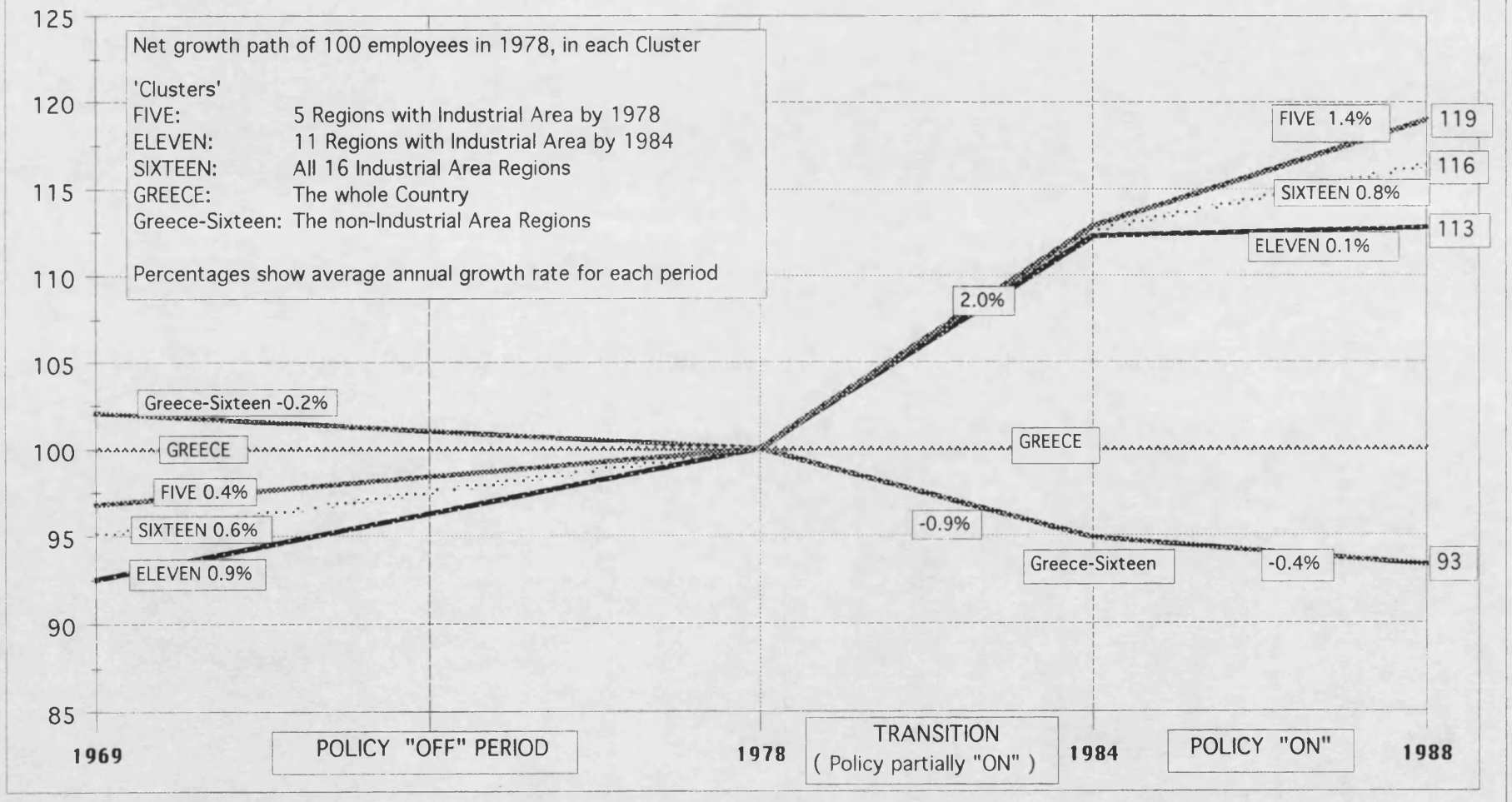
As a first counterfactual arrangement, the annual growth rates of the various clusters are presented net of the national manufacturing growth rate, without accounting for regional sub-sectoral mix. These figures are the actual minus expected employment change paths of the regions, where the expected regional overall manufacturing growth rates are assumed to be the same to the overall national manufacturing growth, for each period. These are shown in the second part of Table 7-2. An illustration of this kind of counterfactual assessment of the policy effects on all manufacturing employment for each group of regions is made in Figure 7-2.

Thus at policy 'on', the 'Five' (old Industrial Area regions) grew annually at 1.4% ahead of the nation and the 'Eleven' (new Industrial Area regions) at 0.1% ahead. This makes the 'Sixteen' to grow at 0.8% ahead of the national rate at the policy 'on' period, while the non-Industrial Areas regions grew at 0.4% below the national average. From this point of view the employment growth of the Industrial Areas regions is seen to be better than the national average and beyond comparison to the non-Industrial Area regions that fall short of the national average.

These quite encouraging results as regards the policy, if seen through the time-trends analysis, lead to somewhat different conclusions. The 'Five' grew at policy 'on' at a rate of 1.4% above the national and 2.0% during the transition ('on' for the 'Five'), while they had only achieved 0.4% above national at the policy 'off' stage. But the time profile is not as good for the 'Eleven'; the 0.1% above the national rates at policy 'on', was 1.9% during the transition (practically 'off' for this cluster) and had been 0.9% before. This is not an encouraging result. For all 'Sixteen', the 0.8% above national rates at policy 'on', was 2.0% during the transition but it had been 0.6% at policy 'off', a mild but positive an effect if the first and the final periods are compared.

The method's counterfactual is not as strong as it might be, it could be argued, since the specific sub-sectoral mix of each region (and clusters) is not assumed. It does have analytical value though, since the actual employment differentials are the ones that the regions realise. In this method the expected employment is not constrained by the national growth rates of 'given' mix, and the latter can be allowed to change individually within a region through time.

Figure 7-2: Regional manufacturing ; growth rates in different periods, net of unweighted expected growth



The second counterfactual arrangement is more widely used. It is argued, not without reservations (MacKay 1975), that the sub-sectoral mix of each region's manufacturing determines the expected growth rate of the manufacturing sector of the region. Here the expected regional figures for each time are based on the product of the regional sub-sectoral mix and the national growth rate for each sub-sector of manufacturing, for each period. The growth figures for the earlier defined regions following this method are given in the third part of Table 7-2. The illustration of the typical sample's growth in this type of counterfactual assessment is given in Figure 7-3.

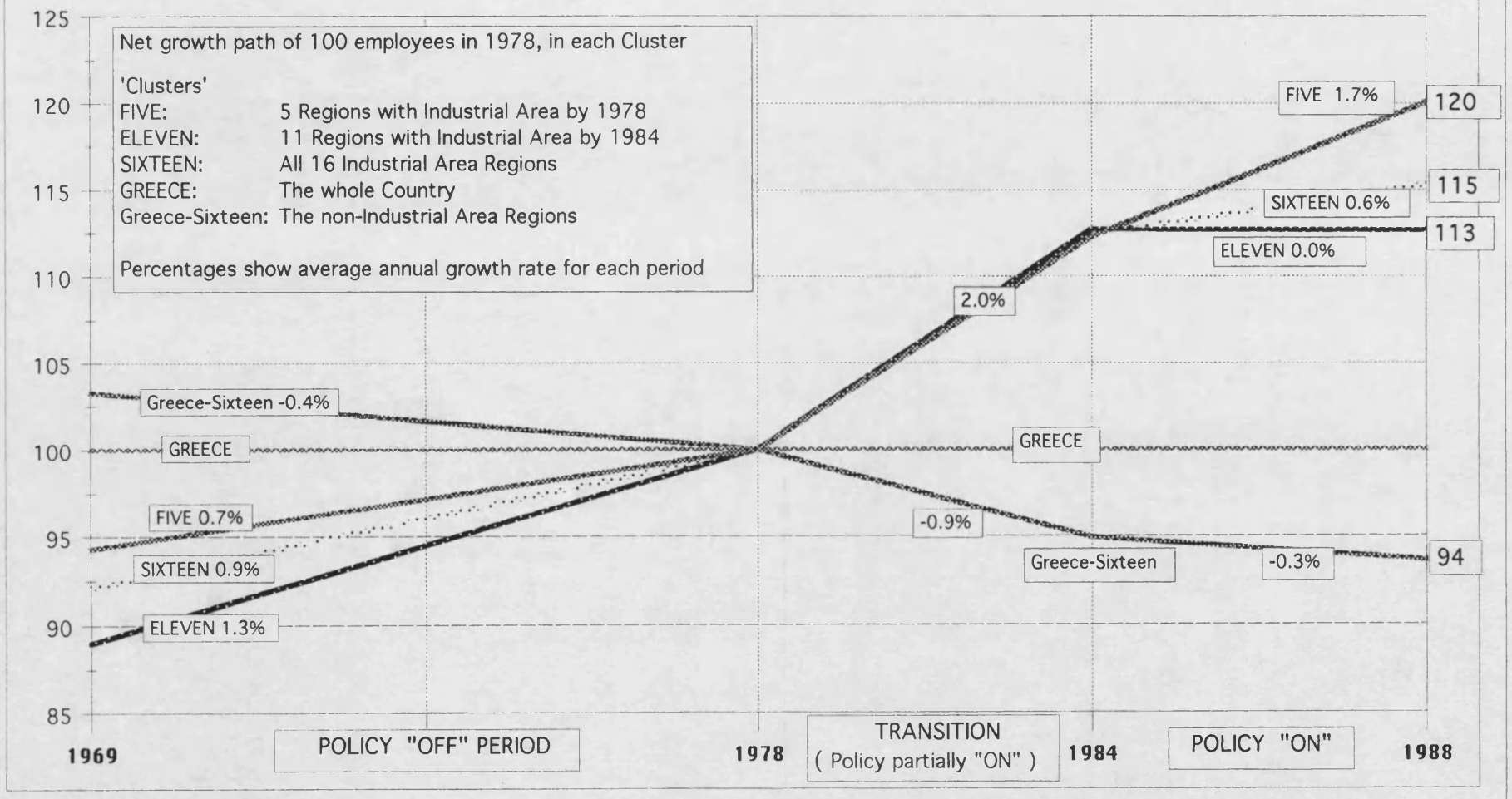
From these results it can be seen that while the figures are somewhat different, the main conclusions are verified and remain. The 'Five' are clearly better-off during the policy 'on' period albeit with a diminishing momentum. Their weighted net annual growth rates had been 0.7% at policy 'off' and became 1.9% and later 1.7% during policy 'on'. These figures for the 'Eleven' are 1.3% at policy 'off', that became 2.0% during the transition but reduced to 0.0% at policy 'on', showing that the effect remains as found earlier. Overall for the 'Sixteen', the net growth at policy 'off' had been 0.9% annually, that became 2.0% for the transition to reduce to 0.6% at policy 'on'. The method shows a slight comparative decline if the first and final periods are compared, instead of the slight positive effect of the previous arrangement. The non-recipient group of regions is found to start at -0.4% at policy 'off', further decline during the middle period at -0.9% and slightly improve, still having a net decline though, at -0.3%.

The above types of analyses suggest, in short, that there has been some increase in growth for the older policy recipient regions but no such success for the more recent ones, and the overall effect is rather neutral. It could perhaps be said that the early projects absorbed much of the potential of the economy and less was left for the later ones.

7.2.4 A specially weighed time - series method

The Industrial Areas-policy is affecting the different sub-sectors in manufacturing at different intensities, that is some sub-sectors are more sensitive to the policy and some less. To take into account the effect of the above, a more appropriate application of the sub-sectorally weighted methodology would be to use a weighing reflecting those sub-sectors of manufacturing that are more responsive to the specific Industrial Areas policy. A custom made sectorally representative sample deriving for each region was considered. The following arrangement was deployed.

Figure 7-3: Regional manufacturing ; growth rates in different periods, net of subsectorally weighted expected growth



From the survey that was carried out in five Industrial Areas, the exact employment of each participant firm and the firms' sub-sectoral classification were available for 1988. But a set of sub-sectoral growth rates for the above defined periods was unavailable, especially for the initial periods. Even for the final policy 'on' period, small or zero employment figures for some of the twenty sub-sectors of manufacturing for the base period would cause relevant computational problems. Thus the Industrial Areas-specific sub-sectoral growth rates could not be produced and utilised as in the previous method.

Instead, the available dataset for 1988, was used to produce a representative typical Industrial Areas-specific sub-sectoral participation set, to be called the 'Industrial Areas-mix'. This, which has to be supposed as fixed for the whole evaluation period, shows the intensity in which the various sub-sectors are attracted to the Industrial Areas and subsequently 'affected' by the policy.

Thus the 'Industrial Areas mix' provides the weights vector. This can be understood as 'applicability-of-policy' for the non Industrial Area regions, and speculatively as 'responsiveness-to-policy' for the Industrial Area regions. The weights set is applied to the actual mix of all regions whether possessing an Industrial Area or not. The suggested arrangement produces policy responsiveness weighted employment samples for all regions and examined periods. The employment samples are obtained as follows:

$$(r_{j1}, r_{j2}, \ldots r_{ji})_t * (w_1, w_2, \ldots w_i) = (s_{j1}, s_{j2}, \ldots s_{ji})_t$$

Where $(r_{ji})_t$ is the regional employment for each of the j = 51 regions and the i=20 manufacturing sub-sectors, for the t=4 reference years, (1969, 1978, 1984 and 1988) ; the w_i are the 'Industrial Areas mix' weights for the i sub-sectors; the$(s_{ji})_t$ are the derived weighted employment samples.

Subsequently, the average annual growth rates are extracted and these are comparable among regions, groups of regions and time periods.

It is understood that within the resultant employment samples, the sub-sectors are not represented by percentages equal to the original regional mix. With the suggested method though, the original regional mixes are biased equally for all regions and time periods to reflect the responsiveness to policy through the 'Industrial Areas mix' weights. The logic of the argument is that the more similar the mix to the Industrial Areas-mix a region develops over the years, the larger the product weighted employment sample becomes, which subsequently transformed to relevant growth rates reflects larger regional gains from the policy. What is captured is how the Industrial Area regions have responded to the policy over time,

in comparison to themselves and to the similarly 'filtered' non-recipient regions.

The results are shown in Table 7-3. The national annual growth rate for the policy 'off' (1969-1978) is 3.2%, it falls to 0.1% during the transition period and rises again to 0.6% at policy 'on'. (The relevant figures of the original dataset had been 3.3%, 0.3% and 0.8%). It appears that this method of measurement is quite consistent to the original.

On the other hand it can be seen that the derived sample's growth rates are somewhat lower than the ones of the original national manufacturing. This means that the sectors affected by the policy, or in other words the ones that the Industrial Areas more intensively accommodate are not the fastest growing ones. But if the change from 'transition' to policy 'on' is observed it seems that the acceleration given by the policy to the national weighted sample is considerably stronger in relation to that for the original unbiased all-round manufacturing set. This means that the supported sub-sectors may not have been the fastest growing ones nationally, but the policy (on) manages to increase their growth rate, at a faster pace than the general manufacturing.

Beyond the national figures, the arrangement can give indications for the effects of the policy over time, for groups of regions. Thus, the 'Five' (old Industrial Areas) show somewhat increased annual growth rates, from 3.3% at policy 'off' to 1.8% at transition ('on' for the Five) and further to 1.9% for 1984-1988. With the original data the trend was diminishing as shown (from 3.7% to 2.3% and 2.2% respectively). The difference although subtle, shows first that the 'Five' considerably concentrate the Industrial Areas favoured sub-sectors, quite expectedly since the Industrial Areas there are older established. This is explained by the derived growth rates that are lower, given that these sectors are slower growing. Second, it shows that these sub-sectors are actively accelerated by the policy (at policy 'on'), enough to manage to change the diminishing original regional trend into an increasing one in the weighted arrangement. Consistently, if the growth rates of the 'Five' are assumed net of the weighted-national, the weighted method suggests that the policy 'on' period brought a relative increase to the regions from 0.1% ('off'), to 1.7% and 1.3% ('on') above national rates. This suggests a faster acceleration and a softer decline than those of the original data set (from 0.4% to 2.0% and to 1.4% respectively).

The weighted method also gives results in the same direction as the original methods for the remaining groups of regions. In fact it intensifies the more subtle policy effects found originally. For example, for the 'Eleven' an 'ineffectiveness' conclusion was traced with the original methods. The net of national growth rates

Table 7-3: Average annual growth rates in manufacturing of regional samples weighted for Industrial Areas' specialisations

Regions	Actual growth rates of weighted samples			Actual - expected growth rates (expected: at rate of national sample)		
	69-78	78-84	84-88	69-78	78-84	84-88
1. Thessaloniki	3.4%	2.3%	2.5%	0.2%	2.1%	1.9%
2. Magnisia	4.5%	-0.8%	-1.8%	1.3%	-0.9%	-2.4%
3. Iraklio	-0.6%	1.3%	1.7%	-3.7%	1.2%	1.2%
4. Preveza	4.5%	3.0%	-0.9%	1.3%	2.8%	-1.5%
5. Drama	7.4%	3.4%	3.8%	4.1%	3.2%	3.2%
Sum FIVE	*3.3%*	*1.8%*	*1.9%*	*0.1%*	*1.7%*	*1.3%*
1. Ioannina	4.0%	3.8%	-1.0%	0.8%	3.7%	-1.6%
2. Rorhopi	1.8%	3.8%	3.0%	-1.3%	3.7%	2.4%
3. Kavala	1.0%	3.7%	2.7%	-2.1%	3.6%	2.1%
4. Achaia	2.2%	1.8%	-1.4%	-0.9%	1.6%	-2.0%
5. Fthiotis	5.6%	-0.4%	-0.6%	2.4%	-0.5%	-1.1%
6. Xanthi	10.0%	6.6%	2.0%	6.6%	6.5%	1.4%
7. Serres	4.5%	1.4%	1.1%	1.3%	1.3%	0.6%
8. Larissa	5.8%	1.3%	0.5%	2.6%	1.2%	-0.1%
9. Arcadia	0.7%	0.5%	1.3%	-2.4%	0.4%	0.7%
10.Florina	1.7%	-0.8%	-1.6%	-1.5%	-0.9%	-2.1%
11.Kilkis	8.2%	5.0%	2.3%	4.9%	4.8%	1.7%
Sum ELEVEN	*3.8%*	*2.2%*	*0.4%*	*0.7%*	*2.1%*	*-0.2%*
Sum SIXTEEN	*3.5%*	*2.0%*	*1.2%*	*0.3%*	*1.8%*	*0.7%*
GREECE	*3.2%*	*0.1%*	*0.6%*	*0.0%*	*0.0%*	*0.0%*
Greece-Sixteen	*3.0%*	*-0.7%*	*0.2%*	*-0.1%*	*-0.8%*	*-0.3%*

for the three defined periods are now 0.7%, 2.1% and -0.2%. The effects are in the same direction and more bold than those suggested originally (0.9%, 1.9%, 0.1%). The method more precisely focuses, through the weighing, on the specific policy effects. Overall then for the 'Sixteen' a less ambiguous, but still not strongly positive, indication of a net of national growth of 0.3%, 1.8% and 0.7%, for the respective periods is produced, compared to the 0.6%, 2.0%, 0.8% and the 0.9%, 2.0%, 0.6% respective results found with the previous methods.

Still, the fact is that even the specifically-weighted method has the main characteristic the original methods have. Time series methods measure growth against each cluster's past performance. Thus they can indicate that a certain policy is causing decline to recipient regions that still grow faster than nationally. But persistent higher growth rates in the policy regions eventually increase net employment differentials from non-recipient ones, and these are not accounted for as will be shown next.

However, the design of the policy might be considered a success in that it specifically helped at the correct time certain regions that were suffering or about to suffer a decline, helping to maintain a considerable annual growth rate, faster than the one of the whole country and much faster than the non-recipient regions.

7.2.5 Conclusions from the time-series procedures

The whole structure of the analysis undertaken through the time-series methodology testing the policy 'off' and 'on' effects shows the following seemingly paradox situation. First, the national figures show increase in manufacturing during policy 'off', a decline in the transitional period and a subtle increase in policy 'on'. Based on this it could be said that the policy 'averted' a further or greater decline and reformed it to mild growth. Second, further analysis shows that recipient regions, while always retaining faster growth rates than the national, by and large reduced their speed of growth from transition to policy 'on'. While, paradoxically, the non-recipient regions mildly increased their rates of growth. Obviously, the policy is designed to attract industry rather than avert it from the policy recipient regions. Through these dynamics it can be seen again that a time-based method offers only little help to the analysis of the situation. The particularly helpful aspect of retaining of a faster growth than the national, even with smaller acceleration, by recipient regions is less focused upon by the method.

It should be added though that one critical factor affecting the results of the time-series methods as used here, is their foundation on growth rates in employment. It is understood that if another arrangement is made in measuring

absolute employment, results could be different. For example, the sample of 100 employees at the end of the policy 'off' period (1978) can be examined for each of the groups of regions, as in Figure 7-1. Measuring the absolute numbers of employees, or the absolute increase in employment, and using the original (actual employment) dataset, the following can be reported. The sixteen policy recipient regions at the end of the policy 'on' period will have larger surplus of employment compared to the non recipient ones (123 to 98, surplus of 25), than that they had at the beginning of the policy 'on' period (115 to 97, a surplus of 18).

With this arrangement the 'Five' prove to be favoured by the policy, the 'Eleven' less but still favoured, and all 'Sixteen' quite favoured as shown above. The conclusion is that the policy is actually effective as regards employment growth. It also shows that the policy proves even more effective when recipient regions have more mature Industrial Areas (Five). Another way of putting this is that the comparative advantages of the policy increase with time. This way the time series method pays attention to the fact that the differentials in volume of employment increase during the course of the policy 'on' period. But it does ignore of course the declining growth rates seen in the Industrial Area regions, and allocates perhaps more than justified credits to the policy.

Given the various shortcomings in establishing stable results with the time-series class of methods as has been demonstrated, it will be shown that a cross-sectional method can more precisely judge the effects of the policy putting more attention on the regional aspects. The time-series methods in general lack a counterfactual that would take into consideration the specific situation in each region, they often suffer from complex time lags between implementation and effects and also are affected by distorting parallel economic and social trends that are external to the model. The cross-sectional method distinguishes the performance of the policy 'on' and 'off' clusters within regions, rather than 'on' and 'off' periods, and demonstrates whether their influence was beneficial to the recipient regions or not. A timing dimension is not incompatible with the cross-sectional method, as it shall be demonstrated.

7.3 A cross-sectional evaluation procedure

7.3.1 Description of the method

The second procedure focuses on a 'policy on' evaluation of the Industrial Areas Programme effectiveness. The principle of the procedure is one of measuring

the differential characteristics, as regards employment growth, of the Industrial Areas themselves against their respective regions, in various ways.

With this method useful results for the effectiveness of the Industrial Areas Programme and the relevant infrastructure provision in creating regional growth can be assessed. Additionally, the evaluation can help derive conclusions about the participant firms' performance. This analysis is intertwined with, and can be measured against the firms' selection procedure and the promotion and use of new and high technology. The method is operationalised twice, for the full policy 'on' period 1978 - 1988 for five regions, and for the period 1984 - 1988 for sixteen regions. Each period involves the maximum number of regions having substantial policy characteristics, in other words an actively operating Industrial Area.

In a first arrangement of the method the participation of the Industrial Areas in the respective regional employment is measured through time. This is equivalent to comparing the employment increase rates in the Industrial Areas to the respective regional growth. Conclusions can be drawn about the potential of the Industrial Area clusters and their respective regions. Comparisons can also be made for the two consecutive time periods.

Participation gives a measure of the attractiveness (local and national) of the incentives offered and infrastructure package available in the Industrial Areas Programme. The growth rates show the dynamics of the Industrial Areas Programme in each region. They not only show the attractiveness of the Industrial Areas to firms, as distinguished from the rest of the region, but also the increase in already established firms' employment.

In a second arrangement, derivative growth rates can be used, if the Industrial Areas employment is separated or 'clustered' from the respective regional employment. Here two different growth rates are compared, the policy 'on' whole region growth, inclusive of the Industrial Areas effect, and the 'policy off cluster' (whole region minus Industrial Areas cluster) growth. This arrangement describes the counterfactual, that is how the region would perform, had the Industrial Area been not existent. The meaning of the test is to check if the region had no intervention, would it grow slower or not.

There is one bias which could be attributed to the above test. From the set of excluded firms of a regions' Industrial Area at the final period, some clearly would have established in the region during the course of the period even if the Industrial Area was not there. These are not accounted for, thus the relevant growth rate in this respect appears smaller. Thus, part of the growth of the Industrial Areas cluster should be 'returned' to the 'surrounding' region's performance. On the

other hand, had the Industrial Area not been in the region, some of the therein established firms at the initial period would also be in the region anyway. These also are subtracted from the region, thus providing a smaller initial period denominator that tends to increase the 'surrounding' region's growth rate. If these two opposite effects are considered counterbalanced, then the arrangement is unbiased and usefully describes the 'counterfactual'.

To deal with the possible disturbance of small initial employment figures in certain Industrial Areas, generating large growth rates which would be difficult for the region to follow, compared regions are finally summed, forming thus 'larger' regions. This is done first for a group of five regions and then for sixteen regions. These 'larger' regions can be thought as the whole 'terrain of policy'. Thus in the first arrangement the grouped 'Industrial Areas cluster' is compared with the respective whole 'terrain of policy'. In the second (counterfactual) arrangement the policy 'on' cluster is the whole 'terrain of policy', while the policy 'off' cluster is the 'terrain of policy' stripped from the 'Industrial Areas cluster'.

7.3.2 Application of the cross-sectional (clustering) procedure for five regions

The first measurement, in an attempt to utilise the longest period for which policy 'on' and 'off' clusters can be distinguished, had to compromise on the number of the regions. Those with an active Industrial Area by 1978 are five; Thessaloniki, Volos, Iraklio, Preveza and Drama. These regions were tested through the methods described above. Results for the participation, the growth rates and the counterfactual arrangement are shown in detail in Table 7-4. The figures are given distinctively for the period 1978-84 and for 1984-88 and also for the full period 1978-88. The growth of the Industrial Areas in the five regions, and their effects on regional growth are illustrated in Figure 7-4, for the decade 1978-1988.

The results show that the effects of the Industrial Areas cluster in the total regional employment is case-sensitive. For the period 1978-1988, in three of the five cases there are clear positive effects on the regions due to the Industrial Areas, that is in Volos, Iraklio and Preveza. For these it can be said that they effectively provided benefits to their respective regions. In the remaining two regions any positive effects of the Industrial Areas are less obvious. There, only some subtle effects can be found for Thessaloniki, and it has to be said some ineffectiveness for Drama.

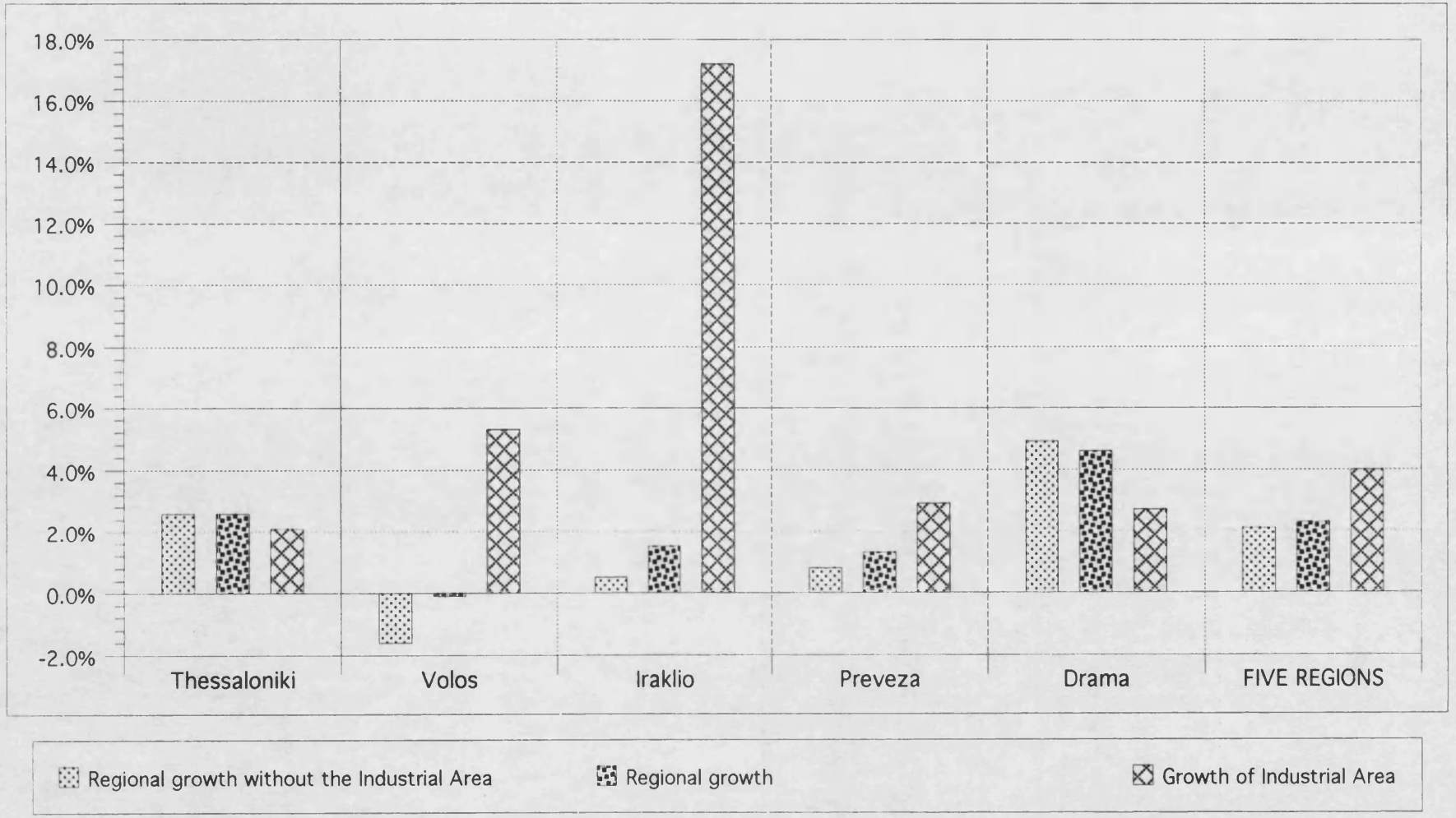
The Industrial Area of Volos started at 16.9% of the regional employment in

Table 7-4: Participation of Industrial Areas in regional employment and their effect on regional growth rates

Five regions	Employment (manufacturing)						Participation of Industrial Areas			Annual Average Employment Growth Rates						REGIONS		
	INDUSTRIAL AREAS			REGIONS						INDUSTRIAL AREAS			REGIONS			without Industrial Areas		
	1978	**1984**	**1988**	**1978**	**1984**	**1988**	**1978**	**1984**	**1988**	**'78-84**	**'84-88**	**'78-88**	**'78-84**	**'84-88**	**'78-88**	**'78-84**	**'84-88**	**'78-88**
Thessaloniki	4773	5331	5903	82886	96726	106919	5.8%	5.5%	5.5%	1.9%	2.6%	2.1%	2.6%	2.5%	2.6%	2.7%	2.5%	2.6%
Volos	2501	3688	4207	14788	15507	14612	16.9%	23.8%	28.8%	6.7%	3.3%	5.3%	0.8%	-1.5%	-0.1%	-0.6%	-3.1%	-1.6%
Iraklio	264	1001	1295	9124	9783	10631	2.9%	10.2%	12.2%	24.9%	6.6%	17.2%	1.2%	2.1%	1.5%	-0.1%	1.5%	0.5%
Preveza	350	350	468	1821	2216	2064	19.2%	15.8%	22.7%	0.0%	7.5%	2.9%	3.3%	-1.8%	1.3%	4.0%	-3.8%	0.8%
Drama	805	952	1053	5542	6987	8673	14.5%	13.6%	12.1%	2.8%	2.6%	2.7%	3.9%	5.6%	4.6%	4.1%	6.0%	4.9%
All Five	**8693**	**11322**	**12926**	**114161**	**131219**	**142899**	**7.6%**	**8.6%**	**9.0%**	**4.5%**	**3.4%**	**4.0%**	**2.3%**	**2.2%**	**2.3%**	**2.2%**	**2.0%**	**2.1%**

Sixteen regions	Employment (manufacturing)				Participation of Industrial Areas		Annual Average Employment Growth Rates			REGIONS
	INDUSTRIAL AREAS		REGIONS				INDUSTRIAL AREAS	REGIONS		without Industrial Areas
	1984	**1988**	**1984**	**1988**	**1984**	**1988**	**'84-88**	**'84-88**		**'84-88**
Thessaloniki	5331	5903	96726	106919	5.51%	5.52%	2.6%	2.5%		2.5%
Volos	3688	4207	15507	14612	23.8%	28.8%	3.3%	-1.5%		-3.1%
Iraklio	1001	1295	9783	10631	10.2%	12.2%	6.6%	2.1%		1.5%
Ioannina	32	89	6605	6397	0.5%	1.4%	29.1%	-0.8%		-1.0%
Rothopi	630	1232	3893	4187	16.2%	29.4%	18.3%	1.8%		-2.4%
Preveza	350	468	2216	2064	15.8%	22.7%	7.5%	-1.8%		-3.8%
Drama	952	1053	6987	8673	13.6%	12.1%	2.6%	5.6%		6.0%
Kavala	74	174	9730	11279	0.8%	1.5%	23.8%	3.8%		3.6%
Achaia	736	1132	22507	21186	3.3%	5.3%	11.4%	-1.5%		-2.0%
Fthiotis	57	276	8672	8480	0.7%	3.3%	48.3%	-0.6%		-1.2%
Xanthi	349	359	6338	6949	5.5%	5.2%	0.7%	2.3%		2.4%
Serres	276	725	9077	10208	3.0%	7.1%	27.3%	3.0%		1.9%
Larissa	26	62	16503	17171	0.2%	0.4%	24.3%	1.0%		0.9%
Arcadia	97	127	2709	2956	3.6%	4.3%	7.0%	2.2%		2.0%
Florina	46	66	1402	1208	3.3%	5.5%	9.4%	-3.7%		-4.2%
Kilkis	250	630	5164	6002	4.8%	10.5%	26.0%	3.8%		2.3%
All Sixteen	**13895**	**17798**	**223819**	**238922**	**6.2%**	**7.4%**	**6.4%**	**1.6%**		**1.3%**

Figure 7-4 : Average annual growth rates for five Industrial Area- regions, 1978 - 1988



1978, and grew to 23.8% by 1984 and to 28.8% by 1988. The growth rates analysis shows that the Industrial Area of Volos for the period 1978-84 grew by an average annual rate of 6.7%.; at the same time the region grew at only 0.8%. For the period 1984-1988 the Industrial Area grew annually by 3.3%, while the region experienced a decrease of minus 1.5% per annum. Overall (1978-88), as shown in Figure 7-4 the Industrial Area of Volos managed an average annual growth of 5.3%, the annual growth rate of the region would have been a -1.6% had the Industrial Area not been there, instead of the actual -0.1% per annum. Significant, if not decisive, is the role the Industrial Areas played in averting a serious decline in the region. It can be said that the Industrial Area effectively provided an advantageous location for incoming firms (especially in the first period). It can also be said that the selected firms participating in the Industrial Area form a recession-proof core that clearly and actively helps the region (second period).

Similarly beneficial proves the Industrial Area for the region of Iraklio. In 1978 the Industrial Area accounted for the 2.9% of the regional employment, which became 10.2% by 1984, and reached 12.2% in 1988. The growth rates' analysis show that for the period 1978-84 the Industrial Area was growing at an annual 24.9%, while the region grew at only 1.2%. Subsequently, for 1984-88 the Industrial Area grew at 6.6% while the region at 2.1% per annum. Overall, for 1978-88 the Industrial Area had been growing at an average annual rate of 17.2%, that made the region grow at 1.5% annually instead of 0.5% had the Industrial Area been not there (Figure 7-4). Even if allowance of any amount of internal relocation is made, still the Industrial Area is shown to be important to the region. Intra regional relocation is beneficial to the region's planning. But more important is the jobs augmentation that has occurred within the Industrial Area, along with attracted investments. What also counts, besides employment, is the advancement in productivity and competitiveness due to the use of new technology and infrastructure, as shown in all previous analyses.

The last region having a clearly positive Industrial Area effect is Preveza. There the Industrial Area started at 19.2% of the regional employment in 1978, and fell to 15.8% by 1984, to grow again to 22.7% by 1988. The growth rates' analysis shows that the Industrial Area of Preveza for the period 1978-84 did not grow (average annual rate of 0%); at the same time the region grew at 3.3% per annum. For the period 1984-88 though, the Industrial Area grew annually at 7.5%, while the region experienced a decrease of -1.8% per annum. Overall (1978-88), the Industrial Area of Preveza managed an average annual growth of 2.9%. The region would have grown at 0.8% without the Industrial Area, but it actually grew

at a 1.3% annually. Here the case shows that when recession hit the region and total employment declined at the second period, the Industrial Area managed a rapid growth. Availability of skilled employment plus the attractiveness of the Industrial Area possibly initiated a relocation stream to the region and specifically into the Industrial Area. The region clearly benefited from the project.

In Thessaloniki in 1978 the Industrial Area accounted for the 5.8% of the regional employment, which became 5.5% by 1984, and remained at this figure until 1988. The growth rates analysis show that for the period 1978-84 the Industrial Area was growing at an annual 1.9%, while the region grew at 2.6%. But for 1984-88 the Industrial Area grew at 2.6% while the region at 2.5% per annum. Overall, for 1978-88 the Industrial Area of Thessaloniki has been growing at an average annual 2.1% with the region growing at 2.6% per annum. For the case of Thessaloniki the counterfactual effects are subtle but rather in favour of the Industrial Area. The regional growth rates are equal at 2.6% with or without the Industrial Area for the decade. But the second period, as subtle the effect as it may be, gives a hint of slightly better durability of the Industrial Area's advantages. The Industrial Area managed to increase its employment in the less favourable economic climate in the region that lowered the overall growth rate. Thessaloniki is offering obvious operational advantages for locating firms, whether in the Industrial Area or not. But the Industrial Area here again proves recession-proof and hints at a rather efficient combination of technology use and infrastructure provision.

The last of the five regions is Drama. There the Industrial Area started at 14.5% of the regional employment at 1978, and fell to 13.6% by 1984, to fall again to 12.1% by 1988. The growth rates' analysis shows that the Industrial Area of Drama for the period 1978-84 grew at an average annual rate of 2.8% but at the same time the region grew at 3.9% per annum. Again, for the period 1984-88, the Industrial Area grew annually at a rate of 2.6%, while the region experienced an increase of 5.6% per annum. Overall (1978-88), the Industrial Area of Drama managed an average annual growth of 2.7%, the region actually grew at 4.6% annually, while without the Industrial Areas employment growth would have been 4.9%. In this case the dynamism of the region as a whole outpaces the Industrial Area's performance. Still the Industrial Area's growth of 2.7% annually for a decade is substantial and perhaps the Industrial Area can be considered as the core of the region's industrial security against any possible future regional slowdown.

To have a representative result for the five regions, as regards the participation test, a new 'all five' region was constructed. Results for this 'region'

show the total effect considering the strength and magnitude of the positive or negative results of each specific regional test above. Thus, it can be seen that the Industrial Areas cluster accounted for 7.6% of the 'all five' region's employment in 1978, that became 8.6% in 1984 and reached 9% by 1988. A clear index of increasing participation of the overall Industrial Areas structure emerges, given the multiple constraints faced by firms considering relocation. As regards growth rates, the all-five Industrial Areas' cluster shows 4.5% annual increase for 1978-84, as opposed to 2.3% for the 'region'. This credits the Industrial Areas cluster with almost double the regional growth speed. For the period 1984-88, the five Industrial Areas' cluster grew at 3.4% annually, as against only 2.2 % for the 'region'. Overall, for the decade 1978-1988 the Industrial Areas grew at 4.0% annually and the regions at 2.3%, quite higher than the estimated 2.1% had the policy been not present. This 0.2% of an annual difference amounts to some 4500 new jobs in the five regions over the decade. These rates come from a mixture of regions of different geographic locations and economic specialisations and levels of development, thus they have a considerable analytical weight.

7.3.3 Application of the cross-sectional (clustering) procedure for sixteen regions

Instead of applying the tests for the maximum period possible, here they are deployed for the maximum number of regions given the data available. That is, the regions that had some substantial Industrial Areas employment by year 1984, until the latest period with available data, 1988. These regions amounted to sixteen. (The full twenty regions that operated by 1987 could not be evaluated since there are no regional data available after 1988 and the test period would have to diminish to one year, besides computational biases in percentages due to small bases). Thus, the method was operationalised as above, again shown in detail in Table 7-4 and illustrated in Figure 7-5.

Starting from the 'all sixteen' region set, that is the whole span of the Industrial Areas Programme for the period, it can be seen that participation of the Industrial Areas increased from 6.2% to 7.4% from 1984 to 1988. The employment increase rates in the Industrial Areas are largely higher than the respective regional, since the 16-Industrial Areas cluster has an average annual growth of 6.4% for the period 1984-88, while the respective sixteen regions (the 'policy terrain') grew at only 1.6% annually at the same period. The counterfactual regional annual growth rate would only have been 1.3%, had the Industrial Areas policy been not injected, that is lower than the actual 1.6%. The difference of

Figure 7-5 : Average annual growth rates for sixteen Industrial Area- regions, 1984 - 1988

0.3% amounts to some 4000 new jobs in sixteen regions from 1984 to 1988.

As regards the regional specific results, it can be seen that the Industrial Areas in the large majority of the regions have increased their participation to percentages that vary from under 3% to some 30%. In some thirteen regions of the sixteen were realised clear positive effects of the Industrial Areas policy. In these cases the policy 'on' actual growth rate was larger than the estimated policy 'off' one, had the Industrial Area been not present. Among this group were Volos, Iraklio, Patra, Kavala, Kilkis, Florina and Komotini. Thessaloniki proved to be only marginal in this respect. Thus for a total of fourteen out of the sixteen regions of the whole Industrial Areas Programme, the effects seem to have been beneficial for employment growth, besides any other positive regional aspects. The Industrial Areas are in most cases acting as growth stimuli or decline shields. The two regions with a negative Industrial Area performance are Drama (for reasons given above) and Xanthi where the Industrial Area is not successful (also confirmed by field survey). In Xanthi the lack of on-site administration and delays in infrastructure provision as late as 1992 unfortunately blunt any policy inspirations. Figure 7-5 gives an illustration of these overall effects, for each and all sixteen regions.

7.3.4 Conclusions from the cross-sectional analysis

As a first conclusion, it appears that the Industrial Areas Programme largely helped the recipient regions' employment growth. Had it not been there some 90 % of these regions would have been worse off, and some of them with large employment losses.

Second, from the five regions longer term test it turns out that if, due to some exceptional positive circumstances, high regional growth rates emerge, (Drama, at 4.6% annually for the decade, or Thessaloniki for 1978-1984), then the Industrial Areas can prove slow or inflexible enough to follow; but not always, as Iraklio showed. On the other hand, in cases of decline or slowdown, the Industrial Areas manage to keep pushing strongly in favour of the region (Volos, Preveza 1984-1988). It should be said that the selection procedure and monitoring by the Industrial Areas administration is connected to this result. It can be assumed that the above causes some delay and also scares 'opportunist' firms in booming times/ regions. Still the Industrial Areas clusters do prove decline-proof in other times perhaps for some of the same reasons. There is a plausible hint for better technology utilisation in this effect, in addition to the formation of attractive 'oases' for external capital as regards infrastructure provision and financial incentives for location.

The third and more interesting conclusion is that the effectiveness of the Programme improved during the latter period. The effects became much larger in range but no less intense. Not only the shift of Thessaloniki shows this. In 1984-1988 the policy produced a 0.3% higher actual annual growth rate than the policy 'off' option for some sixteen regions, as compared to only 0.1% of a shift above the policy 'off' option for only five regions from 1978 to 1984. This shows an increasing effectiveness of the Industrial Areas Programme in the second period 1984-1988.

The reasons for the above can be maturity of the Programme in the form of better administration and wider penetration to regional economic networks. But interestingly, the last period under analysis was one of national slowdown. The finding that the Industrial Areas in general prove better in performance than their regional average, and support growth in their own regions in periods of decline is indicative of an advanced competitive position. This is must only be due to better technology utilisation and better available infrastructure.

When looked at within this methodological framework, the Industrial Areas prove as providing significantly accelerated growth and durability to the recipient regions' employment. In other words the Industrial Areas tend to enhance and secure regional development.

7.4 An evaluation based on industrial specialisations

An interesting piece of analysis regarding the specialisations of the firms that are attracted to the Industrial Areas can be made through the use of a relevant methodology. Having results on the identity of the firms attracted to the Industrial Areas it can be assumed that these represent manufacturing sub-sectors that find advantages from the current structure of the Industrial Areas. To the extent that these firms happen to belong to the faster growing sub-sectors of manufacturing, or in other words the sectors that enjoy comparative advantages in the international competitive economy, the Industrial Areas attain their targets better. To the extent that the above target is missed, suggestions for reorientation of the Industrial Areas' structure and appeal may emerge so that the Industrial Areas may possibly become better at accommodating also some faster growing manufacturing sub-sectors. In this way the Industrial Areas not only will even more help these sectors in their competitiveness, but also by attracting them to the peripheral regions regional development should be enhanced.

A method utilising measurements of specialisation amongst the various industrial sectors related to economic performance is followed here. In other words, what the method describes is an equivalent of the 'industry mix' (or structural) effect of a standard shift share method. As mentioned above such a shift-share cannot be applied over the Industrial Areas, due to computational problems of infinite increases.

Having the employment figures dissagregated to manufacturing sub-sectors for each of the five Industrial Areas of the field survey and those of the respective regions for year 1988, (Table 7-5), the following specialisation index (SI) is computed:

$$SI_{ic} = (E_{ic} / E_c) / (E_{ir} / E_r)$$

Where E_{ic} is the employment of each i sector in each c cluster, E_c is the total employment of each c cluster, E_{ir} is the employment of each i sector in each r region, and E_r is the total employment in each r region.

For the current analysis the c clusters are each of the five Industrial Areas of the sample, and a sixth, that is the sum of the five Industrial Areas, as a larger Industrial Area set. The r regions are the relevant five regions plus the sixth derived region from all five.

The values that this index can take are zero, or any positive value. Practice shows that value of one means that the cluster has equivalent 'specialisation' or preference for the sector in question as its surrounding region. Values below one show adverse or negative preference shown by the cluster to the sector, while the threshold of two is generally agreed for a sector to be regarded as a 'strong and valid' specialisation that can be credited to the cluster. The index is immune to the size of the cluster in relation to the size of the region, that is the participation intensity, while exclusivity of participation of a sub-sector in the cluster is the fact that raises the value of the index.

Industrial Areas are compared to their respective regional rather than any national figures, to keep the Industrial Area - specific effect distinct from any 'regional' attractiveness or specialisation

As can be seen in Table 7-5, the Industrial Area of Xanthi has specialisation in the Tobacco and the Miscellaneous manufacturing sub-sectors. The Industrial Area of Komotini concentrates on the sectors of Beverages , Tobacco, Textiles, Paper, Printing, Leather and Chemicals. The Industrial Area of Volos specialises in Paper manufacturing, Rubber and Plastic, Chemicals, Metal Products and Electrical Appliances. Patra focuses on the sectors of Wood and Cork, Paper, Petrol and Coal

Table 7- 5: Specialisation of Industrial Areas among manufacturing sectors, 1988

Employment of 1988	XANTHI			KOMOTINI			VOLOS			PATRA			IRAKLIO			FIVE REGIONS		
	Region	I.A.	S.I.	Region	I.A.	S.I.	Region	I.A.	S.I.	Region	I.A.	S.I.	Region	I.A.	S.I.	5 Regions	5 I.A.	S.I.
Manufacturing Sectors																		
20: Food Preparation	1841	11	0.1	697	134	0.7	2105	381	0.6	2879	146	0.9	2694	263	0.8	10216	935	0.6
21: Beverages	63	0	0.0	67	42	**2.1**	320	175	1.9	1194	459	**7.2**	774	177	1.9	2418	853	**2.5**
22: Tobacco Manufacturing	813	330	**7.9**	8	8	**3.4**	171	0	0.0	0	0	-	0	0	-	992	338	**2.4**
23: Textile	468	0	0.0	199	199	**3.4**	1513	235	0.5	4053	0	0.0	386	74	1.6	6619	508	0.5
24: Sewing and Footwear	1512	0	0.0	1251	313	0.8	1220	49	0.1	3593	0	0.0	688	3	0.0	8264	365	0.3
25: Wood and Cork	235	0	0.0	232	15	0.2	606	36	0.2	751	134	**3.3**	632	11	0.1	2456	196	0.6
26: Furniture and Fixtures	178	0	0.0	155	0	0.0	392	0	0.0	430	0	0.0	528	27	0.4	1683	27	0.1
27: Paper Manufacturing	330	0	0.0	236	224	**3.2**	266	212	**2.8**	552	111	**3.8**	16	16	**8.2**	1400	563	**2.8**
28: Printing, Publishing	43	0	0.0	42	38	**3.1**	221	0	0.0	321	0	0.0	245	53	1.8	872	91	0.7
29: Leather and Fur	2	0	0.0	3	3	**3.4**	13	0	0.0	236	0	0.0	27	0	0.0	281	3	0.1
30: Rubber and Plastic	299	0	0.0	166	71	1.5	358	331	**3.2**	780	34	0.8	335	49	1.2	1938	485	1.8
31: Chemicals	12	0	0.0	16	15	**3.2**	190	225	**4.1**	219	9	0.8	79	24	**2.5**	516	273	**3.7**
32: Petrol.& Coal refining	6	0	0.0	0	0	-	12	0	0.0	73	13	**3.3**	71	12	1.4	162	25	1.1
33: Non-metallic Minerals	218	0	0.0	135	0	0.0	1565	355	0.8	1292	14	0.2	931	189	1.7	4141	558	0.9
34: Basic Metal Industries	98	0	0.0	9	0	0.0	1413	203	0.5	43	0	0.0	0	0	-	1563	203	0.9
35: Metal Products	299	0	0.0	362	85	0.8	790	780	**3.4**	1869	196	**2.0**	638	130	1.7	3958	1191	**2.1**
36: Machinery,(non-electr)	83	0	0.0	110	15	0.5	1123	222	0.7	627	12	0.4	626	77	1.0	2569	326	0.9
37: Electr.machin&Appliances	183	5	0.5	99	45	1.5	544	438	**2.8**	687	4	0.1	380	40	0.9	1893	532	**2.0**
38: Transport Equipment	248	0	0.0	341	25	0.2	1682	546	1.1	1406	0	0.0	1470	52	0.3	5147	623	0.8
39: Miscell. Manufacturing	18	10	**10.8**	57	0	0.0	107	19	0.6	180	0	0.0	108	98	**7.4**	470	127	**1.9**
Total 1988	**6949**	**356**		**4185**	**1232**		**14611**	**4207**		**21185**	**1132**		**10628**	**1295**		**57558**	**8222**	

I.A. = Industrial Area

S.I. = Specialisation Index (as defined in text)

refining and Metal Products. Iraklio seems attractive in Paper, Chemicals and Miscellaneous manufacturing. If the five Industrial Areas are considered as one cluster, representing the total Industrial Areas Programme in Greece, then it comes that the Industrial Areas specialise in the following sectors, by order of strength: Chemicals (SI =3.7), Paper(2.8), Beverages (2.5), Tobacco (2.4), Metal products (2.1) and Electrical Appliances (2.0). Next come the sectors of Miscellaneous manufacturing (1.9) and Rubber and Plastic (1.8). The SI of all other sectors are at or below the unity, showing adverse specialisation of the Programme to them.

From the sub-sectorally dissaggregated employment data of the decade 1978 - 1988, the national average annual growth rate is extracted for each of the twenty sub-sectors of manufacturing. By order of magnitude these rates are shown in Figure 7-6. They can be broadly divided in three groups. The first consists of the sub-sectors growing at over 2% annually for the decade; these are Petrol and Coal refining, Sewing and Footwear, Tobacco, Printing and Miscellaneous manufacturing. The second group comprises sub-sectors with positive growth below 2%. These sectors are Food, Transport equipment, Paper, Chemicals, Beverages and Basic Metal industry.The third group clusters the declining (as regards employment) sub-sectors.

From the six main specialisations (SI over 2) in the Industrial Areas, as extracted above, one belongs to the fast growing group, (Tobacco), three to the slow growing group (Chemicals, Paper, Beverages) and two to the declining group (Metal Products, Electrical Appliances).

What can be seen from the above analysis is that the Industrial Areas for the above period managed to provide industrial space to water consuming industries (Paper and Beverages), accommodate polluting industry such as chemicals, and also house employment-reducing sectors such as metal products and electrical appliances. The fast growing sectors in Greece, and also the most labour intensive, are the 'soft' industrial sectors, such as Sewing and Footwear, Printing and Tobacco. These prove to be only marginally attracted (and assisted) by the Industrial Areas. Also the specific, and absolute fastest growing sector of fuel refining is less attracted. One reason, of course, may be the 'general use' type of Industrial Areas that were built up till now (not suitable for refineries, etc.). A second and most important reason is due to the, mostly, limited services provision and communication with the neighbouring urban structures, not suitable for labour oriented and specialised labour intensive manufacturing that seem to be the fastest growing nationally.

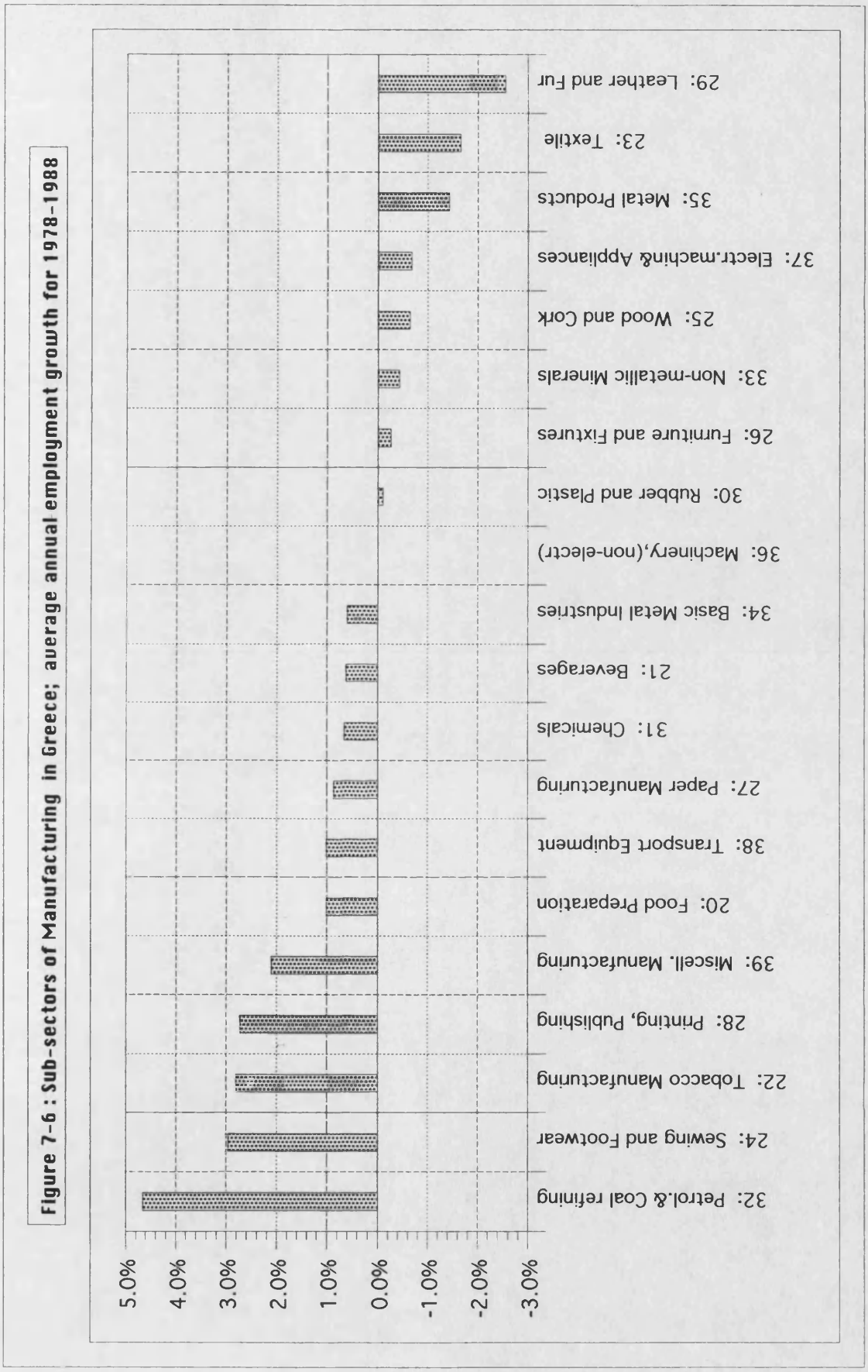


Figure 7-6 : Sub-sectors of Manufacturing in Greece; average annual employment growth for 1978-1988

7.5 A benefit-cost appraisal of the Industrial Areas Programme

7.5.1 The objectives and the context of cost-benefit analysis

The objectives of this part of research are to discover just how beneficial (or otherwise) has been the actual spending on the Industrial Areas Programme in Greece. As was seen earlier, the Industrial Areas Programme, much like those in other countries, has attempted to encourage economic development through the deployment of a range of practical economic policies. These have involved provision of basic infrastructure and industrial land as well as direct grants in aid to industry. Results of this type of policy used will be discussed subsequently mainly in the light of their costs of provision in the form of a cost-benefit analysis.

The principle of cost-benefit analysis is to compare benefits that stem from a project to those parties that they may accrue with the costs of undertaking the project itself. The procedure was initially formulated in the United States in the early fifties by public works authorities. In the subsequent years regard was paid to different sets of value judgements, leading to different approaches each serving different purposes, one perhaps as valid as another.

If cost-benefit analysis is to be used as a tool for social decision making the often used welfare economics criterion of Pareto optimality may on many occasions not be fulfilled. The criterion seeks solutions where some parties improve their welfare without others falling to lower welfare levels. A cornerstone of cost-benefit analysis is the Kaldor-Hicks view of welfare economics (Kaldor 1939, Hicks 1939) one based on the compensation principle. This proposes that a social policy is beneficial if it's benefits are more than enough to compensate any losers. Compensation of course was thought of only in theoretical terms, since if it was to take place in reality a series of inevitable disturbances in the model would occur. (Scitovsky 1941).

Lack of markets and pricing mechanisms for many social benefits such as the limitation of environmental pollution or the reduction in general levels of noise, or costs such as aesthetic damage or increased pollution, challenge cost-benefit analysis for suitable financial appraisal. Values assigned to issues like these along with material costs and benefits are often a product of political circumstances or pressures. Various methods are proposed for 'monetisation' of intangibles perhaps using arbitrary, but specified, weights on measurable magnitudes, or eliciting judgements through surveys using questionnaires or bidding techniques. Weighing of

streams of benefits was introduced by Bergson (1938). The issue of whether individual preferences should count using such gauging techniques, or alternatively whether only those of the policy making body (consensus bearing) should be considered has caused much theoretical debate bringing up the issue of coercion. Little (1957) simply suggests that a beneficial social project is the one that fulfills the Kaldor-Hicks criterion, does not contain the Scitovsky compensation paradox and provides a 'good redistribution of wealth'.

The early seventies saw an attack on this methodology from political science (Self 1972) and was based on the proposition that cost-benefit analysis should not replace political decision making by a 'mechanistic calculus'. More radical critiques (Hunt 1968, Schwartz 1972) focused on the notion that cost-benefit analysis unthoughtfully accepts the prevailing income distribution as optimal. Furthermore they pointed out that the prevailing income distribution resulting from a project usually had a longer lifetime than the relevant decision-making bodies or the elected governments. Pearce and Nash (1981) compromise by concluding that the main use for cost-benefit analysis should be to describe simply the intensity or sensitivity of effects.

In technical terms the appraisal part of cost-benefit analysis has employed a variety of approaches (Diamond and Spence1984, Schofield 1987) ranging from the widely used investment criteria of the net present value, to the internal rate of return and benefits over costs ratio along with the older but more criticised payback methods. All of these analytical approaches will be utilised in this research. Further concerns in the methodology relate to the choice of an appropriate social discount rate, the social opportunity cost rate and the lower social time preference rate having been developed.

7.5.2 Data sources and basic assumptions underlying the methodology

The policy to be evaluated is the Greek Industrial Areas Programme which is mainly based on infrastructure provision but also includes some state locational incentives for industry. The overall aim of course is regional economic and social development. To facilitate the cost-benefit analysis of the Programme annual cash flows from its commencement in 1968 up to 1991 were collected from ETBA. Cash flows for some six Industrial Areas were available, being the maximum that ETBA would disclose for this study. These comprise the five locations of Volos (in the region of Magnisia), Patra (in Achaia), Komotini (in Rothopi), in Iraklio, in Xanthi plus the flagship project of Thessaloniki (Figure 7-7). Prices were standardised for

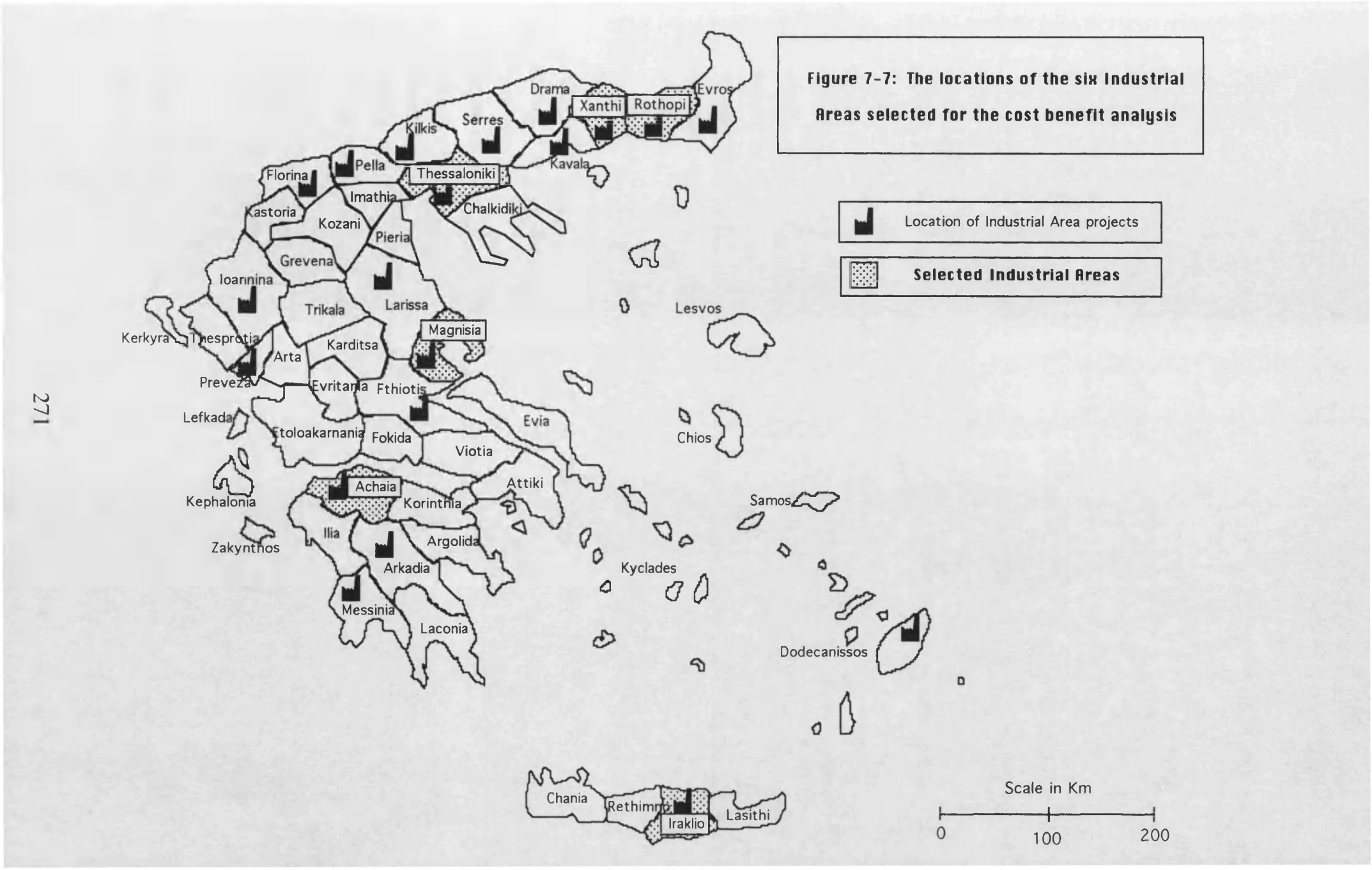


Figure 7-7: The locations of the six Industrial Areas selected for the cost benefit analysis

inflation at the 1988 level, using the annual rates of discount for capital investments that ETBA uses for its own studies. The year 1988 was chosen for the prices standardisation since it is the latest year for which measurements on manufacturing salaries exist for national and regional levels (Annual Industrial Survey, 1988). Employment data were available for the Industrial Areas from 1978 to 1992 (ETBA, unpublished) and at national and regional levels from 1978 to 1988, (National Industrial Censuses 1978, 1984, 1988). Additional information was drawn from the field research.

For the purposes of this analysis, common acceptance of the prevailing income distribution in Greece arising from policy is assumed, and this is based on the understanding that decision making is democratically founded. It is further assumed that it is commonly accepted that over-concentration of manufacturing in the region of Athens is not 'beneficial' since it can degrade the living standards of its inhabitants and also can limit the development possibilities of the enterprises themselves. It is taken as given that in order for industries to establish in peripheral regions, locational incentives are needed along with the existence of some local demand, an operating labour market, some complementary firms and, of course, the necessary infrastructure. Finally, it is also taken as given that recipient regions do not have any objections to receiving investments that are likely to promulgate induced demand for employment.

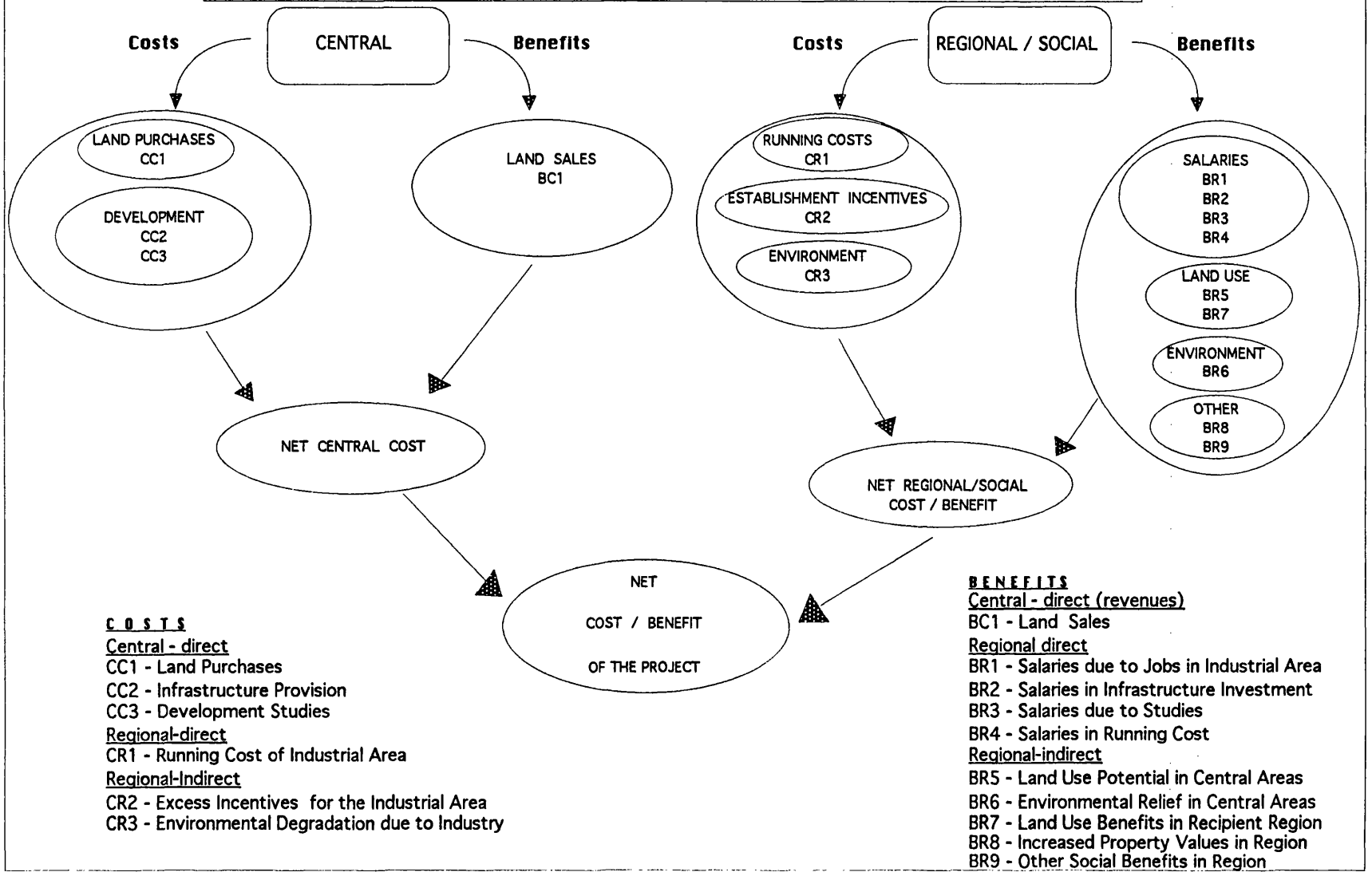
Costs and benefits are grouped in 'central' and 'regional / social', the distinction being made according to whether they relate to the policy recipient region (regional) or to the general public (social), or to the central provision agency (ETBA). The costs and benefits are divided into those which are direct or indirect, according to whether they are directly measurable or can only be estimated. An outline of the costs and benefits and a the diagram of the path to be followed in their assessment is shown in Figure 7-8. There it is shown that prior to the final assessment of the Programme two sub-balances are formulated. The central balance leads to the net central cost, and the regional / social balance produces the net regional / social cost or benefit.

7.5.3 Definitions of the central and the social/regional costs and benefits

a. Central balance.

The central costs can be thought of as the Industrial Areas provision costs. These consist of the costs of land purchase (CC1), the consequent infrastructure construction cost or land development cost (CC2) and the costs of the various

Figure 7-8: Diagrammatic indication of the components of the cost benefit analysis



C O S T S

Central - direct

CC1 - Land Purchases

CC2 - Infrastructure Provision

CC3 - Development Studies

Regional-direct

CR1 - Running Cost of Industrial Area

Regional-Indirect

CR2 - Excess Incentives for the Industrial Area

CR3 - Environmental Degradation due to Industry

B E N E F I T S

Central - direct (revenues)

BC1 - Land Sales

Regional direct

BR1 - Salaries due to Jobs in Industrial Area

BR2 - Salaries in Infrastructure Investment

BR3 - Salaries due to Studies

BR4 - Salaries in Running Cost

Regional-indirect

BR5 - Land Use Potential in Central Areas

BR6 - Environmental Relief in Central Areas

BR7 - Land Use Benefits in Recipient Region

BR8 - Increased Property Values in Region

BR9 - Other Social Benefits in Region

development studies regarding all aspects of the Industrial Areas (CC3). The sum of the three can be thought as the total development cost. The revenues in the central balance of costs come solely from the land sales (BC1). The land sold is clear industrial space being understandably of less usable surface area than that bought, allowance for infrastructure and open space being made.

These costs are mainly borne by the Programme agency, ETBA, with small support from the Greek State and the European Community. An outline of the costs structure of the Programme up to 1991 is given in Figure 7-9. Here the cost of land is assumed to be the net cost, that is land sales are subtracted from land purchases. The different stages of operational state of each Industrial Area can be discerned. Areas with small or zero net land cost are more mature; ones with higher proportions of costs for land, administration and studies are in the initial stages of operation.

Figures 7-10 and 7-11 illustrate the actual timing of the component costs as they occur in Thessaloniki and Volos for example. Throughout, the main costs are due to land and infrastructure with the costs incurred on studies and administration being considerably smaller. In the earlier period of evolution the costs incurred tend to be higher than in the later phases. The graphs illustrate the potential for variation between projects in the purchases and sales of land and in the timing of large capital expenditures on infrastructure. Figure 7-12 shows a comparison of the total costs incurred as they occurred in the six projects by the end of 1991. In Thessaloniki it can be seen that the total costs peaked around 1984-85 and then subsequently constantly but modestly declined to the present. In essence this is due to the fact that the provision of infrastructure was then complete and that land sales have been a feature of recent times. In contrast the graph for Patra shows a continuing upward trend in the project costs.

There could be perhaps a case for adding an additional social cost to some of the sources of the above finances. But the main financial sources of ETBA, besides its other activities as a bank, arise through internal loans via ETBA bonds. These are offered on free market basis and at competitive interest rates, thus they should not really be thought of causing an additional social burden. Additionally the Greek State gives some support to the development cost through the National Investments Programme financed from general taxation. Some support comes from European Community aid through the European Regional Development Fund and the Coordinated Programmes for Development. The amounts involved are small in relative terms because much of the Industrial Area development programme was started long before Greece's entry into the Community. For these sorts of funding

Figure 7-9: The structure of costs in the Industrial Areas from start to 1991

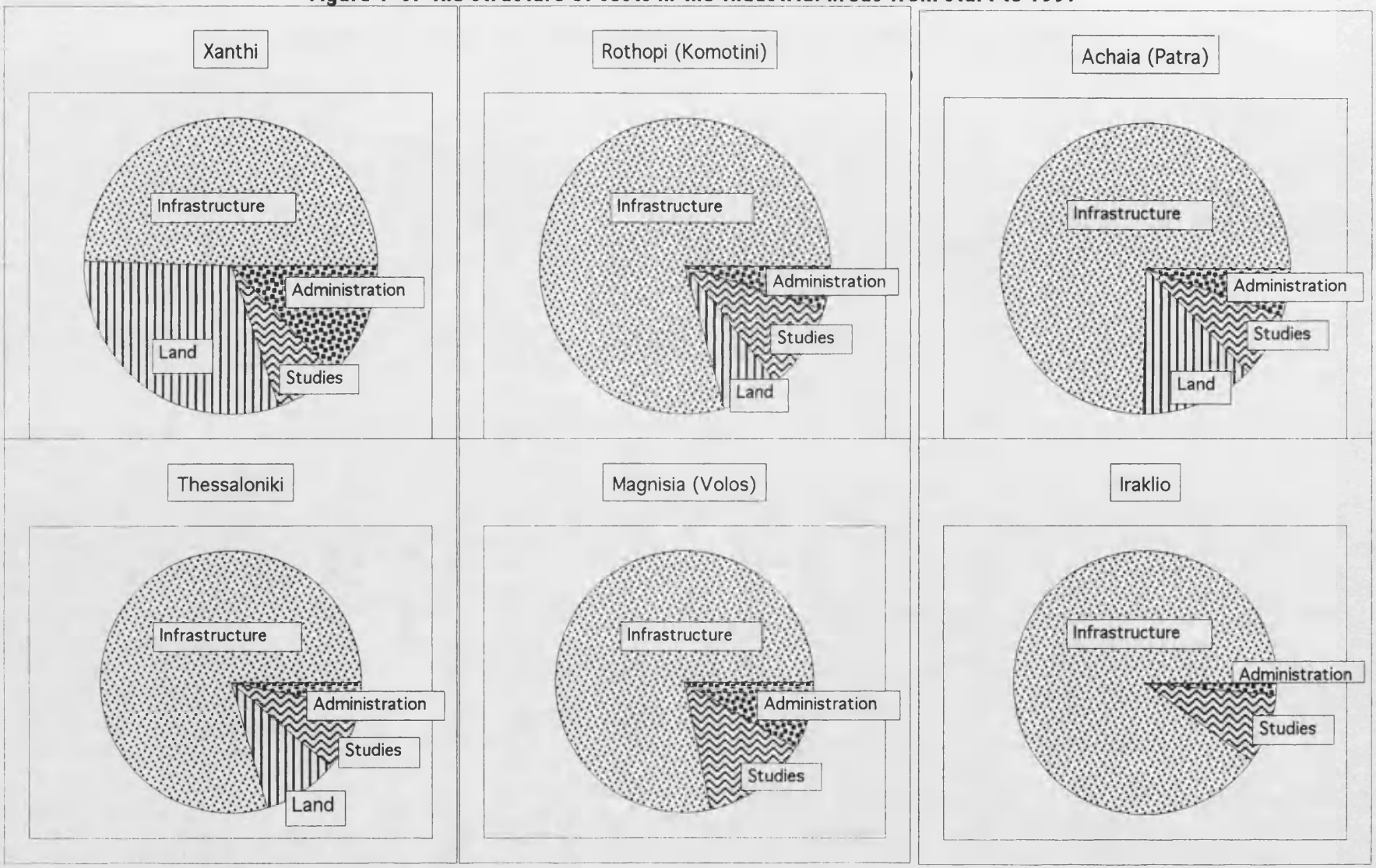


Figure 7-10: A costs profile over time of the Industrial Area of Thessaloniki

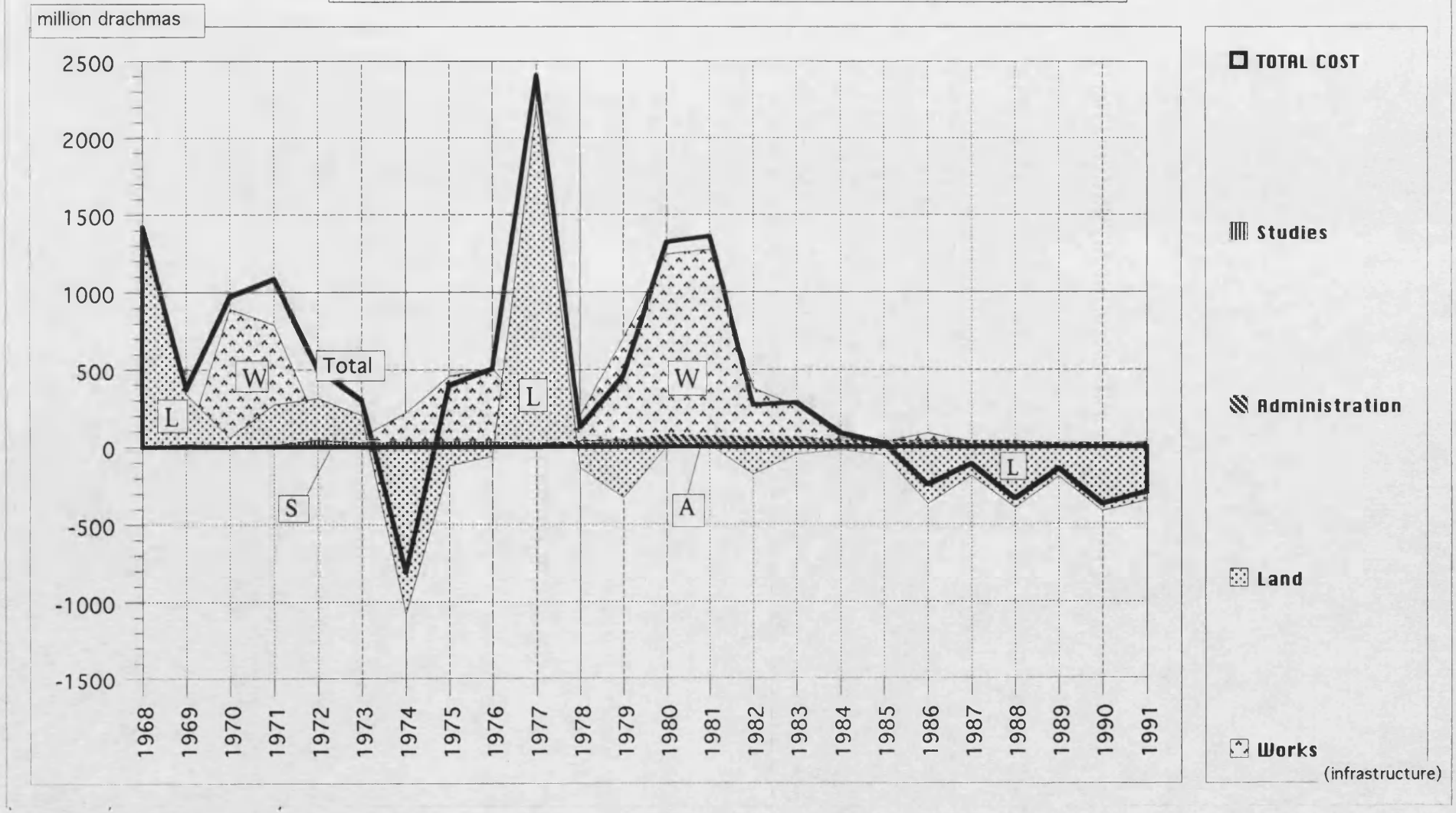


Figure 7-11: A costs profile over time of the Industrial Area of Volos

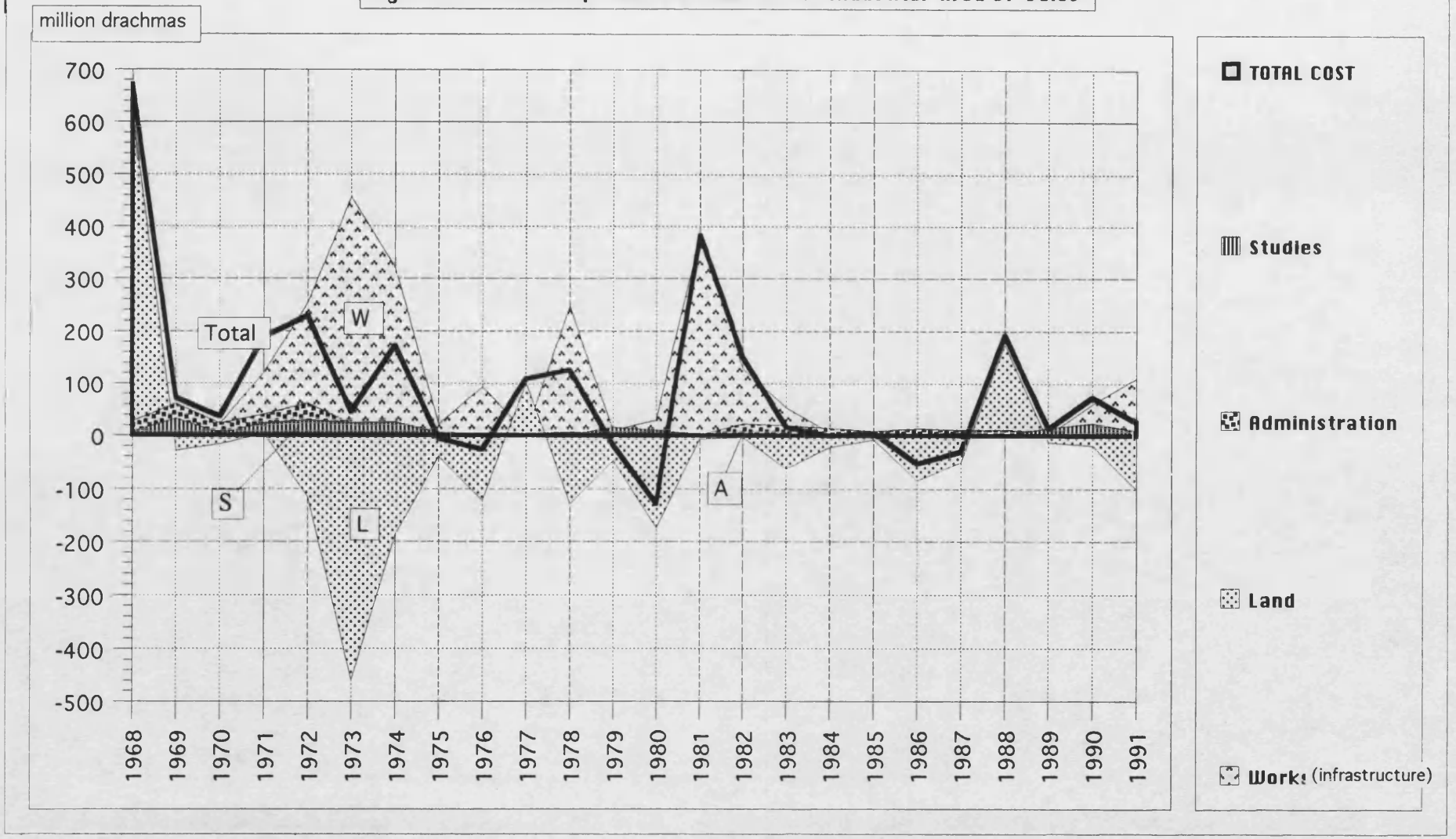
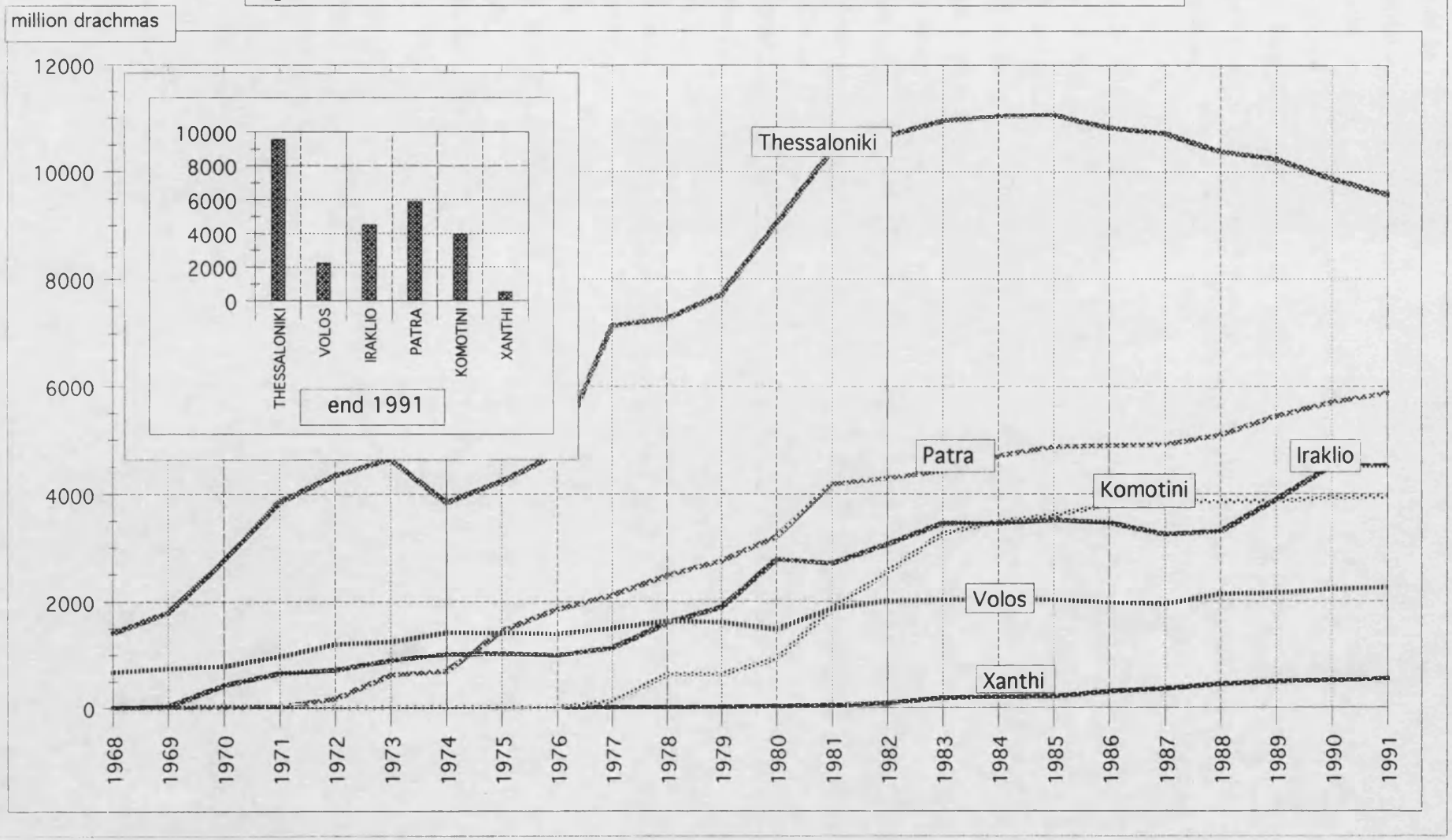


Figure 7-12: A comparison of cumulative costs in the Industrial Areas from start to 1991



it would be difficult to ascribe social costs. The component costs of each of the six Industrial Areas under consideration are shown in Figure 7-13, both in terms of absolute amounts given in million drachmas and the percentage of contribution of each source to the total for these six projects as a whole.

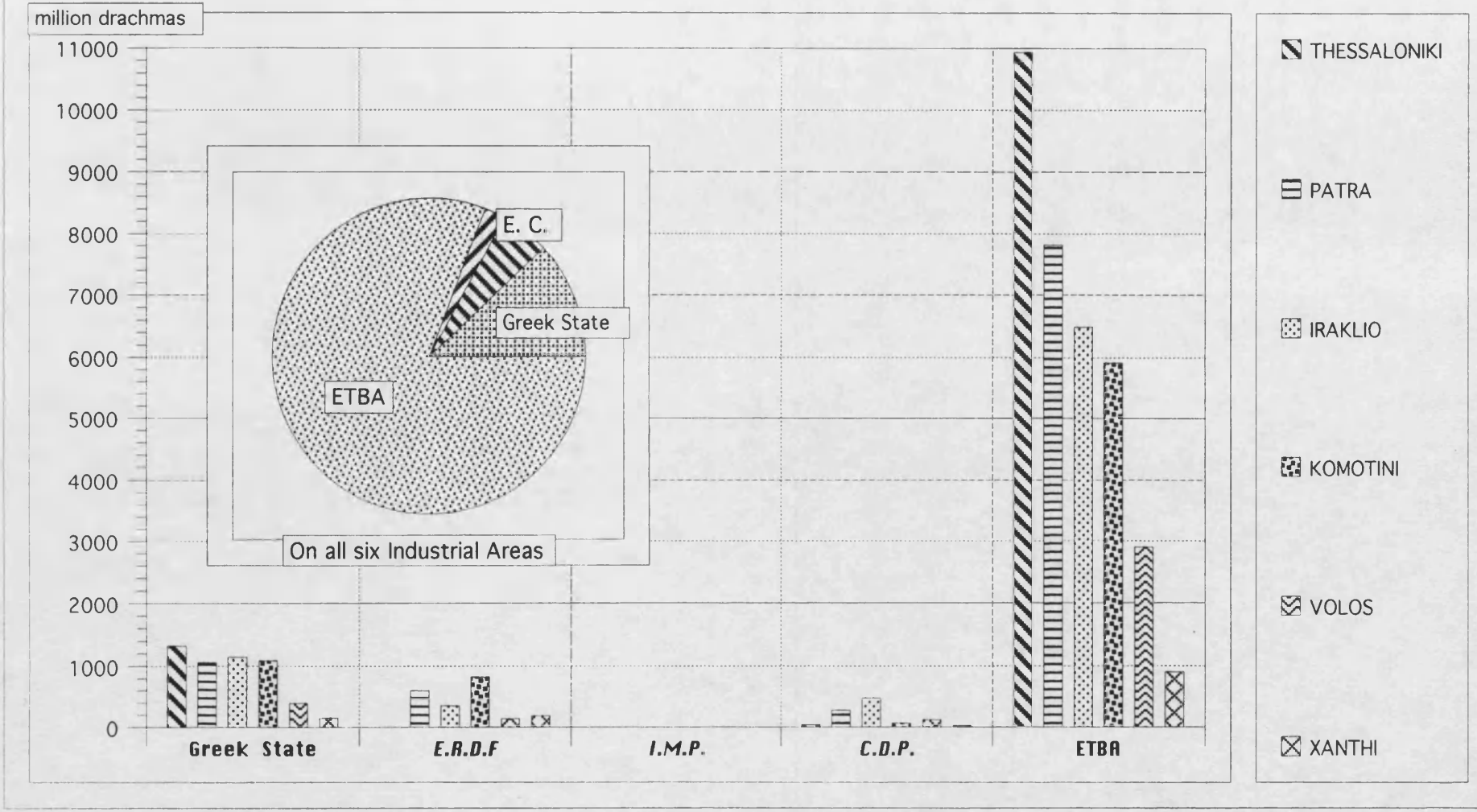
Overall then the efforts to promote regional development from central funds are perceived to be a national priority based on a subsidiary principle and also on national security grounds. They seemingly enjoy a nationwide consensus.

b. Social and regional balance.

Starting with the tangible costs, first are the Industrial Area's running costs which mainly comprise costs of administration and infrastructure maintenance (CR1). A second group of costs arises from the locational incentives. The finances of this cost derive from state taxes and therefore should be added to the social costs incurred as they are not returned to the society in a wider sense but to certain private interests in the form of selected firms. Regional development incentives currently comprise of one-off grants, accelerated depreciation schemes, tax allowances and subsidies on loan interest rates for new or relocating firms. The Industrial Areas Programme is integrated into the national financial incentives scheme for investments in industry. Laws provide enhanced incentives for location within the Industrial Area compared to the respective surrounding region since 1978 with Law 849/1978 and consequently through Law 1262/1982 and its successor 1892/1990. Thus, from 1978 onwards the portion of 'enhancement' should be attributed as a social cost to the project (CR2). Finally, there may be some regional environmental costs that occur in the recipient regions. These include some damage to natural landscapes and some environmental pollution that can be associated with the new economic activity (CR3).

The basic benefits to be found within the recipient regions or the society in general can be summarised as follows. They range from those that involve tangible income flows to those which are much more difficult to quantify. The main component of the former is new employment creation and its multiplier effects which can be estimated through the applicable regional salaries (BR1). There is also a welfare component transferred to the region through the salaries paid for the construction of the project's infrastructure (BR2). Furthermore there are some social benefits deriving from the income created from the salaries involved in the production of the studies for the Industrial Areas (BR3). Finally there are salaries that are paid within the region as part of the scheme's running costs which include maintenance and administration tasks (BR4).

Figure 7-13: The sources of funding of the Industrial Areas from start to 1991



E.R.D.F.= European Regional Development Fund I.M.P. = Integrated Mediteranean Programmes C.D.P. = Coordinated Development Programmes

The Industrial Areas, besides having regional development aims, also serve as a decongesting factor for the large metropolis of Greece - Athens - and to a much lesser extent for Thessaloniki. The region of Athens (Attiki) accounted for some half the national industrial activity by the late seventies. This caused substantial infrastructure and environmental problems and subsequent costs. Any deconcentration due to the Industrial Areas Programme provides benefits to such regions. Social benefits experienced in congested regions arise from enhanced land use potential and de-congestion created due to the export of industry to the periphery (BR5), and a distinct benefit by way of environmental relief, especially as regards pollution, on central regions (BR6).

Additionally there are regional benefits which result from potential or actual land use improvements within the recipient regions (BR7). These arise from evacuation of industrial spaces that were previously occupied by industry in the region which is now relocating to the project. Furthermore properties (commercial and residential) in the region theoretically are supposed to increase their value as they become better serviced and as a result of increased demand promulgated through multipliers (BR8). Finally, there are other social benefits (BR9) deriving from sustenance of existing employment. Salaries are assumed to sustain local demand for goods and services, provide central and local income and produce consumption taxes. These enable the financing of other 'commonly acceptable' social projects, provide for savings or potential investments and sustain education levels. Parallel arguments can be developed which conclude that crime, poverty and degradation should also be reduced.

7.5.4 The settings for the costs and benefits calibrations

Given this specification of the costs and benefits of the Programme the next issue involves the assumptions of how the account can be calibrated. Table 7-6 gives a summary of the settings to be used in this analysis.

To start with the benefits, four types of job generation can be distinguished within a project facilitating some induced employment demand. The first type is the straight forward creation of work places that did not exist before. Let the percentage of these of the total of new jobs be L1. These jobs sensibly should be accounted to the benefits of a project fully, that is by a weight factor w1=1. Second, there are jobs that are transferred to the project through the relocation of previously centrally located (non-assisted) firms (L2). These jobs are again sensibly accredited to the project, but still pose some small cost to the 'central' areas. This cost could be considered as amounting to some one fifth of a lost job,

Table 7-6 : The settings and assumptions for the cost - benefit analysis of the Industrial Areas

Costs		**Settings**	
CC1	(land purchases)		
CC2	(Infrastructure provision cost)		
CC3	(studies cost)		
CR1	(running cost)		
CR2	(K) (regional investment/job) (all new jobs)	K = Excessive aid (than regional) on investment in the Industrial Areas (after 1978)	Value = 5%
CR3	(M) (net new jobs) (regional salary) (SC)	M = Factor on regional salaries regarding cost due to environment degradation	Value = 2%
		SC = Social Coefficient (on salaries)	Value = 40%
Benefits			
BC1	(land sales)		
BR1	(net new jobs) (multiplier) (regional salary) (SC)	Multiplier (on employment)	Value = 1.25
BR2	(V2) (infrastructure cost) (SC)	V2= Percentage of salaries paid locally, on infrastructure cost	Value = 40%
BR3	(V1) (studies costs) (SC)	V1= Percentage of salaries paid, on studies cost	Value = 75%
BR4	(V3) (running cost) (SC)	V3= Percentage of salaries paid locally on running cost	Value = 35%
BR5	(I2) (all new jobs) (N) (regional salary) (SC)	N= Factor on regional salaries regarding central benefit due to land use potential	Value = 6%
BR6	(I2) (all new jobs) (P) (regional salary) (SC)	P=Factor on regional salaries regarding central benefit due to environment relief	Value = 3%
BR7	(I3) (all new jobs) (N) (regional salary) (SC)	N = Factor on regional salaries, regarding benefit of land use potential	Value = 5%
BR8	(R) (land sold)	R= Factor on Industrial Areas land sales,rising aggregate regional properties value	Value = 25%
BR9	(S) (net new jobs) (multiplier) (regional salary)	S= Factor on regional salaries for employment related benefits	Value = 10%

Net new jobs = (all new jobs) (I1w1+I2w2+I3w3)

I1= percentage of new created jobs	w1= weight of an "I1" job	Value = 100%
I2= percentage of relocating employment from central regions	w2= weight of an "I2" job	Value = 80%
I3= percentage of internal relocating employment	w3= weight of an "I3" job	Value = 25%

Social Discount Rate (annual) Value = 2%

and consequently these jobs are to be weighted by w2=0.8. Third, there are jobs attracted to the project from other assisted areas. These transfers are to be considered here as 'random', that is without rational explanation, since they could have been encapsulated in their original region's respective project, and bi-directional, thus creating net result of zero. (If there were clear indications for the existence some significant inter-regional trends of this kind these jobs should be accounted for, perhaps bearing some half the benefit of a new job.) Last, there are the jobs that already exist in the region which are simply transferred from out of the project into it (L3). These jobs should be accounted for positively since even this transfer can be considered desirable as land use aims may be achieved and better productivity result from a location within the industrial agglomeration. These jobs are here only weighted by w3 at one quarter of a new job. For the needs of the present cost-benefit analysis the distinction of the percentages L1, L2, L3 for the types of job generation in each of the six sites can only be based on research undertaken through questionnaires and vary among sites.

Firms that relocate to Industrial Areas in 'remote' regions sometimes find it more difficult to cooperate with the existing, older, supposedly complementary firms but of course some do. It can be assumed, consequently, that either other new firms are going to establish in the region to serve these new needs, or existing complementary firms grow. To the extent that these firms are not in the project area, and thus their growth not accounted for, it is reasonable to deploy an employment multiplier. This multiplier is to be applied to the net new employment, since the intra-regional relocation of firms probably does not create additional effects. A more than usually modest plus 25 percent multiplier (1.25) is used here. This is low enough to account for any of the process being diverted out of the region, or for the servicing of firms from within the project and thus being directly accounted for.

Given the above methodology for estimating the employment generation, the salaries paid are the economic expression of the above effect and mainly comprise the regional benefit. Salaries can be accounted in full as regional benefits from one point of view. But also of course, salaries are the payment for work done by employees. This begs the question as to what extent is a salary a social benefit in addition to a compensation for the output or the task done? Employees producing nothing will soon find that they are receiving only unemployment benefit. To deduce the social benefit extent of salaries it can be assumed reasonably that compensation for the task done should be that part of the salary that exceeds the applicable unemployment benefit. Employees finding the compensation part of

salaries too small for the job done would opt for unemployment benefit (given no alternative job). On this basis the social benefit part of a salary is the level of unemployment benefit applicable.

Based on the above rationale, and given that the employment benefit in Greece is some 40% of the 'basic' salary, the social benefit part of the salaries paid is to be measured at 40% of the 'actual' salaries paid in generated jobs. The 'actual' salaries were chosen since it is anticipated that employees would have to feel rather seriously under-compensated for their performance to opt for 40% of the 'basic' salary as unemployment benefit. Thus, the social coefficient (benefit part) of the salaries is 40% for the analysis. In all cases the average regional salary in manufacturing is used.

Thus, benefits due to new jobs (BR1) are calculated as the net multiplied salaries in an Industrial Areas project, weighted by the social coefficient on salaries. Benefits due to salaries paid in the construction of infrastructure (BR2) are calculated assuming V2=40% (fraction of salaries in total infrastructure costs). The social coefficient on salaries is also applicable here. The social direct benefit due to the salaries involved in research and preparatory studies (BR3) uses V1=75% as the salaries fraction of the costs of studies together with the social coefficient on salaries. The benefits due to salaries paid as part of the running cost (BR4) assume V3=35% in a similar manner.

The indirect social benefit of land use potential (BR5) occurring in central, congested regions is measured using the L2 percentage of jobs relocated from central regions and an N=6% factor on salaries (using social coefficient) regarding the land use potential and decongestion. The calibration of the benefit of environmental relief of central areas (BR6) again uses the L2 percentage of jobs, social salaries and also the factor P=3% on social salaries regarding environmental relief. The land use social benefit occurring in regional areas (BR7) is calibrated at N=5% on regional social salaries. No multiplier is used since only employment actually transferred into an Industrial Area generates land use potential. Only the L3 percentage of new jobs is accounted for here, that is the jobs relocated from within the same region. The benefits regarding increased property values (BR8) are, however calibrated with a multiplier effect. For each piece of land sold in the Industrial Area, it is argued, there is a demand for some additional industrial land (and housing) that is reflected in higher property values. The increase in prices of all other properties together is assumed to be R=25% of the price of land sold in Industrial Areas. Finally, the other social benefits related to employment (comprising BR9) provide an extra social welfare in the recipient regions estimated at S=10 %

of net multiplied salaries.

The central costs CC1 to CC3 and the running cost of Industrial Areas (CR1) are used as they occur on an annual basis. They are standardised for inflation at constant 1988 prices as are all other prices used in the analysis. The state aid cost (CR2) is calibrated using a factor of aid additional to the standard amounts applicable to the region. This is K=5% on amount of investment in the Industrial Area multiplied by the regional investment per job ratio and by the number of the new jobs generated by the project. The cost of regional environmental degradation (CR3) is calibrated at M=2% of the net new salaries to the project adjusted by the social coefficient.

7.5.5 The balance procedures

The Industrial Areas Programme is a public policy for regional development. As it involves a transfer of resources from central locations (in Greece and the EC) to lagging regions the benefits and the costs should be compared at both national and regional levels using at equal weights and without distinction. No expectation of full returns at the national scale is realistic but net central costs can be compared with the results they bring forward. Net benefits thus are assumed to arise through various outcomes involving increased salaries and improved social welfare that occurs in a region as a result of the project which are over and above the overall costs of the provision and operation of the scheme. The aim of the analysis is to judge how efficiently the project funds were spent or, in other words, how cost-effective are the Industrial Areas in reaching their objective of regional development. The evaluation procedure is based on two different methods.

The first utilises one of the pay-back-type methods. These are useful in that they minimise the uncertainty that is associated with lengthy projections and difficulties related to the variable timing of projects. The method takes the total costs of the initial 'x' years of a project and calculates, given the estimated benefits stream, the number of years required from the date of initial operation to cover these costs. The pay-back period can be shown to be sensitive to varying discount rates.

The second is a full-life cost-benefit evaluation. This analyses how the benefits brought forward from each project compare with the costs of the project and is based on an assumed life cycle of each scheme. Such evaluation adds an extra dimension to the comparative performance estimations of the similar ages comparisons involved in the pay-back method above. The full impact can be seen through a critical view of what the position would be, in terms of net present value

(NPV), at the end of the assumed full life cycle of each project. Additionally the internal rate of return (IRR) is produced for each project which provides an indication of the marginal efficiency of its capital. The life cycle evaluation attempts to simulate, logically, characteristics of the mature operation of the project after the completion of the basic investments and other initial costs. The model is based on the logical flow and timing of the various costs, including any social costs, and the various benefits that result. This method also permits the testing of the sensitivity of both the NPV and the IRR to the use of social or full salaries in the calculations. Additionally it also illustrates the sensitivity of the NPV to the variations in the social discount rate.

This way the foundations of a general benefit-cost analysis model have been set out. The model is suitable for evaluating industry-based assisted-area programmes which are typical of sub-national planning in many countries. The assumptions and operational definitions have been detailed as well as the data sources to be used in the analysis. The model is calibrated on a sample of projects formulated under the Industrial Areas Programme in Greece. The results are of course dependent on the way the evaluation model is calibrated and must be read in close conjunction with the general principles presented.

7.5.6 Evaluation of Industrial Areas using the pay-back of the first 'x' operational years

a. Calibration of the method

This method is valuable because the six Industrial Areas examined are of different ages and consequently at different stages of maturity. By the end of 1991 ages varied from 22 years (Thessaloniki and Volos), through 20 years for Iraklio, 13 years for Komotini, 12 years for Patra, to 10 years for Xanthi. This creates a problem of direct comparison amongst the six areas taking into account their full lives to the present. The problem stems basically from the timing of the expenditures on the various types of investments. Heavy financial deficits exist for the initial years due to unsold land. These are accompanied by substantial expenditures incurred by large construction works and studies' costs. On reaching the years of mature operation, the land deficits tend to be recovered (Thessaloniki) or even income flows from land sales may occur (Volos). Such income from land can be set against the costs of the studies and the provision of infrastructure. As projects mature the latter tend to be covered by the former.

Given that the data used for costs are standardised for prices no inflation is

involved. Initially the social discount rate is set to zero to show the pure monetary flows as they occur. The choice of the appropriate social discount rate (SDR) is problematic. The SDR of a project is usually set between the social time preference rate and the social opportunity cost. The social time preference rate is a discount rate which reflects the preferences of a society to consume now or later. Higher values reflect economic short-sightedness in demanding consumption now rather than later. Lower, sometimes zero, values are used for state investment projects. Social opportunity cost is a discount rate which reflects the real cost of a social investment and is related to the real returns that capital can command in the economy. In this case since the prices are standardised for inflation and the projects are in the public domain, no economic 'myopia' should be assumed; the social time preference rate is taken to be zero. Altruistically, and based on political sensitivities, this could even be thought of as negative. The social opportunity cost rate may be set at the leading, widely available, real interest rate for investments (nominal - inflation). This for Greece is rarely above 3 to 4%. Thus for the present analysis a 2% SDR is assumed.

Utilising the pay-back method for the first eight years, the structure of costs given in Table 7-7 was calculated. (It was assumed that the first substantive part of the life cycle of a project is complete in eight years. Additionally, the relative newness of three of the six projects (10-12 years) made the selection of a considerably longer costs-period problematic if projections were not to be used.)

A few years after their formation the different Industrial Areas start creating employment and related benefits while over the same period often considerable costs have mounted up. If the first 'x' accounting years were taken to be from the start date considerable differences would exist between the sites in the accounted for operational years. Instead the pre-operation costs have been aggregated to be placed alongside those of the eight properly operational years. In this way the periods of comparison between the sites, although unequal in reality, were equal in terms of the 'logical' stages of project maturity and relevant costs.

b. The resulting costs and benefits over the first eight operational years

As outlined in Table 7-7 this methodology produces nine years of costs occurrence for Thessaloniki, Volos and Komotini, ten for Xanthi and Iraklio and eighteen for Patra. In Patra there was a considerable and costly delay in preparation and operationalisation which should be accounted for if the efficiency of the project is to be measured. Ten years of preparation costs with only minimal benefits surely pose social costs besides logistical ones. Besides, the aim of this

Table 7-7: Pay-back of costs from start to 8th year of operation of each Industrial Area

	Regions :	Thessaloniki	Volos	Patra	Iraklio	Komotini	Xanthi
	Time Span of Costs :	9 years	9 years	18 years	10 years	9 years	10 years
Full salaries							
	Costs to 8th year of Operation	-4803	-1423	-6169	-1730	-4172	-574
SDR OFF	Operational Year to Recover Cost:	*6*	*2*	*24*	*11*	*27*	*15*
	Balance1992 :	7207	5908	-1942	3125	-1301	-52
	Costs to 8th year of Operation	-7381	-2203	-7989	-2475	-5157	-671
SDR ON	Operational Year to Recover Cost:	*6*	*2*	*32*	*11*	*33*	*15*
(= 2%)	Balance1992 :	8962	7875	-2932	3321	-1716	-63
Social salaries							
	Costs to 8th year of Operation	-4761	-1397	-6156	-1727	-4165	-572
SDR OFF	Operational Year to Recover Cost:	*16*	*6*	*61*	*18*	*71*	*47*
	Balance1992 :	1069	2156	-4196	623	-2889	-342
	Costs to 8th year of Operation	-7319	-2165	-7974	-2470	-5148	-668
SDR ON	Operational Year to Recover Cost:	*20*	*6*	*89*	*20*	*112*	*67*
(= 2%)	Balance1992 :	532	2705	-5629	326	-3618	-400
Social discount rate for pay-back of initial 8-year cost on year 16							
Full salaries	SDR	*23.6%*	*58.2%*	*-6.0%*	*10.8%*	*-14.0%*	*2.5%*
	rank:	2	1	5	3	6	4
Social salaries	SDR	*0.0%*	*20.6%*	*-16.0%*	*-3.0%*	*-25.0%*	*-19.0%*
	rank:	2	1	4	3	6	5

SDR = Social Discount Rate

particular test is to measure the initial 'acceleration' of the projects and not the full life cycle impact. Apart from this, a distinction was also made between the SDR turned 'off' at zero and 'on' at 2%. Lastly, since all prices are standardised to the 1988 levels there is no difference between the timing of the value of the costs and benefits.

For the first part of the analysis the full salaries are used and the sensitivity which results from the SDR 'on' or 'off' is explored. The second part consequently assesses the pay-back periods if social salaries are assumed, again the SDR is either 'on' or 'off'. The third part seeks to assess the varying discount rates which are necessary for each Industrial Area to pay-back in a sixteen year period.

If full salaries are assumed and SDR is 'off', the project cost of Thessaloniki to the eighth operational year is 4803 million drachmas. Figures for the other projects are Volos 1423, Patra 6169, Iraklio 1730, Komotini 4172 and Xanthi 574. Projects then clearly have different costs and these are not only due to their different sizes. The cost of the Thessaloniki project is more than three times that of Volos, both sets of expenses having occurred at the same years, and the former is by no means three times as large. The difference is largely due to varying land prices. Of course differences in location influence the site's attractiveness and hence cost. Firms are prepared to incur higher costs if there is the potential to recover them through the additional opportunities that attractive places afford.

Having said that, the results shows that the benefits-stream created in Volos covers these costs in the second year of operation. In Thessaloniki this is not achieved until the sixth, and in Iraklio the eleventh, year. The small cost of 574 million drachmas in Xanthi, however, will only be covered by the fifteenth year, while in the case of Patra the extensive cost will only be covered in operational year 24, and in Komotini in year 27. It is clear then that the attractiveness of projects, or the acceleration caused by the initial investment, are certainly affected by factors external to the project, most notably their location in the economic map of the country. Volos, being in a good strategic position in the centre of mainland Greece, covers cost in a fraction of the time they need to occur. Thessaloniki and Iraklio seem to cover the costs at more or less at the same pace they occur. Both are regional capitals with extended economic hinterlands, Thessaloniki serving all Macedonia, and Iraklio dominating the large island of Kriti. The case of Patra is unfortunate. The large accumulated costs of the project cannot be offset by the average economic acceleration it has stimulated.

The cases of Komotini and Xanthi are two opposites that may happen in remote regions. In Xanthi too small an investment has not created the impact

needed to cover even its very moderate outlays. In Komotini the initial investment has proved to be far too high. It was an investment of the same order of that for Thessaloniki, for a town twenty times smaller. Although results for the region may be encouragingly positive the project's cost effectiveness seems to fall behind the standards set elsewhere.

The second part of the full salaries' analysis assumes a SDR of 2% per annum as explained above. Thus, assuming full salaries and setting the SDR 'on', Iraklio appears totally insensitive with costs still recovered by year 11. Volos and Thessaloniki prove equally insensitive. These three examples have the feature that there is little if any lag between the timing of costs occurrence and cost recovery. In other words they provide a rapid economic acceleration to the recipient regions. Under these assumptions Patra shifts costs recovery to year 32 (from 24), showing that the benefits occurred considerably later than the investment. Costs recovery for the small investment in Xanthi remains at year 15, while the discount rate of 2% pushes back the recovery at Komotini to 33 years.

If social salaries are assumed, that is if the social coefficient is set 'on', the picture changes dramatically. With the SDR 'off', Volos proves to be the only project to cover its costs at a faster pace than their occurrence, that is by year six. Thessaloniki shifts to year 16 and Iraklio to year 18. Thessaloniki then proves more sensitive than Iraklio to the effect of the social coefficient, since it shifts the period of recovery (6 to 16) 2.7 times, while the shift in Iraklio is only 1.6 times (11 to 18 years). Increased sensitivity to the changed social coefficient shows first, that returns (or benefits) are more salary oriented than land-value oriented, and second, that the employment generation rate of return can be slow and over the long term.

Patra, with the social coefficient 'on', shifts its costs recovery period to 61 years (2.5 times greater than without the coefficient). This shows that, however substantial any employment effect may be, initial delays push the costs recovery time far into the future. Even better employment effects result in the two distant but neighbouring regions of Xanthi and Komotini. Xanthi needs 47 years to recover costs (a shift of 3.1) and Komotini some 71 years (a shift of 2.6). The shows that although Xanthi seems to be recovering costs faster due to initial land sales, Komotini is creating employment at higher rates and is thus less sensitive to the social coefficient.

If, in addition to the social salaries coefficient, the SDR is set 'on' then the costs recovery periods may be influenced. Volos, however, remains at 6 years, that is costs recovery still is achieved prior to the cost generating period. Iraklio, under

these circumstances, manages to match Thessaloniki, due to land gains and accelerated employment, in producing a 20 years repayment period. Patra unfortunately moves to a distant 89 year period. Xanthi needs 67 years to cover the small initial outlay, and Komotini is beyond hope in need of 112 years to recover costs. To continue comparison of Xanthi and Komotini, it shows again that even if employment trends are better in Komotini, the high start-up costs structure of the project is a great burden when discount rates start operating.

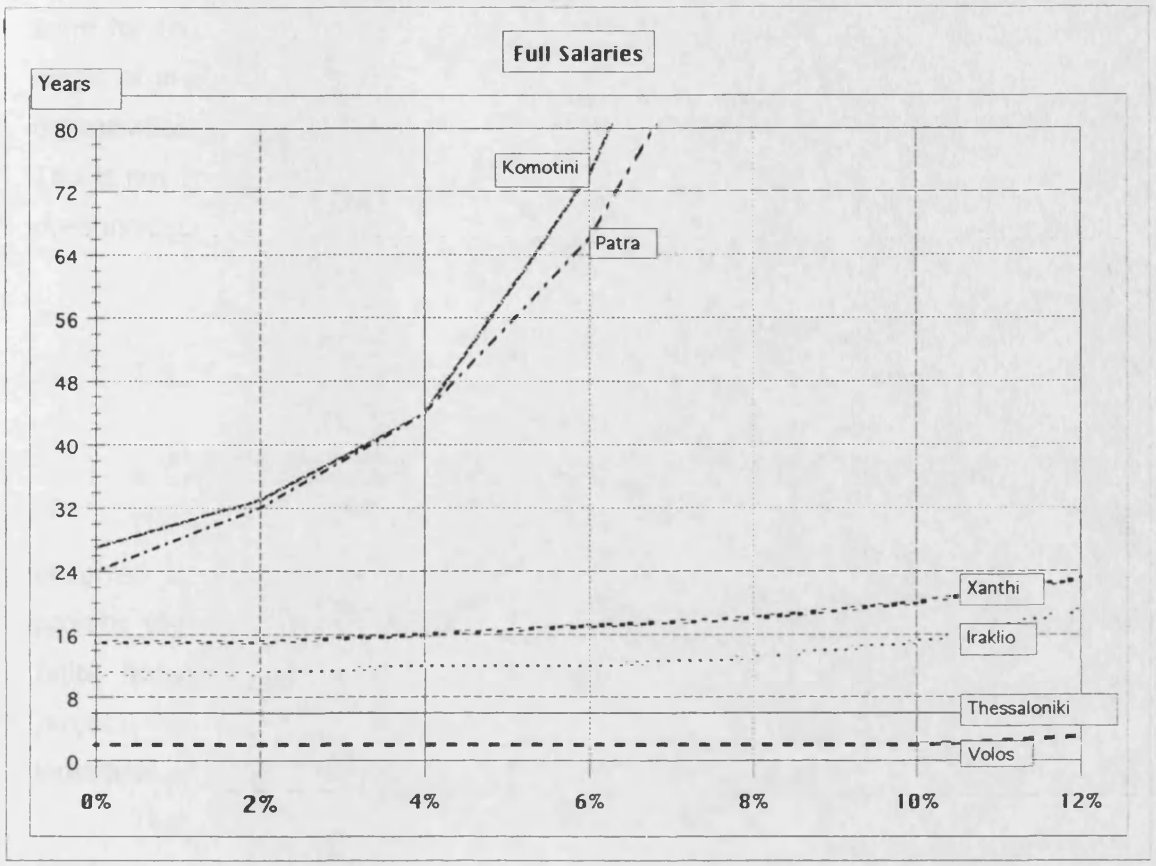
The final part of the pay-back evaluation method seeks the social interest rate needed for a repayment (in terms of social benefits) period of sixteen years. The sixteen years period was selected as being a socially reasonable average of the various repayment periods of the projects considered.

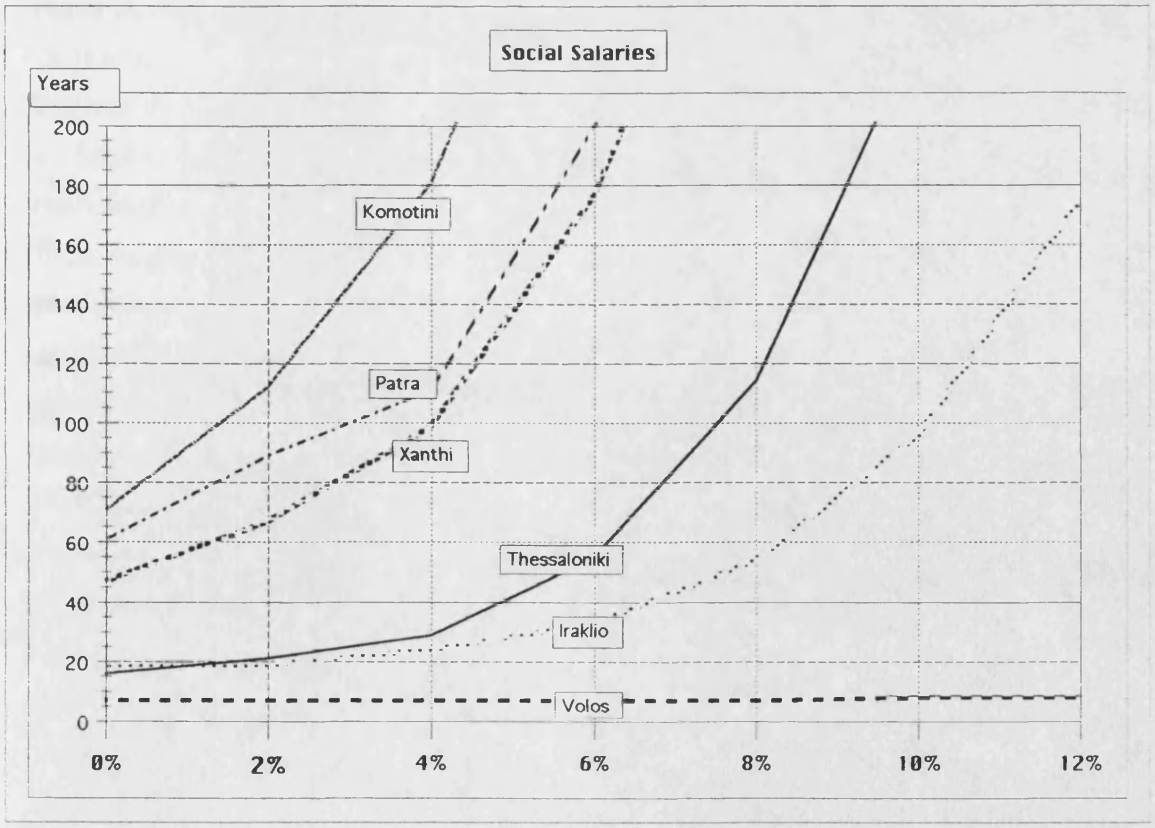
If full salaries are assumed and the SDR is 'off', Volos fulfills the requirement on the basis of a massive 58.2% annual discount rate, Thessaloniki achieves 23.6%, Iraklio 10.8% and Xanthi only 2.5%. These four could be regarded from one point of view as socially acceptable as they all are above the 2% social discount rate. Patra, however, requires a negative rate (subsidy) of 6% and Komotini a negative annual rate of 14%. Patra's delays and Komotini's experiment are seemingly socially unacceptable, needing vast social subsidy to recover their basic costs in 16 years.

If the social salary is used, Volos survives requiring a 20.6% annual discount rate while Thessaloniki stands at zero. Iraklio requires a marginally negative 3.0%. Even this last example could be thought as acceptable in a sense. Patra, however, is down to minus 16%, and this is somewhat better than Xanthi at minus 19% and Komotini at minus 25%. The more developed potential of employment generation in Patra tends to recover the lost time compared to the limited potential of remote regions.

Figure 7-14 shows the effects that the SDR has on the periods needed by each project to pay-back costs up to the eighth operational year. For full salaries Patra and Komotini seem to be able to pay-back expenditures in a reasonable period of time only under zero discount rate. For these two examples a small positive SDR is enough to make the pay-back period likely to be regarded as overlong. Xanthi survives due to a beneficial land sale in early period. But when social salaries are used Xanthi loses this advantage and joins Patra and Komotini. The projects seem to form two groups. The first shows better performance and consists of Volos, Iraklio and Thessaloniki in order of success. These are the older projects that were mainly developed in the seventies. The second group (Xanthi, Patra and Komotini) were accelerated in the eighties. The national and international economic conditions of the two periods are not unimportant in this respect.

Figure 7-14 : Pay-back year sensitivities to variations in the social discount rate for Industrial Areas, using full salaries and social salaries





A first conclusion from the above 'pay-back' years analysis is that investment in remote areas is difficult to recover fast. If the initial investment is too large for the regional potential, or even if it is too small to have some substantial range of impact, difficulties are likely to ensue. Finally, delays in construction and organisation are often irrecoverable as regards cost-effectiveness measurements. This is not to deny that the regional employment effects are usually positive, but it does indicate that in some cases such spending is not socially optimal.

7.5.7 The full life-cycle evaluation of the Industrial Areas

a. Calibration of the method

The basic idea of this method is to define the costs and benefits that have occurred by the time each project reaches its full operation stage, and then to project the subsequent benefits stream either to infinity or to a more realistic finite horizon. The main difficulty with type of approach is that it involves projections of different magnitudes for different future time periods for each Industrial Area.

The projections of benefits, and specifically those resulting from new employment creation, pose difficulties because the influences of wider forces, regional, national and even international, need to be understood. The availability of markets, the state of technology used and more generally the nature of international competitiveness of the accommodated manufacturing all are relevant to future employment prospects. To the extent that the Industrial Area can only represent a small portion of regional manufacturing, it is possible that the Industrial Area might well achieve rapid rates of growth benefitting land-use planning and producing new jobs while manufacturing generally in the region is in decline. As time proceeds the new jobs component could be more or less dependent on only intra-regional relocation. In order to operationalise the model a standard and consistent proportion of externally attracted growth has to be assumed. This fraction varies from project to project and is defined by field research. The extent to which employment growth in the comprehensive national Industrial Areas Programme exceeds the national growth rates gives a hint of the level of inter-regional relocation that helps regional policy but the overall effects might be small and national growth may well be different. Given these difficulties the projections of benefit streams made for the years after 1992 simply follow the 1984-1992 trends.

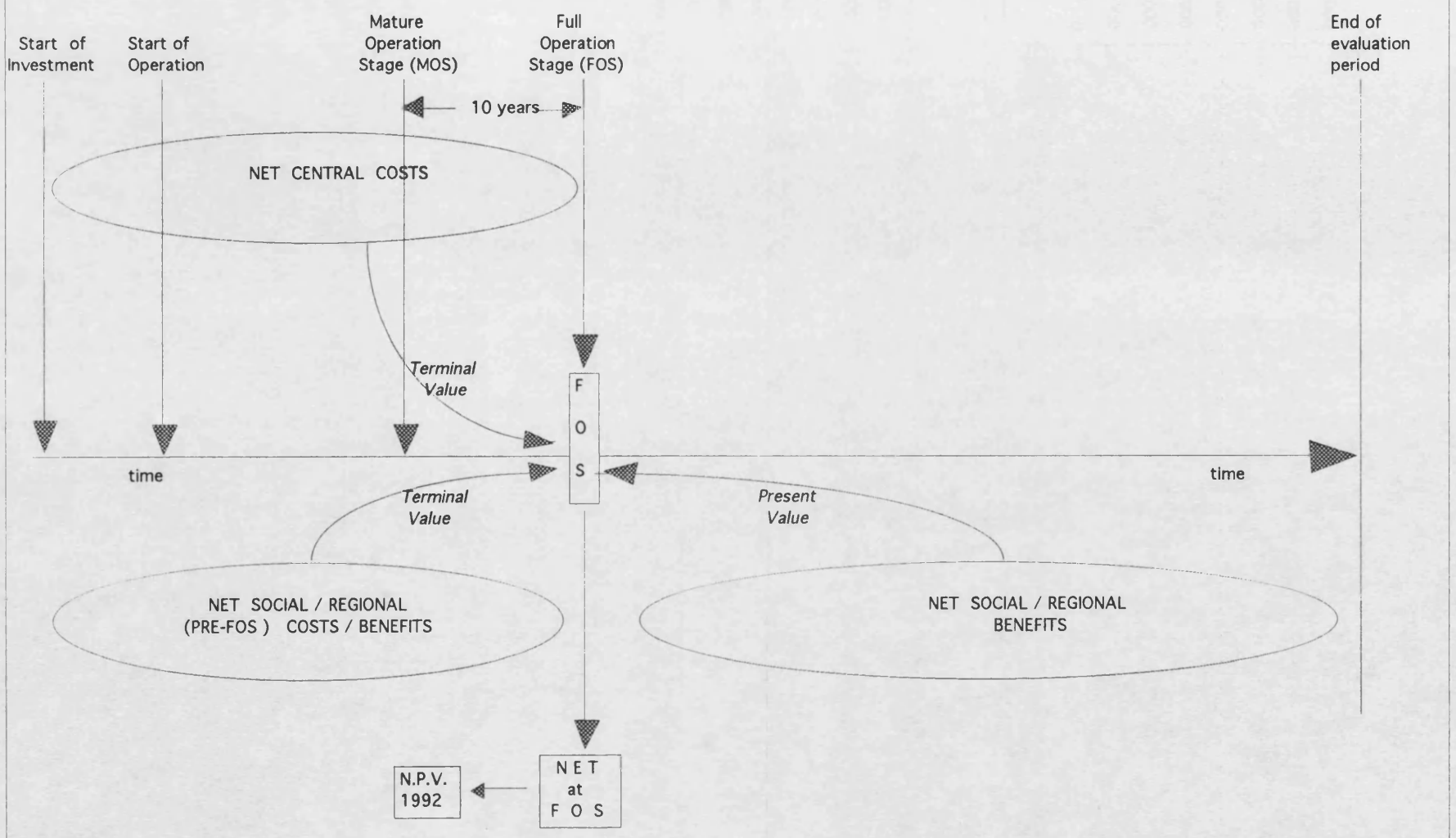
The projections of costs also pose difficulties and these arise because different stages of project maturity necessitate different ways of handling expected future cost streams. This can only be done arbitrarily for the 'younger' projects and should follow some average experience based on the relevant parts of the life cycles of 'older' projects.

The scope of the method is to compare the net present value (NPV), the internal rate of return (IRR) and other indices of each project through a generally applicable model. The logic of the full life-cycle cost-benefit analysis can be seen in Figure 7-15. Here the cost-benefit streams are divided into three groups, according to the bearer and their timing. These are respectively the net central costs that accumulate to the full operation stage (FOS) date, the net social/regional costs or benefits to the FOS date, and the net social/regional benefits that are expected after the FOS date until the end of the evaluation period. Both the FOS date and the full life-cycle period are defined subsequently.

The total development costs stream is the sum of the costs of land purchases and infrastructure provision and these are shown in Figure 7-16. Inspection of these graphs shows that some types of development costs for some projects have already been completed. For analytical purposes assume that the mature operation stage (MOS) be the year of the completion of the development works. This should occur some years after the land purchases stop. In order to project the likely full development costs in each Industrial Area where these are not yet complete the following method was employed. An index was constructed of how much investment in infrastructure is poured onto a certain value of bought land. This land development index is calibrated on the experience of land purchases and relevant infrastructure costs in the Industrial Areas where this has already occurred. The land development index for Thessaloniki is 1.625, that is infrastructure costs 1.625 times the value of land. For Volos it is 2.09, Iraklio 5.33, and for Komotini it is 6.5. There is an explanation for the increased index for the more peripheral regions. First, land is cheaper in general in the periphery. Second, such land is usually more poorly served by existing basic infrastructure which in turn has to be provided in full. Development of the land purchases then usually proves more costly in more peripheral regions.

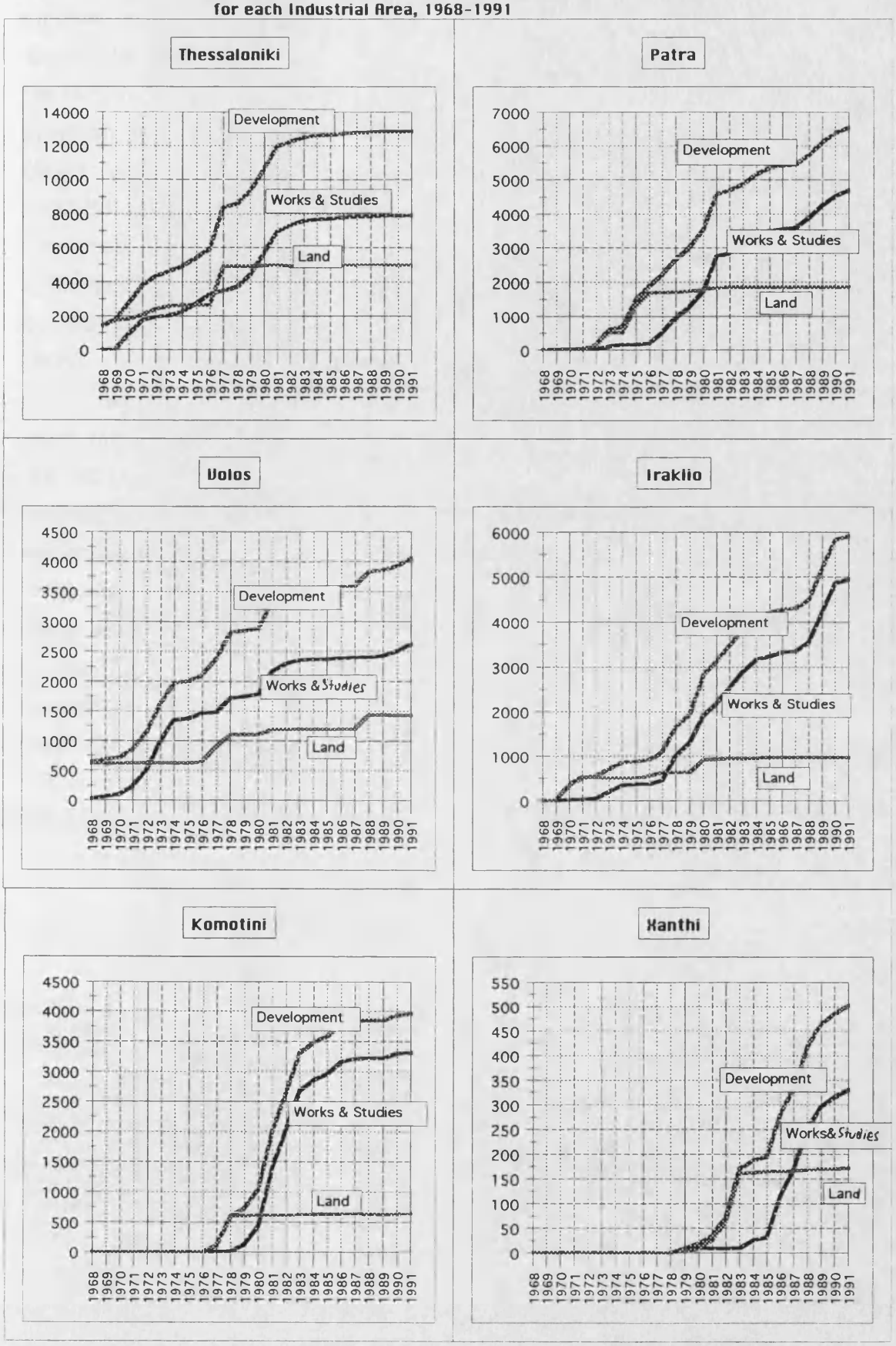
Utilising these ideas an estimate can be made for the incomplete project of Patra. A ratio of 3.5 is assumed and this lies between that of Volos and Iraklio. Thus the development of the 1700 million drachmas worth of land bought that up till now amounts to some 4750 million drachmas of infrastructure spending which is expected to reach some 5900 million drachmas by the completion of the MOS in

Figure 7-15: Diagrammatic indication of the timing of the flows of costs and benefits



Note: As for all cases FOS is after 1992, projections are utilised. Projections differ in their pre- and post- FOS construction. NPV= Net present value

Figure 7-16: The composition over time of the central development cost for each Industrial Area, 1968-1991



'Development' cost consists of land purchases (CC1), infrastructure works (CC2) and development studies (CC3) costs.

1995. The same method estimates that the completion of the infrastructure provision in Xanthi will cost some six times the value of the land bought. Thus it shall exceed the 330 million drachmas spent by 1991 and reach some 1000 million at the MOS in 2006. Thessaloniki can be regarded as having finished the infrastructure provision since 1984 (MOS). Komotini's infrastructure was complete by 1988 (MOS). Volos, with the late land purchases of some 250 million drachmas in 1987-88, given its own land development index, needs some additional 500 million drachmas for extra infrastructure development. This would raise the infrastructure cost from the stabilised 2400 million drachmas to some 2900 million by 1994 (MOS). Finally, Iraklio, should complete the infrastructure spending in 1993 (MOS).

Given these estimations the central total development costs the projects reach the MOS benchmark and stop increasing. Of course for a full stabilisation of the net central cost to occur land sales have first to settle down. The following assumption has been adopted in this respect. For each Industrial Area after the respective MOS year any land sales are to take place within an assumed period of ten years. This time period then defines the FOS of each project. The assumption is based on the notion that opportunities for firms to relocate are always increasing in space. Any comparative advantage of a newly constructed Industrial Area might be expected to last say for ten further years after firms first started to locate there. It should be noted that most land is sold before the full completion of the infrastructure provision, so ten years after the MOS stage the chances are that all the land has been sold. If after ten years there is still land unsold it can be assumed that it is defective in some way. Even if it is subsequently sold it is likely that it would be for the secondary uses of existing firms rather than for new relocations and consequent employment.

The net central costs at the FOS are estimated as the total development costs that are fixed after the MOS (by definition) minus the stream of returns from land sales projected to reach the FOS.

But the really important question is to what extent do the above costs create regional and social benefits? To approach this question the following procedure was adopted. Some costs and benefits are constructed to be linked to the growth of the Industrial Area and these extend to the FOS date. Following from this there are costs and benefits that are tied to the maintenance of the Industrial Area operation itself. These extend from the FOS date to the end of the evaluation period of the project.

In terms of regional/social costs, state aid to the newly establishing or in

situ expanding firms is regarded a cost that extends to the FOS date and not after. The second component is the running cost of the Industrial Area itself. This comprises a projection of the actual running costs trend up to the FOS year which then remains at a constant level for the life of the project.

As for regional/social benefits, land use returns are calculated up to the FOS year. This is because, after the last establishment joins the Industrial Area, no further land use benefits occur in the region or elsewhere as a result of the project. Increases in property values also occur only until the FOS year in that no further additional demand for space is initiated in the region due to the project.

The benefits from salaries are assumed to reflect the social benefit component only. This assumption means that the benefits' stream estimate is at a minimum as was discussed earlier. Salary benefits are calculated incrementally, benefits are based on the new employment created in each year until the FOS. Where employment projections are required to reach the FOS year these are developed from the previous employment trends within the Industrial Area together with land sales projections and their estimated employment per unit land. The benefits due to salaries based on studies and infrastructure construction expire at the MOS year of complete infrastructure provision. Benefits of salaries included in the running costs apply until the FOS year.

The regional benefits after the FOS stem only from the estimated basic employment. Benefits for this period derive from the sustenance due to the employment. This comprises the 'saved' unemployment benefits, the part of taxes paid due to salaries that finance other beneficial social projects, and other social benefits related to the sustenance of employment, such as savings or investments, better education, lower crime, etc. (The theory that theft increases social welfare, if decreasing marginal utility of capital/property is assumed, is not accepted in this analysis!). All the above benefits are compounded to some 40% of the regional salary. These benefits are assumed to accrue until the end of the evaluation period of the project. The full evaluation period is assumed to be 100 years from the project's operation date. In reality the remaining years from the FOS to the end of the evaluation period vary and are of the order of some 70 years. (A full evaluation period of 60 years is also tested finally).

The net social/regional benefit (after FOS) is constructed as the benefits from salaries less the project running costs over the long term period. The overall assessment is produced as follows:

The net central costs and the net social/regional (pre-FOS) costs and benefits are compounded to the FOS year with the terminal value formula:

$X [(1+i)^{t-1}] / i$

where X is the average annual stream of each cost or benefit, t is the number of years concerned and i is the SDR.

The net social/regional benefits (after FOS) are discounted to the FOS year using the present value formula:

$X [1- (1+i)^{-t}] / i$

where the terms are as above.

Initially the SDR is set to zero to show the purely mechanistic results of each project. The choice of the appropriate discount rate was then treated following the rationale as described in the 'pay-back' method above. This involves a compromise between social time preference and social opportunity cost and is again assessed as a 2% SDR (a 6% SDR is also tested). A full sensitivity analysis using different discount rates from zero to eighteen percent was produced.

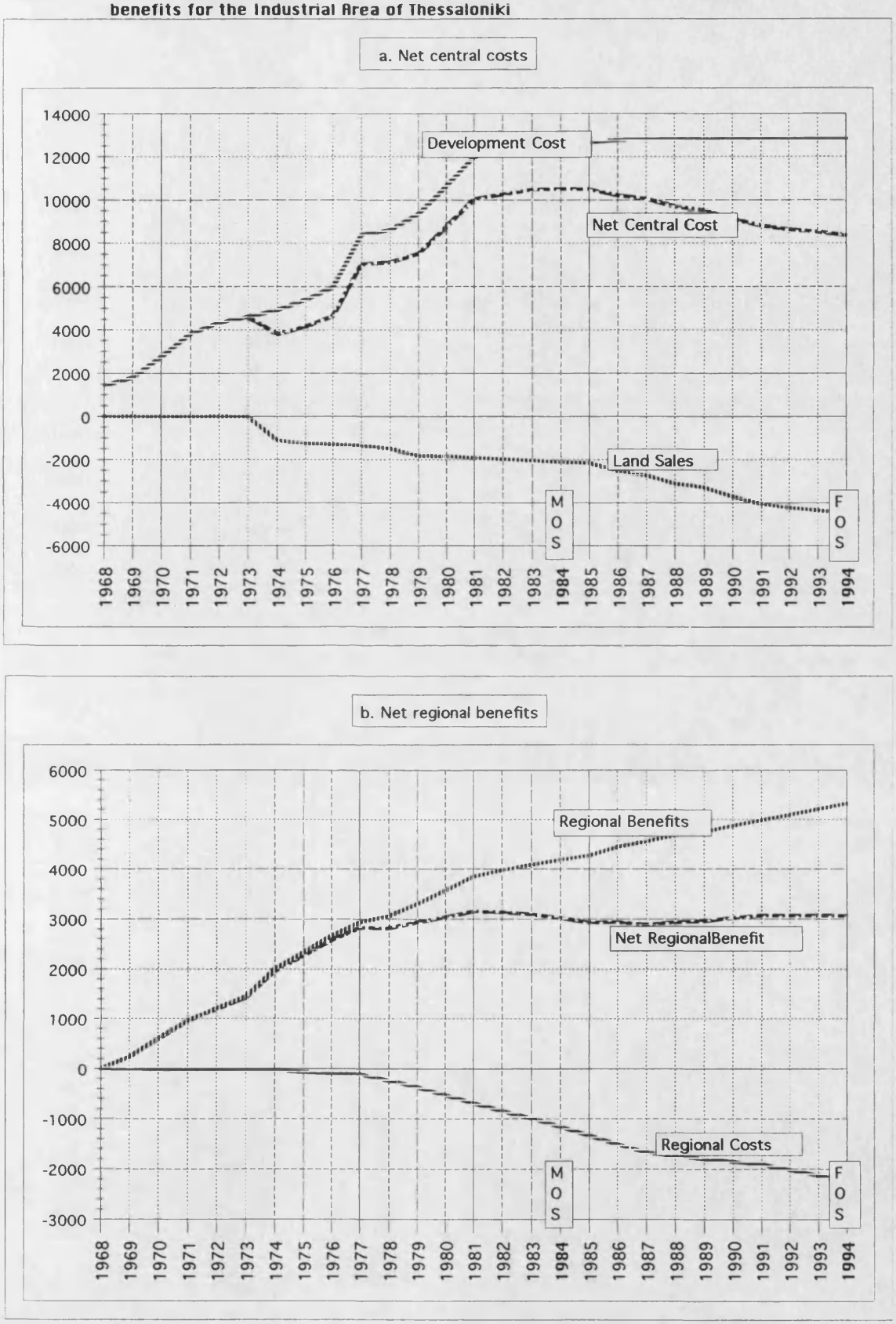
b. The resulting costs and benefits calculated over the full life-cycle

First, the central balance (net central costs) are assessed. The components of the net central costs' paths are illustrated in Figures 7-17 to 7-22 for Thessaloniki, Volos, Iraklio, Patra, Komotini and Xanthi respectively. All use a zero SDR to show unbiased monetary trends (standardised 1988 prices). It should be noticed that the development costs stop at the MOS, while the net cost starts decreasing from that point due to land sales until the FOS year. Central costs terminate at the FOS year.

It can be seen from the graphs and from Table 7-8 that for Thessaloniki the net central cost at the FOS is some 8364 million drachmas. For Volos it is 1444 million, Iraklio 2565 million, Patra 5658 million, Komotini 3434 million and for Xanthi the net central cost is 1113 million drachmas. In the light of these results it would appear that the Industrial Area of Thessaloniki is an expensive project for the central authorities. This is also most certainly the case for Patra and to a lesser extent Komotini. The project in Volos on the other hand looks like an extremely economical one and the same can be said for Iraklio.

Second, the regional/social balance is assessed. The net regional/social costs' or benefits' paths up to the FOS are also shown in Figures 7-17 to 7-22 for the same sample of projects. The results are again shown at zero SDR and can also be seen in summary form in Table 7-8. Thessaloniki at 3062 million drachmas, Volos 929 million and Xanthi some 27 million all show a net benefit. The other Industrial Areas produce net social costs up to the FOS and these mainly derive from the large cost of state aid. The actual figures are for Komotini -229 million

Figure 7-17: The composition over time of a. the net central cost and b. the net regional/social benefits for the Industrial Area of Thessaloniki

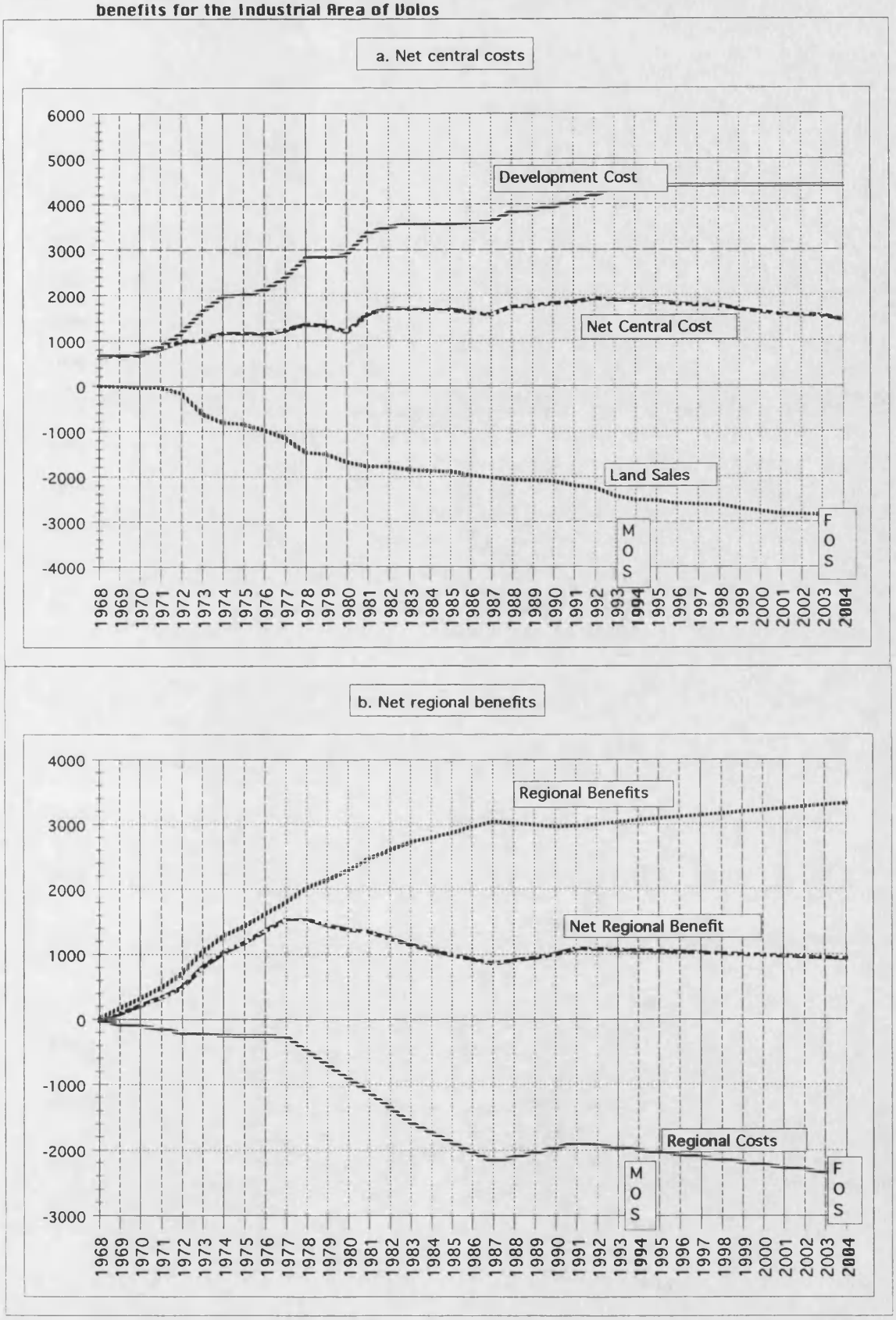


MOS = mature operating stage FOS = full operation stage

'Development cost' includes costs CC1, CC2, CC3 ; 'Land sales' is BC1 ; 'Regional costs' include costs CR1, CR2, CR3

'Regional benefits' includeBR1, BR2, BR3, BR4, BR5, BR6, BR7, BR8, BR9. All costs/benefits are used as described in text

Figure 7-18: The composition over time of a. the net central cost and b. the net regional/social benefits for the Industrial Area of Volos

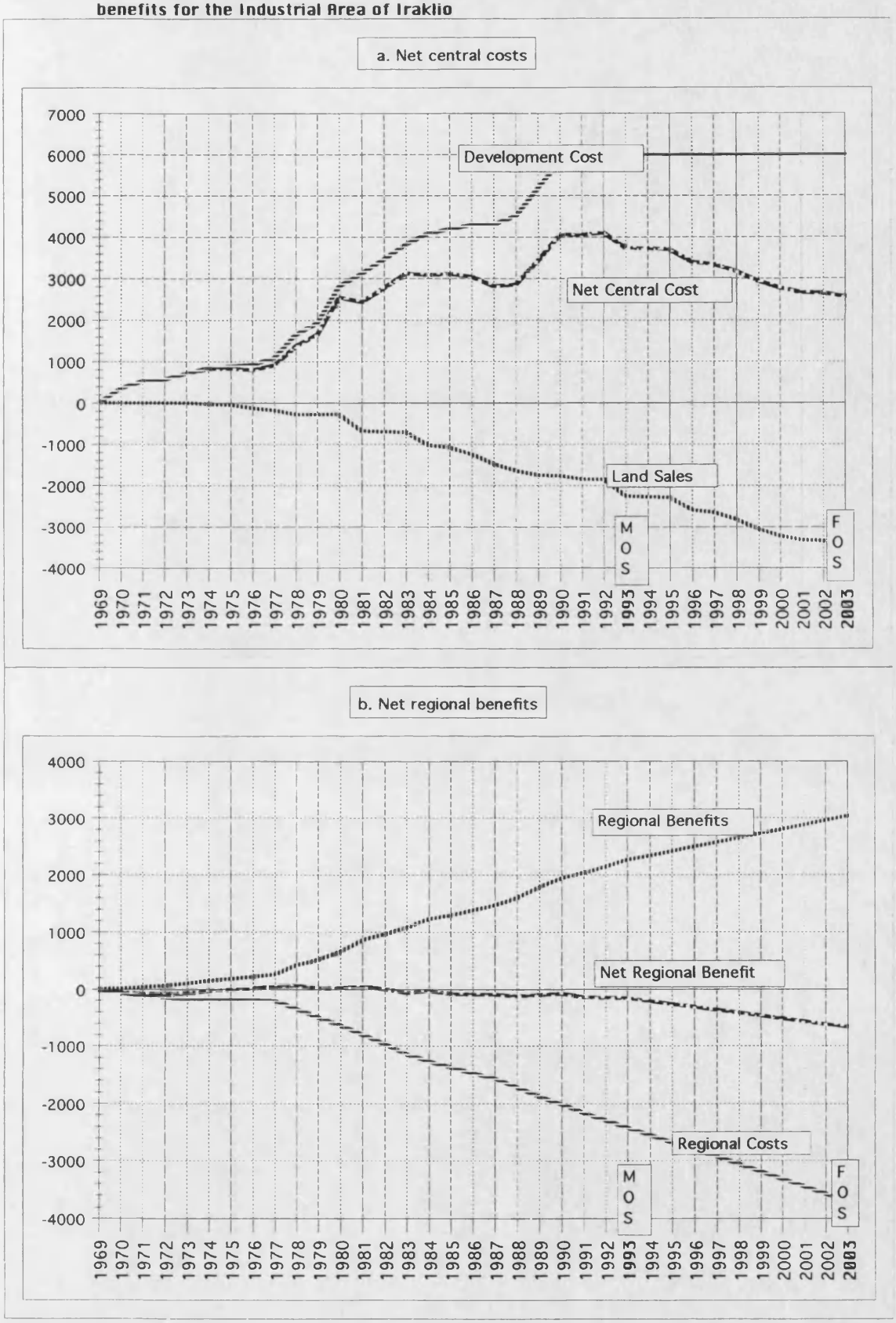


MOS = mature operating stage FOS = full operation stage

'Development cost' includes costs CC1, CC2, CC3 ; 'Land sales' is BC1 ; 'Regional costs' include costs CR1, CR2, CR3

'Regional benefits' includeBR1, BR2, BR3, BR4, BR5, BR6, BR7, BR8, BR9. All costs/benefits are used as described in text

Figure 7-19: The composition over time of a. the net central cost and b. the net regional/social benefits for the Industrial Area of Iraklio

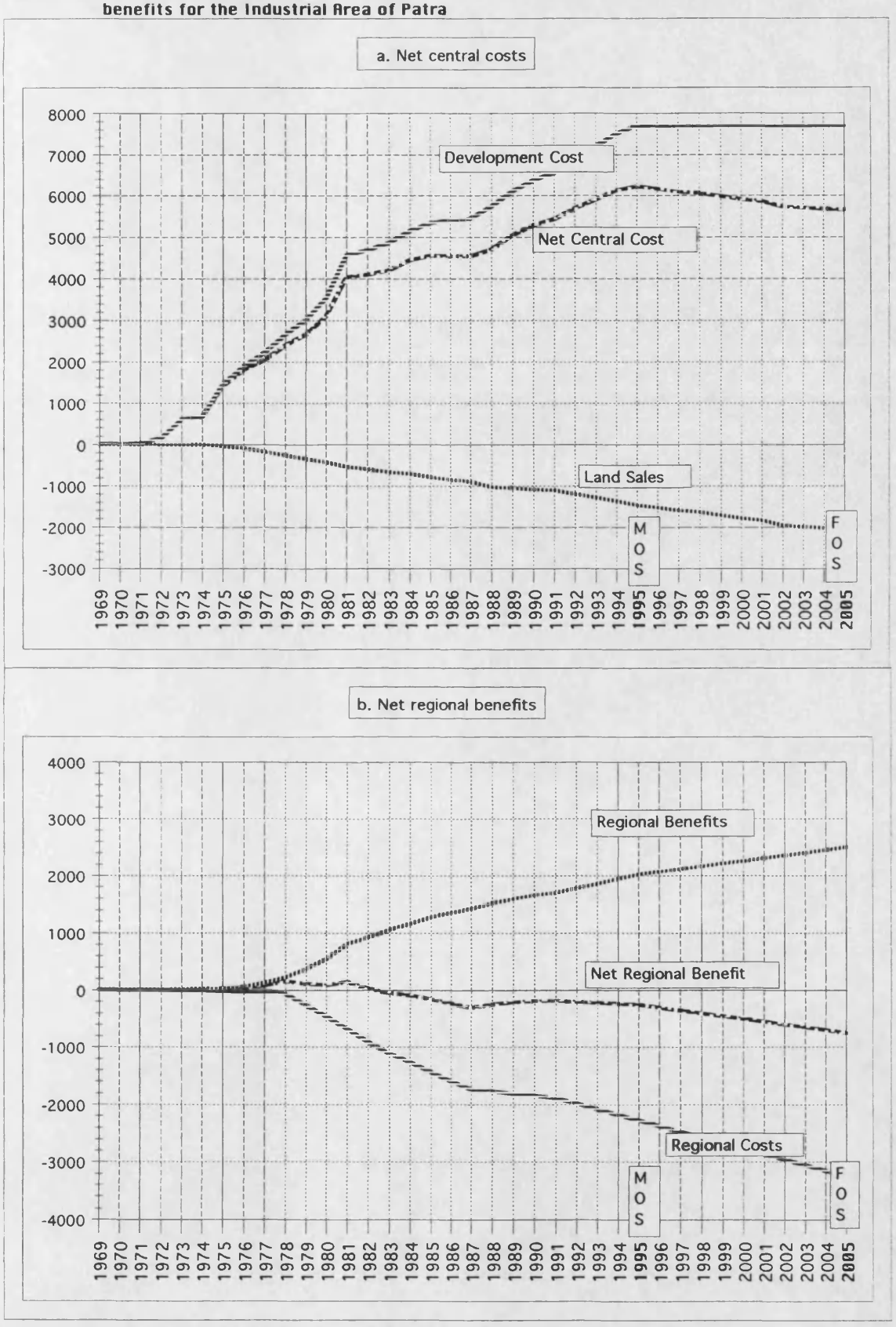


MOS = mature operating stage FOS = full operation stage

'Development cost' includes costs CC1, CC2, CC3 ; 'Land sales' is BC1 ; 'Regional costs' include costs CR1, CR2, CR3

'Regional benefits' includeBR1, BR2, BR3, BR4, BR5, BR6, BR7, BR8, BR9. All costs/benefits are used as described in text

Figure 7-20: The composition over time of a. the net central cost and b. the net regional/social benefits for the Industrial Area of Patra

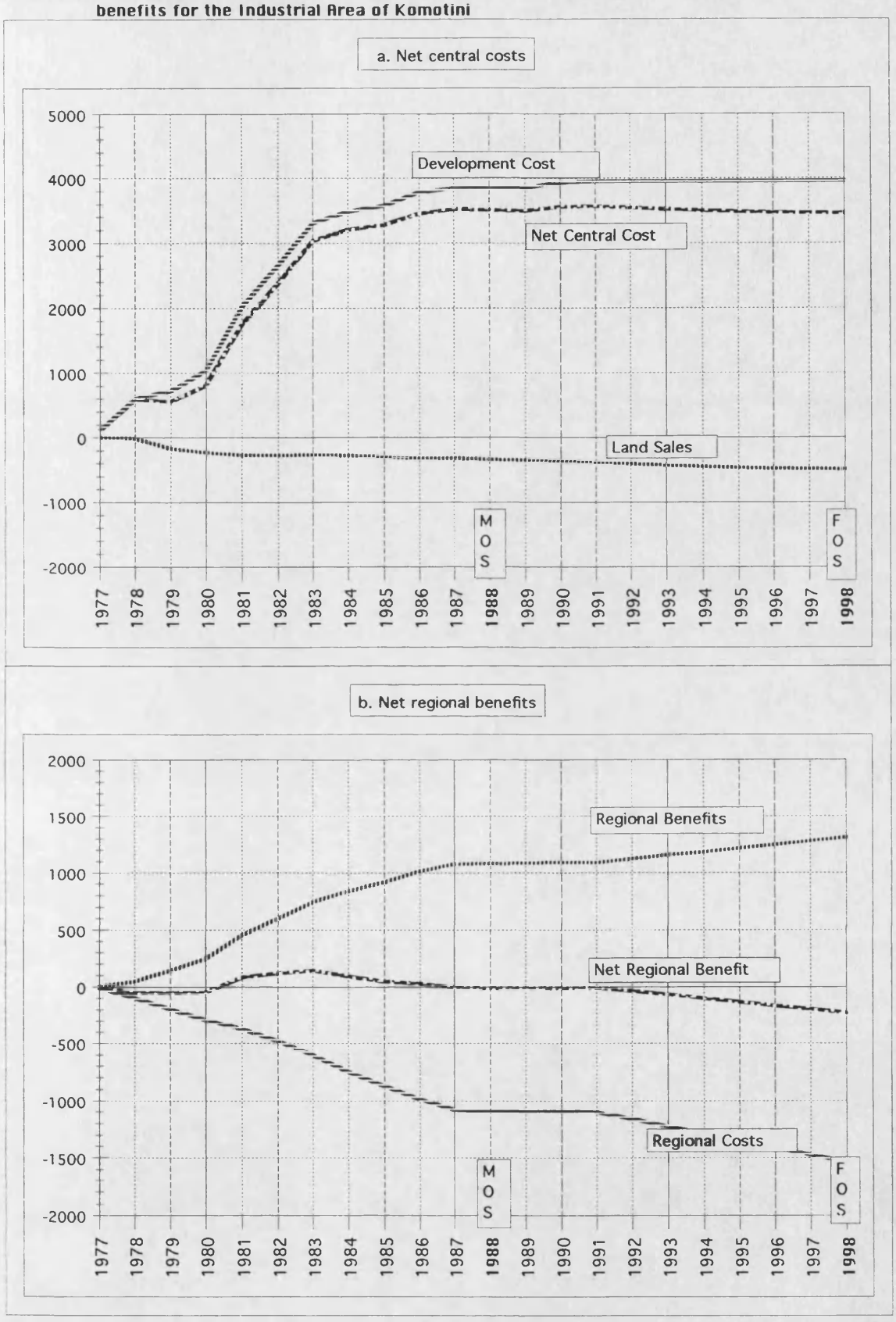


MOS = mature operating stage FOS = full operation stage

'Development cost' includes costs CC1, CC2, CC3 ; 'Land sales' is BC1 ; 'Regional costs' include costs CR1, CR2, CR3

'Regional benefits' includeBR1, BR2, BR3, BR4, BR5, BR6, BR7, BR8, BR9. All costs/benefits are used as described in text

Figure 7-21: The composition over time of a. the net central cost and b. the net regional/social benefits for the Industrial Area of Komotini

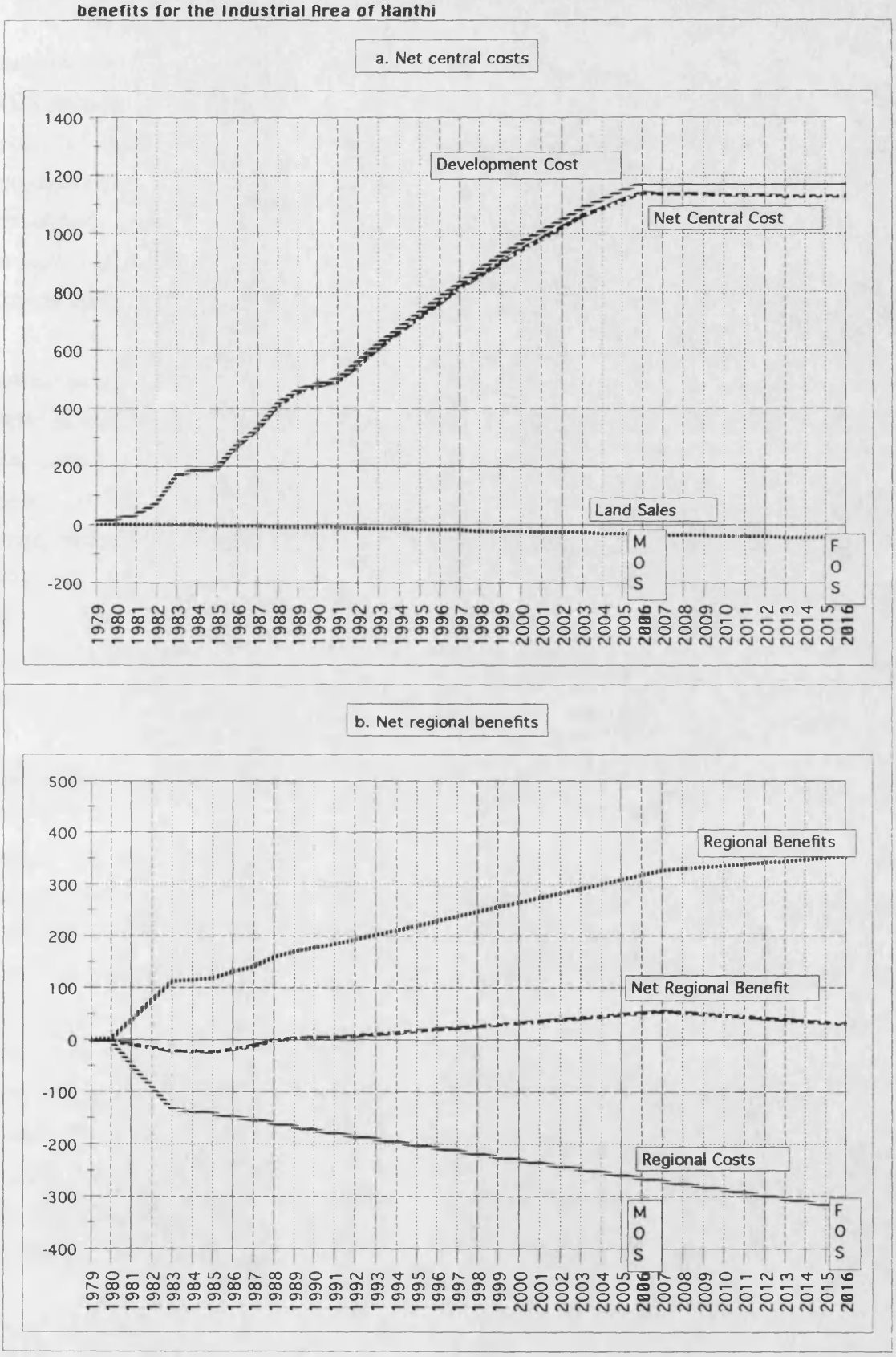


MOS = mature operating stage FOS = full operation stage

'Development cost' includes costs CC1, CC2, CC3 ; 'Land sales' is BC1 ; 'Regional costs' include costs CR1, CR2, CR3

'Regional benefits' includeBR1, BR2, BR3, BR4, BR5, BR6, BR7, BR8, BR9. All costs/benefits are used as described in text

Figure 7-22: The composition over time of a. the net central cost and b. the net regional/social benefits for the Industrial Area of Xanthi



MOS = mature operating stage FOS = full operation stage

'Development cost' includes costs CC1, CC2, CC3 ; 'Land sales' is BC1 ; 'Regional costs' include costs CR1, CR2, CR3

'Regional benefits' includeBR1, BR2, BR3, BR4, BR5, BR6, BR7, BR8, BR9. All costs/benefits are used as described in text

drachmas, Iraklio -668 million and Patra some -754 million.

The projected benefits stream after the FOS is defined as the benefits from salaries minus the Industrial Area running costs. These are based on the estimated FOS employment of each project and the level of regional salaries. For the 100 years of operation tested here, it can be seen in Table 7-8 that Thessaloniki produces the largest net benefit overall and this amounts to some 198762 million drachmas. Volos is ranked second with 157172 million, Iraklio follows at 78961 million, Patra is next with 73807 million, Komotini only manages 45715 million and Xanthi comes last with 14539 million drachmas.

The above net values do span long period of time and thus it does make sense to use a SDR. The value as discussed before is 2% and the results that this level produces are given in Table 7-9. First, the net present values at the FOS are calculated. The ranking of the NPV at the FOS for each project produces the same result as for the non-discounted calculations. The problem with these results is that, although they relate to the same logical point in the life cycle of each project, they do refer to different years in reality. Thus the NPV of each project is accordingly discounted to a selected and consistent year (1992) producing comparable results in same year money terms. Again for this the NPV ranking is the same as before but the quantities are smaller.

A further index is constructed to show another aspect of the projects' performance. This is the net present value of benefits divided by net central costs (NPV/NCC). This index signifies for a given level of central deficit how much net social benefit occurs. The index is sometimes formulated as the net benefit over investment, but here, given that only part of the investment is actually recovered, interest is focused on the actual deficit or net transfer of resources to the region. The index is stable when comparing Industrial Areas for the FOS year and for 1992 and is clearly not affected by the variable length of discounting taking place. However the index does produce a different ranking for the projects to that previously observed. It brings Volos into the first place, with net benefits 54.25 times the size of the central net transfer to the region. Second in rank comes Iraklio, with 15.74 times. Thessaloniki is in this case only third with a leverage of 14.24 times. Komotini follows with a ratio of 8.61 in front of Patra and Xanthi with multipliers of 7.34 and 6.04 respectively.

Table 7-10 further explores the sensitivities of the choice of appropriate SDR this time using a rate of 6 percent which may be the highest possible social opportunity cost, always cleared of inflation. The NPV of the Industrial Areas change in money terms again, and the ranking shows one difference for the 1992

Table 7-8: Full life-cycle costs and benefits for each Industrial Area, using zero discount rate

Constant Prices (1988), in million drachmas.

	Timing	Net central benefit (until FOS)	Net social/regional benefit (until FOS)	Employment (at FOS)	Net regional benefit after FOS	Full Project net benefit	Rank
XANTHI	Operation 1981 FOS: 2016 Horizon 2081 Salary: 1.0573	-1113	27	573	15625	14539	6
KOMOTINI	Operation 1978 FOS: 1998 Horizon 2078 Salary: 0.9667	-3434	-229	1628	49378	45715	5
PATRA	Operation 1979 FOS: 2005 Horizon 2079 Salary: 1.4094	-5658	-754	1954	80219	73807	4
IRAKLIO	Operation 1971 FOS: 2003 Horizon 2071 Salary: 1.1794	-2565	-668	2587	82195	78961	3
VOLOS	Operation 1969 FOS: 2004 Horizon 2069 Salary: 1.4015	-1444	929	4339	157686	157172	2
THESSALONIKI	Operation 1969 FOS: 1994 Horizon 2069 Salary: 1.2595	-8364	3062	6205	204064	198762	1

Operation: Year of project's first operation
FOS : Full operational stage
Horizon : End of evaluation period (100 operational years)
Salary : Variable full regional salary (in the evaluation the social part of this is used, that is 40%)

Table 7-9: Full life-cycle costs and benefits of each Industrial Area, using a social discount rate of 2%

Constant Prices (1988), in million drachmas.

Present Values at FOS year

	Net central benefit (until FOS)	Net social /regional benefit (until FOS)	Net regional benefit after FOS	Full project net benefit	Rank	NPV/NCC index	Rank
XANTHI	-1590	39	11160	9609	6	6.04	6
KOMOTINI	-4172	-278	40370	35920	5	8.61	4
PATRA	-7327	-976	62080	53776	4	7.34	5
IRAKLIO	-3545	-924	60280	55812	3	15.74	2
VOLOS	-2063	1328	112627	111892	2	54.25	1
THESSALONIKI	-10716	3924	159361	152569	1	14.24	3

Present Values at 1992

	Net central benefit (until FOS)	Net social /regional benefit (until FOS)	Net regional benefit after FOS	Full project net benefit	Rank	NPV/NCC index	Rank
XANTHI	-1253	30	8795	7572	6	6.04	6
KOMOTINI	-3895	-260	37689	33534	5	8.61	4
PATRA	-6396	-852	54193	46944	4	7.34	5
IRAKLIO	-3154	-822	53632	49656	3	15.74	2
VOLOS	-1818	1170	99256	98608	2	54.25	1
THESSALONIKI	-10403	3809	154705	148111	1	14.24	3

FOS : Full operation stage
NPV : Net present value
NCC : Net central cost

Table 7-10: Full life-cycle costs and benefits of each Industrial Area, using a social discount rate of 6%

Constant Prices (1988), in million drachmas.

Present Values at FOS year

	Net central benefit (until FOS)	Net social /regional benefit (until FOS)	Net regional benefit after FOS	Full project net benefit	Rank	NPV/NCC index	Rank
XANTHI	-3544	86	6472	3015	6	0.85	6
KOMOTINI	-6316	-421	28318	21581	5	3.42	4
PATRA	-12873	-1716	40119	25530	4	1.98	5
IRAKLIO	-7285	-1898	36176	26993	3	3.71	3
VOLOS	-4597	2959	65319	63681	2	13.85	1
THESSALONIKI	-18355	6721	104345	92710	1	5.05	2

Present Values at 1992

	Net central benefit (until FOS)	Net social /regional benefit (until FOS)	Net regional benefit after FOS	Full project net benefit	Rank	NPV/NCC index	Rank
XANTHI	-1853	45	3385	1576	6	0.85	6
KOMOTINI	-5176	-345	23208	17687	4	3.42	4
PATRA	-8766	-1168	27320	17385	5	1.98	5
IRAKLIO	-5224	-1361	25938	19353	3	3.71	3
VOLOS	-3212	2067	45636	44491	2	13.85	1
THESSALONIKI	-16826	6161	95653	84987	1	5.05	2

FOS : Full operation stage
NPV : Net present value
NCC : Net central cost

base. There is a shift of Patra to fifth place with Komotini moving to fourth. (The switch actually occurs at a SDR of 5.88%). The reason for this is that Patra reserves the bulk of its benefits for the later stages in its life-cycle compared to the early rapid growth of Komotini. Interestingly with an SDR of 6% the ranking according to the NPV/NCC index is much the same as that based on the NPV, with the only exception being the switch of Thessaloniki and Volos for first place. It will be recalled that in the case of the 2% SDR example there was marked variation in the rankings produced by the NPV and the NPV/NCC measures.

Consequently, a full sensitivity analysis for discount rates ranging from zero to 18% is shown in Figure 7-23. This shows that Thessaloniki generates higher NPV than Volos from zero up to some 14.8% of SDR. Above this level Volos produces the highest NPV until it becomes zero and beyond. Patra and Iraklio seem to have much the same sensitivity to discount rates and are overtaken in terms of NPV by Komotini at 5.9 and 6.9%. Komotini maintains its third ranking behind Volos and Thessaloniki until its NPV becomes zero. It does manage to produce a smaller negative NPV than Thessaloniki at higher discount rates. Xanthi is last ranked and produces a negative NPV after only 7.9% SDR. Patra and Iraklio are also overtaken at some 11% SDR by Xanthi, but at these levels all three have negative NPV.

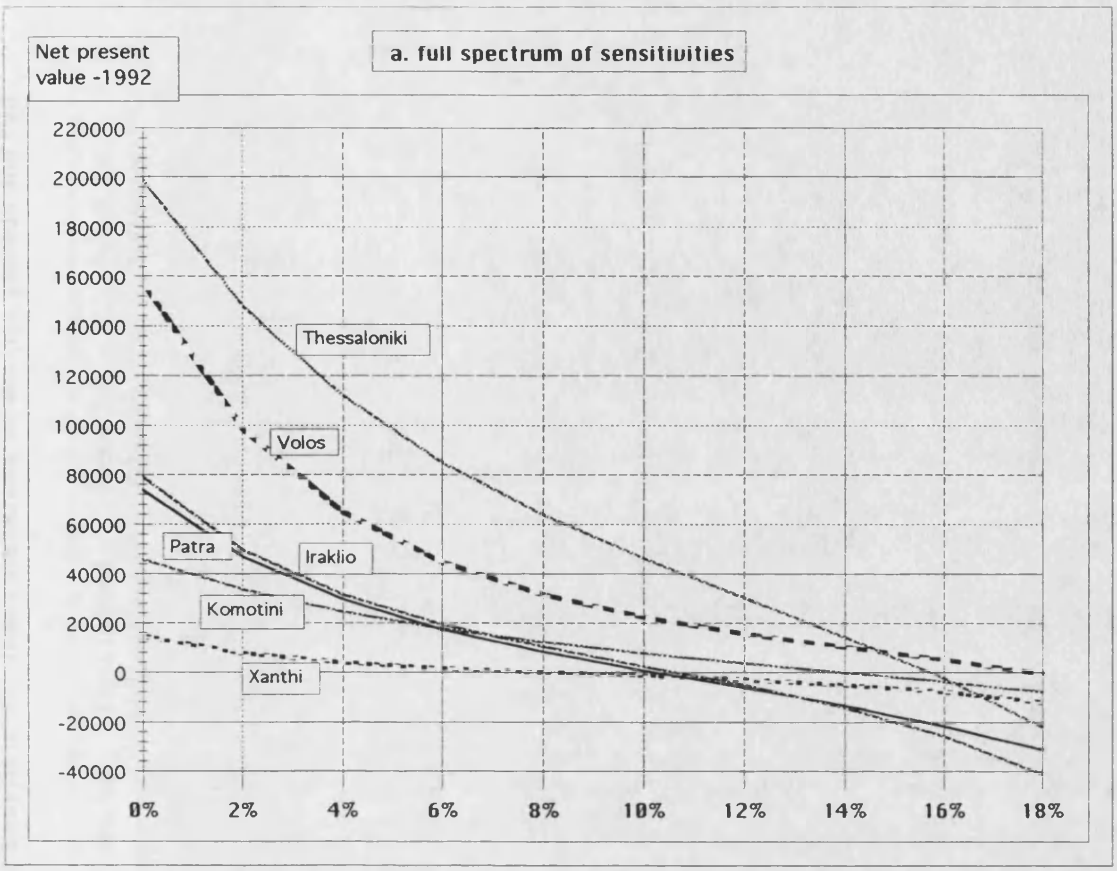
Figure 7-23 also gives details of the IRR in each of the six Industrial Areas. This is the marginal efficiency of capital investment, or put another way, the interest rates at which the NPV of each project becomes zero. Net present values beyond the IRR are negative. This occurs precisely at 17.7% for Volos, 15.7% for Thessaloniki, 13.9% for Komotini, 10.6%for Iraklio, 10.2% for Patra and finally at 7.9% for Xanthi.

A similar IRR can be produced from completely different types of projects. Komotini and Thessaloniki may have similar IRR but the slopes of the paths followed to them are much different as can be seen from the illustration. The slope shows how early or late in the life of a project the main benefits have occurred. A less steep slope at increasing levels of SDR means that the bulk of the returns have been produced early in the life of the project. A steeper slope reflects a project with returns more evenly spread over time or arising later in the life of the project. The latter type of project is much favoured as regards NPV if lower or even zero SDR are used as is often the case with public schemes. It is not difficult to deduce from two paths originating from the same point on the horizontal interest rates axis (IRR) that the one with the steepest slope produces a higher NPV at lower SDR.

Finally, an alternative test for a full life period of sixty operational years instead of the assumed one hundred was also carried out. This, of course,

Figure 7-23: Net present value sensitivity to varying social discount rates for each Industrial Area

a. full spectrum of sensitivities b. focus on the internal rates of return (million drachmas)



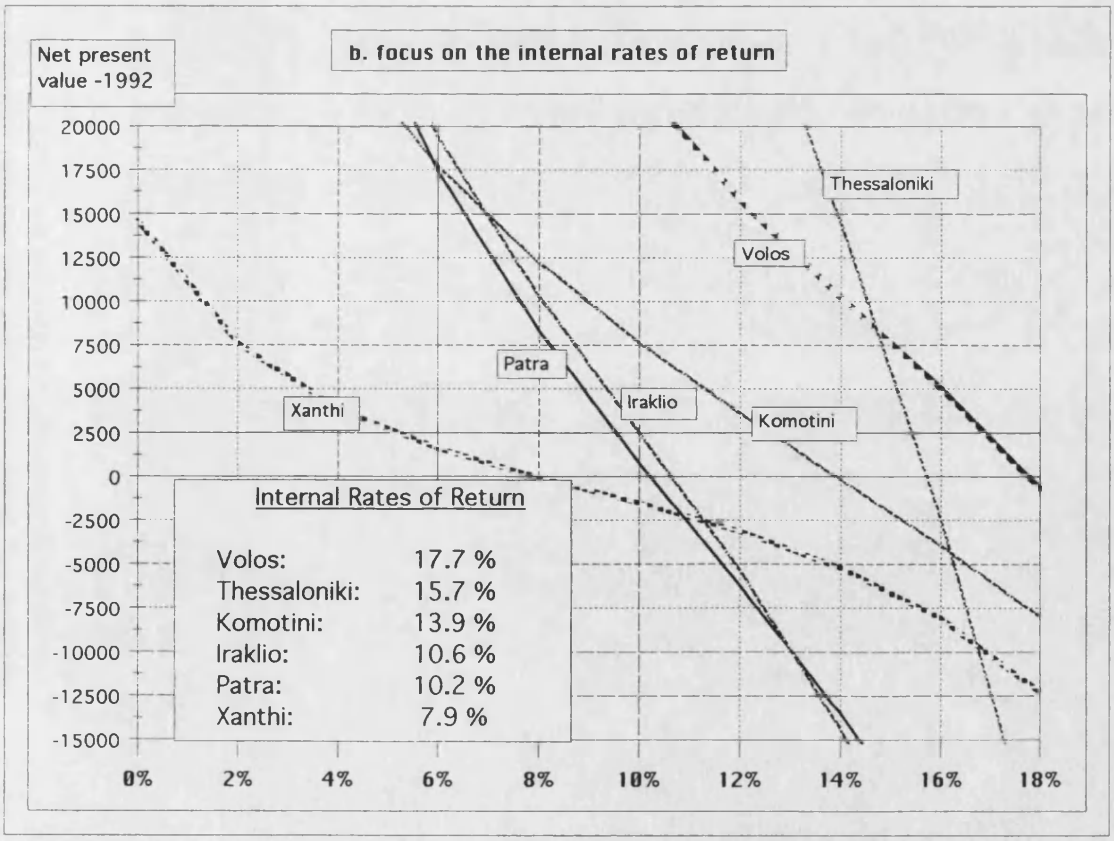


Table 7-11: Break-even year and present values of net benefit of the Industrial Areas, at various periods and SDR
(in millions of drachmas, standardized for 1988)

Industrial Area	Year of operation	Year of FOS	Year of Break-even	Years needed for Break-even from year of operation	Years needed for Break-even from FOS	Result for 60 years of operation (NPV 1992)	Result for 100 years of operation (NPV 1992)
XANTHI							
SDR=0	1981	2016	2021	40	5	4924	14539
SDR=2%	1981	2016	2025	44	9	2160	7572
SDR=6%	1981	2016	2051	70	35	-968	1576
KOMOTINI							
SDR=0	1978	1998	2004	26	6	21026	45715
SDR=2%	1978	1998	2007	29	9	14690	33534
SDR=6%	1978	1998	2018	40	20	11885	17687
PATRA							
SDR=0	1979	2005	2011	32	6	30445	73807
SDR=2%	1979	2005	2015	36	10	17651	46944
SDR=6%	1979	2005	2032	53	27	2168	17385
IRAKLIO							
SDR=0	1971	2003	2011	40	8	30612	82195
SDR=2%	1971	2003	2015	44	12	18018	49656
SDR=6%	1971	2003	2021	50	18	4096	19353
VOLOS							
SDR=0	1969	2004	2005	36	1	60134	157172
SDR=2%	1969	2004	2005	36	1	37527	98606
SDR=6%	1969	2004	2006	37	2	16407	44491
THESSALONIKI							
SDR=0	1969	1994	1996	27	2	89928	198762
SDR=2%	1969	1994	1998	29	4	65602	148111
SDR=6%	1969	1994	2003	34	9	33972	84987

FOS= Full Operational Stage SDR= Social discount rate
NPV= Net present value

decreased the NPV the projects deliver. For the sixty operational years, at zero and 2% of SDR all projects' NPV are positive and ranking is the same with the one hundred years appraisal. At the highest 6% though, faster accelerated Komotini gives higher NPV than Patra, while Xanthi gives negative NPV. Details are given in Table 7-11.

The same table shows the years needed for coverage of the full projects' outlays, or the break - even year of their life-cycles. It is tested for zero, 2% and 6% SDR and is measured in two ways. First, in years needed after FOS, that is after the full operation stage, and second, in years needed after the first operation date. Here Volos breaks even in one to two years after FOS for zero to 6% SDR respectively; Thessaloniki in 2 to 9 years, Iraklio in 8 to 18 years, Komotini in 6 to 20 years, Patra in 6 to 27 years and Xanthi in 5 to 35 years. If break-even is calculated from first operation date, all regions break even earlier than the sixty years limit and for all SDR up to 6%, with the exception of Xanthi, which at 6% would need 70 years.

7.5.8 Conclusions from the benefit - cost appraisal

Some preliminary judgements about the cost effectiveness of the performance of the six Industrial Areas sampled has already been made on the basis of the first 'x' operational years pay-back methodology. The last part of the analysis permits some more general judgements to be made when considering the full life-cycle of the projects. All of the Industrial Areas sampled produce a positive NPV when their costs and benefits are calculated over their full life cycles. Using a 2% SDR, returns on central financial transfers to the receiving region range from 6 to 16 times that provided, except in the case of the Industrial Area in Volos where the return is a massive 54 times that expended. Even with the higher 6% SDR all Industrial Areas maintain a positive NPV from their cost and benefit streams. Net present values start becoming negative at discount rates of 7.9% for Xanthi and not until at 17.7% for Volos, for the standard 100 operational years evaluation.

Volos is a model example of an Industrial Area from this evaluation stance. It produces both high NPV and can endure high discount rates. This means that it can be thought of as a most profitable social investment. Thessaloniki does manage to produce the highest quantity of benefits but these prove more costly to the operator and also provide lower returns on capital expended. Iraklio also appears to come out well from this type of evaluation. As regards the index which measures the net present value of benefits per unit of net central costs, it is second only to Volos at the lower interest rates as it shows rapid growth in the early stages. This

is just what peripheral regions need given the present limited availability of public funds. Patra shows a larger potential to realise benefits in the later development stages so producing a much larger NPV than either Komotini or Xanthi and matching Iraklio. However this is achieved at double the cost of Iraklio. The opposite is the position with Komotini which has rapid early growth and proves to be the least sensitive of the Industrial Areas to rising discount rates. This is so much so that it even overtakes Iraklio as regards NPV at discount rates above 7% and Patra above 6%. These effects do however seem to ease at later stages. The project at Xanthi did give a push to the region in the early stages but seems not to show much future potential. It is somewhat sensitive to the social discount rate but, notwithstanding this, the NPV it produces is by far the lowest. At the higher 6% SDR the NPV of benefits may be positive but they are smaller in magnitude than the net transfer to the region and in this sense and in these circumstances Xanthi is the only project of those considered here that should be regarded as unsuccessful, but only failing the more strict sixty-years, 6% SDR test.

From this analysis it can be seen that of those Industrial Areas which are peripheral (excluding Thessaloniki) the ones located near larger agglomerations eventually have greater potential. Those near smaller cities seem to produce rapid early growth but generate lesser potential over the longer term (Komotini, Xanthi). It would appear that the simulation of agglomeration economies by the Industrial Area seems to be adequate for a good start but the wider economic forces of polarisation and centralisation prove difficult to overcome in the longer term. Still though, the projects are profitable in societal terms, some very much so, and of course help provide some modest solutions to the employment and land use problems of the peripheral regions as demonstrated by this research.

7.6 Conclusions on the evaluation of the effects of the Industrial Areas policy

This part summarises the main outcomes of the multiple analyses carried out in this chapter on the effectiveness of the policy of the Industrial Areas.

From the time - series analysis it was shown that the five regions with older established Industrial Area projects were growing faster than eleven younger Industrial Area regions. Even the latter are growing somewhat faster than the average for Greece, and Greece is growing faster than the non-Industrial Area

regions group. Second, the counterfactual that the time series provided showed that the Industrial Area regions, though growing faster, they decreased their speed during the development of the policy. While it would be misleading to assume that the policy was unsuccessful, the method's results need careful interpretation. Factors external to the model that change with time, such as regional economic circumstances and policy timing, along with national and international, are not considered.

The cross sectional evaluation procedure more precisely examined the role that the Industrial Areas play within the recipient regions. First, it was found that in most cases the Industrial Areas clusters grow faster than their respective regions and play a leading role in the regional employment growth. Second, had the Industrial Areas not been in these regions, the regions would be largely worse off in employment terms. In only a few cases, especially in fast growing regions and/or periods, did the Industrial Areas not play a leading role. This might be explained by the tendency in periods of rapid expansion for firms to avoid establishing in the Industrial Areas because of delays and obedience to rules that may be involved. Much 'occasional' employment in 'booming' regions/periods tends to disappear in recession times, while firms in the Industrial Areas tend to be more stable. There is an indication of better competitiveness of these firms and this acts as a regional 'insurance policy' for the periods of decline.

As regards the industrial specialisations that are attracted to the Industrial Areas, taking advantage of them, it can be seen that they are rather of the heavy industry type, certainly by Greek standards. The labour intensive, and fast growing sectors do not seem to be preferentially benefiting from the Programme. This may be due to the low level of facilities and services offered at the moment, even in large and thriving Industrial Areas. The answers of the firms in the field survey give the clues to the above, and to the way the Industrial Areas can create and sustain growth for the years to come to the benefit of both the regions and the country.

Finally, the cost-effectiveness of the Industrial Areas was analysed in the cost-benefit analysis section. Projects have different costs often not only due to their different sizes, but also to the land prices of each place and time period and the efficiency of their construction proceedings, that vary. Analysis showed that the Industrial Areas form two groups. The first shows better performance than the second, and consists of Volos, Iraklio and Thessaloniki. They happen to be the older projects that were mainly developed in the seventies. The second group (Xanthi, Patra and Komotini) were accelerated in the eighties. It becomes clear that the attractiveness of projects, or the acceleration caused by the initial investment is

still affected by factors external to the project, that is the location in the economic map of the country. It appears that investment in remote areas and ones near smaller agglomerations may be difficult to be recovered fast and the potential long term effects may be as high. This is likely to be so especially if initial investment is too large for the regional potential, or if considerable delays occur, or even if investment is too small to have a substantial range of impact. In most cases the projects prove acceptable to the discount rates set, but in some cases, as it proved, far from the socially optimal way.

In the light of all the above analyses it could be said that rather positive effects can be accredited to the Industrial Areas policy. It can be seen though that, even when the national trends are discounted for, the acceleration given to the regions receiving the Industrial Areas policy was faster in the period 1978 - 1984, rather than in the later periods. The effects of regional policy seem to be more profound when the efforts are concentrated in well specified locations rather than if an almost-nationwide uniform policy is adopted. Thus, there are reasons to believe that a 'blanket' regional policy may not only be unable to enhance the positive differential growth rates in recipient regions, but also the total absolute effect and the cost-effectiveness might well be reduced. Precision, consistency and quality rather than quantity seems to be more effective in this respect.

Chapter 8 : An overview of the Industrial Areas policy, evaluation and suggestions

8.1 Overview of the policy in the light of regional development theory

8.1.1 The theoretical foundations of the Industrial Areas setup

As pointed out in chapter one, postwar Greece suffered from extreme centralisation of economic and industrial activities. It was soon understood that it was of vital importance to keep the peripheral areas alive economically.

In chapter three the theoretical background of the initial development efforts was presented. The policy makers in the fifties and sixties, using a two-sector neo-classical 'supply' based development model, after having characterised the traditional sector of agriculture and stockfarming as 'low productivity' and 'non exporting' were faced by a dilemma. The 'modern' sector of peripheral manufacturing remained of low productivity and non-exporting, even after the initial and continued support with incentives. As a consequence it was realised that in this way little if any labour shift towards this 'modern' small scale manufacturing sector was to occur. What was opted for instead, was the creation of large scale industry and the adoption of a more effective development model. The model selected was based on a strategic dispersal of resources and industry, and one which was founded in the theory of cumulative causation and the growth poles strategy.

Thus, the policy makers in the late sixties organised an ambitious plan named the Industrial Areas Programme. The Programme was based on the provision of land, infrastructure, locational and technological incentives, all located in few strategic peripheral regions. With the initial stimulation by the state, new propulsive industries were expected to establish, and a cumulative process was expected to start. The Programme has made considerable progress, even though it has had a rather slow implementation, and has proved to be wider in scope than the initial 'decentralisation' setup. The Industrial Areas themselves numbered twenty by

1988, from the five that were initially planned.

For the policy makers though, the overall effect of the Industrial Areas Programme for the regional - and national- economic development perhaps fell short of the levels expected when the projects were planned. Thus, in 1988 a theoretical reorientation took place. This reflected a move from the older growth pole strategy, to a policy for a generalised industrial space provision, mainly aiming for an accommodation scheme for local industry. The main idea (Vliamos 1988) is that through this mechanism the hinterlands of each growth pole would be smaller, and the resultant respective intra-regional disparities that would evolve, would be on a smaller spatial scale. It was anticipated that such provision would mobilise the local indigenous potential and would reduce any resultant 'backwash' effects.

8.1.2 A theoretical evaluation of the scheme

On theoretical grounds, the Programme was perceived and designed being based on the concepts in vogue in the late fifties. Since then, evaluations of past development practice that have been undertaken in the wider world brought new advances in development theory and practice. In the light of more recent theories, it can be seen why the Industrial Areas development policy, while significant and positive overall, offered only a fraction of its potential, both at the intra-regional and inter-regional levels. Important reasons surely are the problems of their finance, construction and organisational delays. But there are more, and some of these are considered next.

The policy in many cases did not manage to create poles that had the ability to generate the awaited 'spread' effects to their hinterlands which is the ultimate goal of the growth pole theory. Several reasons account for this divergence from expectation. The first is the result of external economies. The awaited localisation economies, which occur because of geographical concentration of plants and cooperation especially of the same or complementary industries, were rather slow to emerge. There are no signs of such economies in all but few of the older sites. Second, the agglomeration economies (Kaldor 1970), which result from the supply of infrastructure and the availability pools of skilled labour again were limited, perhaps to even fewer sites, possibly only Thessaloniki and Volos. However, there were attracted to the regions some larger plants that did experience economies of scale, but these mainly arose because of diminishing costs of mass production. Such economies were though, as managers said, often counterbalanced by additional transportation and communications costs.

Finally, the expected internal economies due to endogenous technical

progress (Friedman 1972, Berry 1974) proved to be less significant for the regional economies, although several modern, smaller firms have found suitable accommodation in some Industrial Areas. Later theories (Klaassen 1987) support the notion that the volume of innovations and inventions increases with the size of agglomerations. A typical size of an urban / regional agglomeration that could offer a 'full grown' services sector, which is regarded an important precondition for the so-called 'take off' into the accelerated cumulative growth, was assessed at 275,000 by Klaassen. None of the Industrial Areas in Greece, with the exception of Thessaloniki, is adjacent to as large an agglomeration as this.

The less developed state of many of the peripheral regions in Greece produces agglomerations at but a fraction of the above mentioned size. Almost all are in need of an induced, 'simulated-fully grown' institutional and socio-political framework and a distinct orientation to new technology utilisation to have a real chance for development. It was shown in the theory that cumulative effects mainly derive from a globalised rather than regional division of labour. The considerable immobility of production factors can only partially be counterbalanced by re-locational incentives. Should subsequent operational attraction be based on incentives and low wage promises? Beyond the functional infrastructure and the experience of external economies, the real attractions of a model Industrial Area are the practice of new technology and the existence of higher productivity. The competition among firms, that seems as effective in the production of best quality products, as perhaps their potential integration. The efficiency of economic integration and physical connection to attractive agglomerations nearby that offer full and comprehensive services, not for the entrepreneurial activities -as these should be offered on site- but for the skilled and specialised labour that is to be attracted and/or persuaded to stay. All the above were more or less absent in the conceptualisation and implementation of the Industrial Areas as propulsive poles for regional development.

The suggested reorientation of 1988 assigns the Industrial Areas to play a role of a generalised industrial space provision policy, expecting positive response by the local potential. But if the scope of the Industrial Areas as a regional policy still is regional development and the promotion of demographic balance, then it seems likely that, with the new nationwide framework, the peripheral regions will indeed remain peripheral. Considering the number of the agglomerations to be selected to serve as growth poles for a country, Klaassen suggested that from all possible 'nuclei' those should be selected, which are most likely to react rapidly. It is now well understood that the greater the number of centres selected, the weaker

will be the impact, for three main reasons.

The first and obvious point is that the limited financial assistance from the centre has to be divided amongst more places and its intensity is bound to reduce. The second and more important, is that industry of national and international marketing scope will take advantage of the Industrial Areas preferably in the most favourable locations, that by all means will remain the central ones. The more peripheral regions will tend to be left to their own fate. As Friedman (1972) emphasises, improved 'communications' affect the mobility of factors in a way that the central cumulative effect is intensified. The incentives for location in peripheral Industrial Areas will tend to prove only a national subsidy, or 'compensation' to any capital that may decide to take advantage, and depend on this.

The third reason is that there are only a limited number of industries in search of a new location at any one time. It is possible that at no one time there may be enough mass of industry to stimulate growth in all Industrial Areas and especially in all peripheral geographical departments. Thus, the parallel development of many projects may, expectedly, cause irrecoverable financial outlays. It would appear that generalised industrial space provision policy by a central agent can only be seen as a socially expensive and perhaps questionable land use policy, but not a regional development one. Except if, as Brugger (1986) suggests, central governments tend to reduce only some 'convenient' regional disparities. Would, then, every single region be happy to 'receive' its own costly but empty Industrial Area? There would seem to be little point in this. A different structure for planning for Industrial Areas, to be suggested later, may give a viable solution.

8.2 Evaluation of the policy through measurements of effectiveness

8.2.1 The employment impact of the Programme

Initially, a shift share analysis of employment in the 51 regions of Greece was carried out using secondary data of seven economic sectors. This provided information on the all-sectors economic performance of the regions and their competitive effect. An index (Rman) of manufacturing-specific performance was constructed to compare the actual regional performance with the regional performance had the regional manufacturing grown at national levels. Initially it was shown that manufacturing is certainly most important for the country. While

employment in manufacturing in Greece grew by a relatively modest 5.1% in the decade 1978-1988, or an average annual growth of 0.5%, it was the second largest new jobs contributor, after the Trade and Tourism sector. The results of the analysis led to two findings.

First, that the all-round competitive effect is very much related to the manufacturing specific performance. It was found that in 16 of the 20 Industrial Area regions the Rman index is co-directional with the competitive effect of the regions. The higher rates of manufacturing growth are related to positive regional competitive effect, and lower manufacturing growth rates to lower general regional performance. In other words a better than average performance in manufacturing very often gives regions a positive all sectors regional growth effect.

Second, compared to all regions of the country, the Industrial Area regions had higher percentages of manufacturing-specific results and competitive effect. Some 14 out of the 20 -mainly peripheral- regions containing an Industrial Area benefitted from more than proportionate growth in manufacturing (positive Rman). The relation can be regarded as compatible to the notion that the Industrial Areas strategy helps the recipient regions to maintain and expand their manufacturing capacity above national levels.

Another analytical procedure used, was a chronological estimation of the regional manufacturing growth trends before and after certain points in time. The period 1969 to 1978 could be named the 'off' policy period, the period 1978-1984 being the 'transitional' policy 'on' period and after that, until 1988, was the 'on' policy period. It turned out that for Greece as a whole the average annual growth rate in manufacturing employment during the policy 'off' period of 1969-78 was 3.3%, while for the consequent transitional policy 'on' period (1978-1984) it was 0.3% to become 0.8% during the policy 'on' (1984-1988).

The net of national growth of the sixteen-region Industrial Area cluster, was next assessed. First, using a method unweighted for sub-sectoral mix, a net growth rate of 0.6% was reported for the policy 'off' period of 1969-1978, that became 2.0% during the transitional policy 'on' and 0.8% during the policy 'on' (1984-1988). Second, using a sub-sectorally weighted method, the net of national growth for the Industrial Areas was assessed to 0.9% during policy 'off', 2.0% during transition and 0.6% during policy 'on'

Interestingly, the non-recipient regions, shifted from -0.4% net of national (weighted) annual growth at policy 'off' to -0.9% during the transition and to -0.3% at policy 'on'.

This would appear to show that the policy during the transition helped the

recipient regions, while during the 'on' period, the policy actually worsened the growth of the recipient regions, rather in favour of the non- recipient ones. On the other hand though, throughout the period the employment growth of the Industrial Area regions' cluster was at a higher level than the average national and beyond comparison with that of the non-Industrial Area regions. This widened the resultant employment differentials in favour of the recipient regions.

Next, a more sophisticated method utilised the fact that the Industrial Areas-policy affects the different sub-sectors in manufacturing at different intensities, that is some sub-sectors are more sensitive to the policy and some less. To overcome the effect of the above as regards their sensitivity to the policy, the original regional mixes were biased equally through the Industrial Area-mix weights for all regions and time periods to produce samples reflecting the intensity and responsiveness to policy. Employment data obtained through the field research were utilised. Subsequently, the average annual growth rates of the samples were extracted and compared among regions, groups of regions and time periods. The analysis showed that while those sub-sectors supported by the Industrial Areas policy may not be the fastest growing nationally, the policy (on) did manage to increase growth rates at a faster pace than the general manufacturing. This is based on the somewhat more encouraging -compared to the previous methods- set of net of national growth rates of 0.3%, 1.8% and 0.7% for the respective policy 'off', transition' and 'on' periods that is produced by this method. But still the overall benefit that the time series based methodologies produce remains not clear enough.

Thus, a new method, cross-sectional rather than time-series based was used. The procedure was based on measuring the differential characteristics of employment growth, of the Industrial Area established firms compared to those of their respective region, in various ways. The method was run twice, for the period 1978 - 1988 for five regions, and for the period 1984 - 1988 for sixteen regions, each having an actively operating Industrial Area.

The results for the first analysis showed that in a 'five-region' terrain the Industrial Area cluster accounted for 7.6% of the total employment in 1978, that became 8.6% in 1984 and reached 9% by 1988. As regards growth rates, the Industrial Area cluster grew at 4.0% annually and the 'region' at 2.3% for the decade 1978-1988. It was assessed that the 'region' without the Industrial Areas policy injection would have grown at 2.1% percent, the difference from the 2.3% being the Industrial Areas effect.

The results for the 'sixteen-region' terrain showed that the participation of

the Industrial Areas' cluster increased from 6.2% to 7.4% from 1984 to 1988. The annual employment increase rate in the Industrial Areas, being 6.4%, is considerably higher than the respective 'regional' (the policy terrain) rate at 1.6%. The 'region' without the Industrial Areas' effect would have grown at only 1.3%.

The cross-sectional method did then demonstrate the importance of the Industrial Areas Programme for regional economies.

8.2.2 The total factor productivity results

Total Factor Productivity (TFP) is that part of productivity over and above the constant returns to scale. TFP is the sum of external and scale economies (VRS) and technological levels (TEC). Measurement of these factors was made for the nine consecutive years 1981-1988 and TFP was produced as an annual average for the whole period.

The analysis showed that for the whole country TEC is positive (beneficial technological levels) in only 38% of all regions (16 of 42) and only eight Industrial Area regions of the twenty or 40%. A small technological advantage can be found in the Industrial Area regions. Positive VRS (beneficial external and scale economies) are experienced in 57% or 24 of all 42 regions. From the Industrial Area regions 60% were found with positive VRS. Again here there is a small advantage in the Industrial Area regions. Finally, the TFP for the whole country is positive for 50% or 21 regions, while 12 from the 20 departments with an Industrial Area, or 60%, had a positive average TFP. This implies substantial benefits of the Industrial Areas policy and is shown much clearer if a comparison of the TFP results between the Industrial Area regions and the non-Industrial Area regions is made. Only 41% of the non-Industrial Area regions had positive TFP, while the Industrial Area regions had positive TFP by 60%, for 1981-1988.

It can be thus supported that, whether the penetration of the Industrial Areas in the industrial structure of the Industrial Area regions is high or low, the actual existence of the Industrial Areas is coinciding with better total factor productivity. Technological advantages were less pronounced, mainly occurring in regions with medium sized cities. There are then reasons to believe that the existence of Industrial Areas offers external economies and some technological advantage to the recipient regions. These results seem sufficient to suggest that the Industrial Areas effectively raise the productivity levels of their own regions, each to a larger or smaller extent. Subtly as it may be, they may be claimed to cause relevant spill-offs, rise the level of labour skills in the region, rise the level of competition and subsequently the quality of products and regional competitiveness

and create local job multiplier effects.

8.2.3 The field study results

The Industrial Areas Programme consists of twenty defined land spaces, for industrial use with provision of infrastructure, operating in various places in Greece. The total area of the Industrial Areas Programme was in 1992 some 42.7 square kilometers. From aggregate data about the Industrial Areas Programme it turns out that by 1992 the general average space occupancy rate was 35.9 percent. The rate of establishing firms was 28 new firms annually between 1982 -1988, but 37 for the period 1988 to 1992. The average size of the participant firms in 1982 was 41 employees, in 1988 it was 40, while in 1992 it became 33. Thus new smaller firms kept opening at higher rates in the latter period. The net employment result was strongly positive, and a basis of more and potentially more modern and flexible firms has been created.

In employment terms, there was a total increase of 8100 jobs from 1982 to 1992, or an average increase of 810 jobs per year. An average annual increase of 6.75% was maintained for the six consecutive years of the period 1982 to 1988, this dropping to 2.14% in the recession period of 1988 to 1992. This is by far higher than the national rates of increase in manufacturing for each period. Thus, the Industrial Areas Programme was effective in attracting some employment to selected developing areas while restructuring to generally smaller sized plants took place.

The pricing of the industrial land sold to the entrepreneurs was mostly considered to be advantageous. Many respondents, though, commented they had to wait for considerable period of time for the infrastructure to be completed, notwithstanding cases where basic infrastructure is not yet ready. The Industrial Areas offer infrastructure that at the moment varies considerably in range and quality among the different sites. Field research showed that only a few, older sites provide comprehensive and functional infrastructure while the younger have deficiencies of various degrees. The common situation of low capacity or quality of infrastructure and services seems to have caused unwanted externalities for the firms located in many Industrial Areas, compared to those located in the urban agglomeration.

As for the actual location of the sites, comments made by firms in several cases considered Industrial Areas to be inconveniently located. In fact, for the three cases of Patra, Volos and Iraklio where a nearby port is available, the Industrial Areas are located eight to fifteen km far from the coast, and at

considerable altitude 100 to 300 metres above sea level. Poor public transportation linkage, according to the firms' views, accounts for the Industrial Areas remaining unconnected to the life of the nearby localities, as well as producing a negative externality of labour transportation cost. While in most cases the roads on-site are good, the connecting roads are often old, narrow or congested. In contrast, the connecting roads for the Volos project are good. In the opinion of the established firms, in all cases, roads have main priority against the train for desired improvement. Comments were pessimistic as regards the chances of creating a reliable and cost-effective railway service.

Telecommunications quality was also found to vary considerably among sites. In the distant regions of Xanthi and Komotini firms mentioned operational and entrepreneurial problems. As regards electricity, supply proved to be more reliable. An interaction effect can be clearly discerned. The larger industries tend to establish in areas with proven efficacy of infrastructure and in return the state invests and better maintains the infrastructure feeding these substantial clusters of demand.

The selection procedure for new establishments in the Industrial Areas does not seem to be much concerned with the levels of technology to be used. What seems more important, according to the local administration answers, is the amount of employment to be created. There is no centrally organised technological guidance or help scheme. Such efforts are left to other central public bodies, or the local actors' and firms' initiatives themselves. However, the technological levels of the firms established in the Industrial Areas were found to be higher than those in the surrounding region. In most cases this was due to the use of private technological consultation by the firms. Information and capital prove to be the firms' main necessities in the implementation of latest technology, so justifying the relevant theories.

It does not appear, interestingly, that the more dense the Industrial Areas the more interfirm cooperation that emerges. Proximity within the Industrial Areas plays little role as it seems. From the comments that firms made it is competition rather than cooperation among smaller firms that is engendered by these locations. Large firms were more positive on cooperation possibilities in perception and also in practice.

The marketing destinations external to their own regions of the firms established in the Industrial Areas vary from some 50% to over 90% of production. This shows a high competitive potential of these firms. In general the Industrial Areas administration provides only limited help as regards the firms' marketing.

When firms were asked what kind of help would expect from the Industrial Areas, technological consultation came third, help in marketing second and employment training first. It is not that firms are not interested in technology though. When their financial assistance preferences were put forward, some 59% of the respondents indicated new technology subsidies as their first choice, a rival policy of export subsidies achieving 25% of first choices, and employment subsidy only 16%.

Finally, while a principal aim of the Industrial Areas Programme is to help and promote local economic development, in most peripheral regions people were of varying opinions of how the Industrial Areas would affect their region. There were some cases where critical conflicts with certain local vested interests had emerged. Local interaction varied considerably between different sites at different times and on different issues. Perceptions of the regional level implications were that some industrialisation and new employment creation surely had occurred. Some industrial consciousness was thought to have emerged, and certainly some increases in female employment achieved. But, there was little direct perception of social life or education level improvements. It seems that realising the social benefits from the Industrial Areas is a subtle procedure. In none of the regions possessing community manufacturing businesses, (of the textile and handicraft type mainly, as in Iraklio, Volos and Komotini), any of them are established in the Industrial Areas

8.2.4 The costs and benefits of the Industrial Areas Programme

To facilitate a cost benefit analysis the Industrial Areas Programme annual cash flows from its commencement in 1968 to 1991 inclusive were used for a sample of six Industrial Areas. These were the surveyed Industrial Areas of Volos, Patra, Iraklio, Komotini and Xanthi, plus the flagship project in Thessaloniki. The various costs and benefits were grouped into a 'central' and a 'regional / social' balance framework. The distinction was made according to whether the effects are administered by the Industrial Areas provision agent ('central'), or experienced in the policy recipient region or society in general ('regional/social').

In the central balance the costs were the Industrial Areas provision costs while revenues come from the land sales. The deficit of these costs is covered mainly by the Programme administrative body, ETBA, with some support from the Greek State and the European Community. In the social and regional balance, costs involve the running expenses of the projects, the Industrial Areas specific locational incentives and any 'regional' environmental costs that occur in the recipient regions. The basic benefits comprise of the new employment creation in all phases

of the Programme, including the prevailing multiplier effects and estimated through the applicable regional salaries. Besides benefits experienced in central and recipient regions due to the land use potential, a de-congestion factor due to export of industry into the Industrial Areas and benefits due to any environmental relief, together with increased values of property and other social benefits are taken into account.

A methodology was developed for estimating the employment generation considering relocation percentages and other generally accepted calibrations have been used to generate the multipliers and other mechanics of the model. Two evaluation procedures were carried out. The first was one of the 'pay back' type and the second was a full-life cost benefit evaluation. An evaluation structure was constructed, based on the logical flow and timing of the various occurring costs, in accordance to any social costs and the various benefits, allowing for a sensitivity analysis relating to the social discount rate.

The payback method showed that the benefits stream created in Volos would cover the costs in the second year of operation, in Thessaloniki in the seventh and in Iraklio in the tenth year. In Xanthi this situation would only be achieved in the fifteenth year, while for Patra the extensive cost was to be covered only by operational year 24 and in Komotini year 27. From this first test it comes clear that the effectiveness of projects, besides their implementation cost effectiveness, is also affected by factors external to the projects such as the location in the economic map of the country. This is the case for Komotini and Xanthi. In the case of Patra the large accumulated costs of the project cannot be quickly offset by the modest economic acceleration it has stimulated.

The full life of project evaluation provides the following results. Initially for one hundred years of operation, with the social discount rate set to zero, Thessaloniki generates the largest net benefit, at some 197331 million drachmas (1 million drachmas equivalent to £4000 at 1988 prices). Volos follows at 156865, Iraklio at 79267, Patra at 73807, Komotini follows at 45715 and Xanthi comes last with only 14539 million drachmas. With net of inflation discount rates of 2%, 4% and 6% the net present values of benefits become considerably lower, but remain positive for all projects. The net present values become zero at the internal rate of return, that is the marginal efficiency of capital investment. This occurs at 17.7% for Volos, at 15.7% for Thessaloniki, at 13.9% for Komotini, at 10.6% for Iraklio and 10.2% for Patra and finally at 7.9% for Xanthi. With a second test for sixty years of operation the above net present values are analogically lower and the project of Xanthi does not pass the most demanding 6% test.

From these results it can be seen that Volos has proved a paradigmatic example of an Industrial Area, giving both high net present value of benefits and being endurant to higher discount rates. This means that it also is a much 'profitable social investment'. Thessaloniki generated the largest level of benefits, but proved more costly to the operator. Iraklio proved also to be a quite beneficial example. Patra showed a large long term potential but has not given solutions to the existing employment problems of the region. The opposite happens with Komotini, having experienced a fast initial acceleration. Xanthi gave some rapid development to the region at an early stage, but does not seem to show much potential for the future.

As this type of analysis shows, in all cases the Industrial Area projects prove socially beneficial to the set discount rates, but in some cases it seems that this is achieved not in a socially optimal way.

8.3 Views and suggestions deriving from the evaluation

8.3.1 On the general planning of the Programme

It has become evident that the Industrial Areas Programme has offered considerable employment to the selected recipient regions and also some external economies to firms that locate therein. In addition, it is evident that the levels of technology and the competitiveness of the firms established in the Industrial Areas usually are ahead of those in the rest of the region. But, it has to be said, that these positive effects are not as strong as they might have been. This is thought to be due to two general reasons.

The first is that many Industrial Areas do not offer as yet adequate facilities to accommodate leading edge industry. There are considerable deficiencies in the infrastructure of many of the present Industrial Areas, as found in the field study. In addition, a lack of proximity to services such as banking, health and safety and of course local government and development agents is disturbing. In such cases serious externalities are posed to smaller, mainly local firms, while the larger and more modern ones, as well as those being attracted from abroad, have a wider locational choice at the national level.

The second is that financing pressures on the Programme operator (ETBA), in part due to the increasing range of the Programme, have perhaps made the selection criteria for the establishment of firms even softer than they were

designed to be. In this way, the expensive, strategically located and often unique industrial space of the Industrial Areas is in cases 'wasted' on non-competitive activities. This also poses quite heavy costs to the society and the economic actors at regional and national levels.

Thus, given that considerable effort is made to obtain resources for the Programme by ETBA, there is a strong case for directing them towards enlargement, improvement and refinement of existing Industrial Areas, and much less for creating new ones for reasons to be explained next.

This research on the Industrial Areas has shown that only the mature Industrial Areas well populated by firms have significant economic spill-overs to their regions or the wider economy. The same can be said as regards their costs payback and their overall benefit to the society. Thus, there is a need for the Industrial Areas to be competitive location options at national, if not international levels, utilising the most modern infrastructure and offering all the relevant services and facilities. The development and expansion of the existing sites will make more affordable the most modern modes of infrastructure and also the promotion of technology through training schemes and consulting research institutes. This shall make the existing Industrial Areas attractive in themselves and less dependent on locational incentives.

The above structure appears more effective overall than centrally running perhaps even fifty industrial sites, many of which would generate only rather small effects on the local economy and the regions. While the idea of development of more industrial sites across the country is useful and needed, and not only for land use improvement but also for economic development, such plans could possibly be more effective if carried out by agents other than the central (state) development agent (ETBA). Local agents such as local government or local industrial clubs could be more suitable and effective. The precision in spatial planning and economic timing of these latter agents might secure better management and more clear realisation of benefits. This latter option would still be eligible for state financial support.

A compromise, and perhaps near optimal solution might be the development of Industrial Areas by ETBA in cooperation with such local agents, following though the integrated and planned initiatives of the latter.

8.3.2 Restructuring and Specialisation

The Industrial Areas Programme has produced a considerable record of industrial expansion, but also has encouraged a significant restructuring and modernisation of the productive basis of the recipient regions. The results of the

evaluation and research conducted in this study indicate that a larger number of smaller and newer firms has succeeded the fewer, larger, older units. This new larger base consists of more modern, flexible and technologically advanced firms. The perception is that, given the opportunity, it can expand its employment to much higher numbers. Effectiveness of this restructuring is based on the new firms' competitiveness, this being based on their spatial comparative advantage and the state of technology used. However, while better technology utilisation was evident, there were some cases of considerable dissatisfaction caused by locational disadvantages that need to be addressed, and resultant lack of competitiveness.

Initially the Industrial Areas Programme was perceived in a mode to attract large industries to peripheral, possibly other than optimal locations and provide them with the land, infrastructure, and financial incentives in order for strategic and demographic regional development objectives to be met. As a future and longer term strategy it might be the case that the Industrial Areas would be more productive if an effort was made for sectoral specialisation of each Industrial Area. In such a case research institutes and specialised staff would cluster, and innovation and localisation economies could be facilitated. The cooperation among firms, besides the competition between them, would raise their overall competitive status. Up to a certain extent, such specialisation is already informally taking place.

Of course, a legal regulation that would lead firms to certain Industrial Areas according to their specialisation might be too restrictive of local initiatives on locationally 'wrong' sectors and be probably not advisable. But if research centres and technological consultation are organised and provided in each Industrial Area in the sector to be favoured, this is likely to have the following effects: First, operation of such competent technological research and information centres would prove an important incentive for the sectorally relevant firms to establish in the 'correct' Industrial Area. Second, it would be more cost-effective for the policy maker than the provision of several institutes on the same sector in several sites.

Which one Industrial Area would be the correct one for each - say specialised sector? The Industrial Areas specialisations really should follow the local industrial skills and traditions, for two reasons. First, due to existence of experienced skilled labour in the sector in question, and second because there probably is already some considerable comparative advantage for the region. This is not the case clearly for declining or abandoned sectors. There, restructuring and re-specialisation should be the policy, in sectors that are relevant to the existing skills, but using new technology and attempting to reproduce the previous comparatively advantageous position. Whatever the sector, experience shows that

such specialisation combined with use of advanced technology and supported by research and the existence of skills, tend to raise productivity and competitiveness.

It must be said however that specialisation is the opposite of diversification. It can be strongly argued that specialisation with all the described positive effects, also means vulnerability. However the Industrial Areas are but a small part of the regional economies and as a result there is almost always an in-built component of regional industrial diversity.

8.3.3 Local interaction

As analysed, the Industrial Areas policy was initially planned as an industrial decentralisation strategy mainly, rather than to facilitate new local investment creation. In the early period an appeal to Greek capital in general was made. The Industrial Areas objectives were constructed around the perception of attracting industry and not stimulating the local entrepreneurial potential and skills. Incentives would compensate the 'external' capital for its potential lower productivity having relocated. But as it appears from the theory and experience elsewhere, the attraction of local capital and entrepreneurial activity in order to achieve local spin offs and indigenous growth is perhaps a more important priority.

A paradoxical inconsistency no doubt is that a principal decentralising policy like the Industrial Areas Programme has had, and still has, a rather strongly centralised decision making character. The problems that have often plagued the fast and fruitful development of the Industrial Areas have often derived from the above problem. Lack of information flows to the local actors have made them in some cases reluctant to adopt the centrally designed development policy. Lack of feedback from the local actors has often led the central decision making bodies to solutions other than the optimum. Local actors in some cases have been frustrated to see resources that were wasted or opportunities that were missed by the projects, because the central administration was not well informed.

No less important, the local morale concerning this large and costly development effort is in some cases lower than it should be. Public and business opinion at the local level, understandably due to the above reasons, has sometimes not perceived the full magnitude of the investment correctly and furthermore that it was primarily meant to specifically assist their localities.

Field survey research discovered that the relations between the on-site Industrial Area administration and the established firms were not always what they might be. These relations can be improved with more effort by the local Industrial Area administration to contact firms, inform them about their plans and make firms

to feel and be more responsible for the whole Industrial Area, of course by receiving and working on the relevant feedback from the firms themselves.

More decentralisation of the decision making process regarding the Industrial Areas orientations is then a necessity. Better communication between the local government, the local development agencies (still much tied to the central government) and the local Industrial Areas administration is a serious priority for the development strategy and the Industrial Areas Programme itself.

If new Industrial Areas are to be created by ETBA radical changes in the modes of cooperation with local actors should be made in the direction of promoting common decision making. This will help to obviate the inefficiencies of the past and promote a higher expectation of even better results. On the other hand, the local factor should be expected to show the development initiative and more actively participate in the development cost, seeing some of their ideas capitalised upon, rather than passively accepting, or discarding, the central policy. Additionally, 'free-rider' insatiable demand for Industrial Areas will be reduced this way and some relevant political pressures will be released.

8.3.4 Orientation to technology and efficiency

From both the theoretical setup of the Industrial Areas and from the practice followed to date, as demonstrated by the field study, the state of technology in the industry to be assisted was never a leading priority. The technology strategy that would make the industries competitive is not yet seen by the Industrial Areas planners. The Programme was oriented towards replication of agglomeration and scale economies rather than inducing higher technology and increased productivity. The conditions, described in the theoretical part of this research, for local implementation and possibly improvement of leading edge technologies were not set down and of course have not been met in the large majority of the sites.

The real attractiveness of an Industrial Area in modern terms can only be one based on the development of high technology practice. This can only be done by the policy makers through serious and continuous investment in training and research and development procedures, beyond investment in infrastructure. Development of local, specific and efficient structures of techno-financial assistance for the innovative firms plus a consistent cooperation with international organisations and schemes will greatly help these efforts.

The markets where the Industrial Area industries could place their products were at the time of the planning of the Industrial Areas Programme vague. Effort

was made for the Industrial Areas to be located near existing railway stations and motorways (Konsolas 1970) so that with the minimum infrastructure provision cost by the state the locating industries would be able to minimise their transportation cost. Real land use planning with wider criteria, even if it would in cases mean a few extra kilometres of railway or road, was not at the time considered. Studies that would show the optimal product-routes that would actively provide locational efficiency to the Industrial Areas were also omitted. And of course the above deficiencies could have been avoided if more cooperation with the local agents had been made during the period of the planning of the projects. As mentioned early in the Thesis, the economic repercussions of certain phases of the recent political history of the country, like period 1967-1974, do have important implications for the present times.

A dramatic example of the above effect, which is discussed in detail in the main text, is the location of the large Industrial Area of Patra. Location near Rio would have helped to solve some of the eminent transportation problems of the Industrial Area. However such a location was not selected and a motorway that would link the Industrial Area to Rio, circumventing Patra by the south, is for so many years now needed. The result is problems both for the Industrial Area and for the city of Patra itself. This example provides one more reason to suggest that the existing structure of Industrial Areas needs more improvement to be properly efficient, before new centrally conceived sites are put in the pipeline.

8.3.5 Resources and environment

A resources policy is nowhere mentioned in the formulation of the Industrial Areas Programme. Development of a policy is vitally needed that would set the balance of local slowly renewable resources, like water in Greece. Relevant investments have to be made, since often drilling for water for industrial use causes water shortages to the nearby localities. In addition, while Greece has a strongly negative energy and payments balance, a policy towards soft energy sources is not adopted yet in the Industrial Areas. Wind generators could have been used in some of the Industrial Areas, at least for the site lighting, or in certain cases for desalinisation of water for industrial use. Iraklio in Crete, for example, is an Industrial Area without water. Furthermore, while solar energy in Greece is more than abundant the Industrial Areas have also neglected it.

Policy should also effectively regulate and audit the emissions and waste disposal sites and treatment. While officially regulated by the Programme, the implementation of these activities in the Industrial Areas is generally rather vague,

possibly due to an equally vague level of auditing. At least within the Industrial Areas there should be a proper and publically visible level of auditing and compliance.

8.4 Final conclusion

The Industrial Areas Programme that was launched in Greece twenty five years ago has managed to attract and develop a considerable amount of industry at planned and controlled locations, strategically arrayed in the peripheries of the country. Evidence can be found that this industry is performing better and is growing faster than the regional, non-Industrial Area industry. Equally, there are signs that the Industrial Area industry is making the recipient regions more productive than the non-recipient due to assimilated agglomeration economies. There are also hints of better technology utilisation. These seem to be proven for many, but by no means all cases, through the total factor productivity methodology.

A field study in five representative sites, involving structured questionnaires answered by fifty five firms and the local administrations, showed that the institution is well into operation. The degree of development amongst the Industrial Areas sites varies considerably, however, while various infrastructural inefficiencies persist in many cases partially explaining the above variable results. One further serious deficiency often mentioned is the lack of services on site, and these are certainly causing operational problems. But still, the younger age of the attracted firms gives the Programme considerable growth potential. New firms' orientation to new technology is significant and relevant financial assistance in this respect was often sought.

Finally, a benefit - cost analysis of the Programme, based on data for six Industrial Areas, two large, two medium and two small, showed that implementation inefficiencies prove costly to the Programme operator and to society in general. All projects proved to be beneficial, but again to varying extents, when tested at varying discount rates.

Overall, it has been found that attraction of investment 'foreign' to the region has been a prime interest. Such investments may prove after some time to have located sub-optimally and thus be less competitive with respect to their competitors located elsewhere. Risk of close-downs is only partially avoided due to a

moderately favourable spatial micro-climate in the Industrial Areas. If firms are to deviate from a satisfactory operational environment elsewhere, it should be because the conditions in the destination Industrial Areas are in all respects excellent. Interaction with the local government and the entrepreneurial and business community at the local level has probably been one of the weaker points of the Programme as a whole, while of course there have been some cases of success in this respect.

Based on the above evaluation, this study would finally suggest a policy orientation for the Industrial Areas on the following lines for improved effectiveness and efficiency towards the aim of regional development in Greece.

First, assistance funds should be shifted from supporting distant relocations to the Industrial Areas, to enhance the competitiveness of local potential (located, or about to locate). This is because local investment and ownership of enterprises in the Industrial Areas safeguards the local understanding of the enrollment of the Industrial Areas and commitment in local development.

Second, public funds should not specifically set out to compensate capital for operating in unfavourable environments, but on the contrary should create a favourable and fully operational Industrial Area environment, attractive in itself. The efficiency of the existing Industrial Areas should primarily be improved with investment in modern and comprehensive infrastructure, this in priority to any expansion plans. In addition, the need for on-site services provision seems to be critically important for the creation of efficient industrial nuclei. The above two priorities should provide lasting operational advantages more effective than financial locational incentives.

Third, the technological competence of the establishing firms should be a most important concern for the Programme. The policy should directly target the creation of suitable technology transfer and implementation structures in all Industrial Areas, effectively and specifically supporting the matter. These structures would consequently help the wider recipient regions to upgrade and develop. Sectoral attraction procedures should target the local specialisations that are profitable at the moment and have continued comparative advantages.

Fourth, the political structure of decision making bodies would appear to work better if more effectively deconcentrated to the regional / local level. Proximity to the problem, better communications and flexibility of the local decision making bodies seems to promote better understanding of the local development needs and more effectively come to solutions. If new Industrial Areas are to be planned, local cooperation and responsibility should be secured before rather than

sought after the development of the projects.

Finally, the need of effective policy orientation to environmental protection, energy saving and economic use of resources prevails as sine-qua-non prerequisite for regional development and the future economic well being of the nation.

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Appendix One

The research questionnaires

1. The questionnaire of the central administration of the Industrial Areas.

2. The questionnaire of the local administrations of the sample Industrial Areas.

3. The questionnaire of the sample firms.

Note: The following questionnaires are translations of the original questionnaires, that were in Greek. The layout is kept the same.

LONDON SCHOOL OF ECONOMICS

STATE SCHOLARSHIPS FOUNDATION OF GREECE
(IKY)

Questionnaire of Central Administration of the Industrial Areas

Research

Regional development in Greece: an evaluation of the effectiveness of the Industrial Areas Programme

Research conducted by

NIKOLAOS G. VAGIONIS

1992

Part 1. Employment

1.What is the total number of the employed in all the Industrial Areas today?
1992:_____persons
1978:_____1982:_____ 1988:_____ (Q1)

2. What is the total number of the established firms in operation in the Industrial Areas today? 1992:_____firms
1978:_____1982:_____ 1988:_____ (Q2)

Part 2. Area

1. What is the total area of all the Industrial Areas in operation, today?;
Total Area of Industrial Areas:_____ sq.km.
Net industrial space _____ sq.km
Total space sold to firms _____ sq.km
Total space of firms in operation_____ sq.km.
Indication prices of land, per strem (=1000m^2)
1984_____1988_____1992_____ (Q3)

Part 3. Financing

1.Costs and financial sources of the up till now offered infrastructure within the Industrial Areas Programme (totals): (Q4)

Periods :	_____ to 1981,	1982 to 1992
Costs:	_____mil.drs	_____mil. drs
Financial sources:		
ETBA:___(total)	_____mil.drs	_____mil. drs
Greek State:	_____mil.drs	_____mil. drs
EC:___(total)	_____mil.drs	_____mil. drs
Other source:	_____mil.drs	_____mil. drs

2. What is the annual total running cost of the Industrial Areas? (for 1991)
_____mil.drs Who cover the running cost?
ETBA: _____mil.drs
Established firms _____mil.drs
Others:_____ _____mil.drs (Q5)

Part 4. Responsibility

1.What are the main responsibilities of the director of the division of "Regional Development and Industrial Infrastructure" (ΠΑΒΥ) of ETBA bank as regards the Industrial Areas?

a._____
b._____
c._____
d._____ (Q6)

2. To which Ministries has the central administration of the Industrial Areas (ΠΑΒΥ) to report?

_____
_____
_____
_____
_____ (Q7)

Part 5. Selection, Technology

1.Is there a technological help / consulting department for the new applicant and for the existing firms within the Industrial Areas ? YES NO

If YES: What is the number of the relevant staff?_____

How many consulting sessions with firms does it have weekly?_____

(Q8)

2. What are the basic principles of the selection procedure of the firms applying for establishment?

a._____
b._____
g. _____
d._____(Q9)

3.How do you evaluate the following characteristics of the applicant firms?
(mark: 1=not important, 5=very important)

Work places:_____ (1 2 3 4 5)
Export Potential: _____ (1 2 3 4 5)
State of Technology to be used:_____ (1 2 3 4 5)
Production ties with other established firms _____ (1 2 3 4 5)
Profitability of the firm:_____ (1 2 3 4 5)(Q10)

Part 6. Local Interaction

1. Do you have indications of local government support towards the Industrial Areas?

Comment:_____
_____
_____
_____
_____
_____
_____
_____ (Q11)

Part 7. Central Policy

1. In your opinion, what are the THREE sectors in the central policy for regional development that need further more attention?

a. Financial incentives policy ( )
b. Regional planning policy ( )
g. New Technology policy ( )
d. Policy for staff specialisation & expertise ( )
e. _____ ( )
f._____ ( ) (Q12)

Part 8. Evaluation

1. Comment on the following:

a.The Industrial Areas attract the technologically advanced firms in the country.
b.The Industrial Areas keep in business non-competitive firms.
c.The Industrial Areas increase the competitiveness of the country's manufacturing.

Comment:_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____ (Q13)

For ΠΑΒΥ-ETBA , _____ ..../ 7 / 1992(Q14)

LONDON SCHOOL OF ECONOMICS

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(IKY)

Questionnaire of Local Administration of the Industrial Areas

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1992

Part-1 General

1. Industrial Area of: _____ (Q1)

2. Date of legislative foundation: _____ (Q2)

3. Date of operation: _____ (Q3)

4. Infrastructure provided within the Industrial Area:

Internal Road Network:	YES / UNDER CONSTRUCTION / NO
Water Supply:	YES / UNDER CONSTRUCTION / NO
Sewage:	YES / UNDER CONSTRUCTION / NO
Sewage Treatment Unit:	YES / UNDER CONSTRUCTION/ NO
Solid Waste Collection:	YES / UNDER CONSTRUCTION / NO
Pollution Control Unit:	YES / UNDER CONSTRUCTION / NO
Street/Area Lighting:	YES / UNDER CONSTRUCTION / NO
Electricity (med.voltage):	YES / UNDER CONSTRUCTION / NO
Electricity(high voltage):	YES / UNDER CONSTRUCTION / NO
Telephone lines:	YES / UNDER CONSTRUCTION / NO
Motorway connection:	YES / UNDER CONSTRUCTION / NO
Railway connection:	YES / UNDER CONSTRUCTION / NO (Prox:___km)
Bus line connection:	YES / NO (Proximity:___km)
Sea Port in Industrial Area :	YES / NO (Proximity:___km)
Airport:	Proximity:_____km
LOCAL ADMINISTRATION	YES / UNDER CONSTRUCTION / NO (Prox:___km)
Bank	YES / UNDER CONSTRUCTION / NO (Prox:___km)
Post Office	YES / UNDER CONSTRUCTION / NO (Prox:___km)
First aids/Health centre	YES / UNDER CONSTRUCTION / NO (Prox:___km)
Exhibition Centre	YES / UNDER CONSTRUCTION / NO
Food / Cafeteria	YES / UNDER CONSTRUCTION / NO
Sports Grounds	YES / UNDER CONSTRUCTION / NO
Training Institute	YES / UNDER CONSTRUCTION / NO
Research Institute	YES / UNDER CONSTRUCTION / NO (Q4)

5. Costs and finance sources of up till now infrastructure provision: (Q5)

	Period :	_____ to 1981,	1982 to 1992
	Costs:	_____drs	_____drs
Financial sources:	ETBA:	_____drs	_____ drs
	Greek State:	_____drs	_____drs
	E.C.:	_____drs	_____drs
	Other source:	_____drs	_____drs

6. What is the annual running cost of this Industrial Area (for 1991)_____drs

Who finances the annual running costs?

ETBA	_____drs
Established Firms	_____drs
Others	_____drs (Q6)

7. What are the present magnitudes regarding this Industrial Area?

Total Area of Industrial Area	_____m^2
Net Industrial Space:	_____m^2
Total Land Sold:	_____m^2
Total Land of Operating Firms	_____m^2

Land prices (current) per 1000m^2 in 1974_____ 1978_____
1984_____ 1988_____ 1992_____ (Q7)

8. List of established firms giving date of establishment. Employment for every year. (or for those years available) (Q8)

9. What are the main five responsibilities of the Industrial Area's local administrator?

a._____
b._____
c._____
d._____
e._____ (Q9)

Part-2 Selection, Technology

1. Is there a consulting department for the applicant firms in this Industrial Area?

YES NO, but integrated in other region. NO

If YES: What is the number of the relevant staff?_____

How many consultations they have per week?_____ (Q10)

2. What are the basic lines of the selection procedure for applicant firms to establish?

_____

_____ (Q11)

3. How are the following firms' attributes evaluated? (put in order of importance)

Work Places: _____(1 2 3 4 5)

Export Potential: _____(1 2 3 4 5)

State of Technology: _____(1 2 3 4 5)

Production Linkages with existing Firms _____(1 2 3 4 5)

Profitability of Firm: _____(1 2 3 4 5) (Q12)

4. Were there any applicant firms to whom establishment was denied, in period 1990-1992? YES NO

If YES , how many ?_____

What are the TWO main reasons of applications' decline?

a._____

b._____ (Q13)

5. Compared with other competitive firms in the region, would you consider technology used in this Industrial Area, as :

LOWER EQUAL HIGHER MUCH HIGHER (Q14)

6. What efforts does this Industrial Area make for adaption of technological innovations by the resident firms?

Cooperation with scientific/academic institutions? YES NO

If YES of what kind? _____ (Q15)

7. Does the Industrial Area offer technological consultation to the established firms?

YES NO

If YES, number of specialist staff ._____

Average hours of consultation per week:_____ (Q16)

8. What are the TWO most important reasons for firms' closures in the Industrial Areas?

a._____

b._____ (Q17)

Part-3 : Local Interaction

1. What percentage of all the establishments belongs to local interests?

0-20% 21-40% 41-60% 61-80% 81-100% (Q18)

2. Do you have evidence of local governments support to the Industrial Area? (mark 1=none, 5=very strong)

Adjacent infrastructure provision?_____ (1 2 3 4 5)

Financial support?_____ (1 2 3 4 5)

Advertising, moral support?_____ (1 2 3 4 5)

Other Support?_____(1 2 3 4 5) (Q19)

3. Do you have elements of opposition? YES NO

If YES, give TWO reasons they put forward.

a._____

b._____ (Q20)

4. Are there any community manufacturing enterprises in the region?

YES(how many?)_____ NO

If YES, how many in the Industrial Area?_____

Why the rest are not in the Industrial Area?

Comment:_____ (Q21)

5. Are there any re-specialisation / training projects run in the Industrial Area?

YES NO

If YES, how many people attended in 1991?_____ (Q22)

6. How often does this Industrial Area receive organised educational visits by academic institutions?

Once a week Once a month Four-per-Year Once a Year Never (Q23)

7. What facilities of the Industrial Area are used by other than the established firms or the public? Mark intensity of external use.

(1=rare use, 5=constant use)

a._____ (1 2 3 4 5)

b._____ (1 2 3 4 5)

c._____ (1 2 3 4 5) (Q24)

Part-4: Estimations

1. Do you believe that the Industrial Area has helped the local municipalities in any of the following? Mark intensity of following Industrial Area's effects.

(1=none, 2=little, 3= moderate, 4=much, 5=very much).

a. Demographic Balance (1 2 3 4 5)

b. Local wealth creation (1 2 3 4 5)

c. Active social life (1 2 3 4 5)

d. Level of local education and training (1 2 3 4 5)

e. Female employment (1 2 3 4 5) (Q25)

2. How important is the role of the Industrial Area in diversifying the region's economic basis?

NOT AT ALL A LITTLE CONSIDERABLY VERY MUCH (Q26)

3. To what extent you believe that the Industrial Area helps the region's self-relied growth?

NOT AT ALL A LITTLE CONSIDERABLY VERY MUCH (Q27)

4. To what extent does the Industrial Area attract technologically advanced firms to the region?

NOT AT ALL A LITTLE CONSIDERABLY VERY MUCH (Q28)

5. Do locals believe in self relied development? Have they come to believe that the region can develop a substantial productive basis?

NOT AT ALL A LITTLE CONSIDERABLY VERY MUCH (Q29)

LONDON SCHOOL OF ECONOMICS

STATE SCHOLARSHIPS FOUNDATION OF GREECE
(IKY)

Firms' Questionnaire

Research

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Research conducted by

NIKOLAOS G. VAGIONIS

1992

Part 1: Firm's Identity

1. Name of Firm, legal form:

_____

2. Is the Firm branch of a larger Group? Which? Greek? Multinational?

_____

3. Year of Firm's establishment: _____

4. Year of Firm's location in the I.A.(*) :_____

5. Owners of this Firm. Give percentages:

Greek State:.	_____
Local government/community	_____
Private Greek banks.	_____
Greek private capital.	_____
Foreign capital.	_____
Other. . . (_____) . . .	_____
T o t a l	1 0 0 %

6. Number of employees: 1978_____1984_____1988_____1992_____

7. Annual sales value : 1978_____1984_____1988_____1992_____

8. Sector of industry, specialisation :

_____

Name of Person answering, position.

Date: __ / __ / __

_____

(*) I.A. stands for Industrial Area throughout the questionnaire

Part 2: Infrastructure

a.Transportation

1. What percentage of your employees that use for their transport to work.

Public Transport:	up to20%	20-40%	40-60%	60%or more
Private cars?	up to20%	20-40%	40-60%	60%or more
Company Bus?	up to20%	20-40%	40-60%	60%or more (Q1)

2. Do you regard the public transportation's quality connecting your I.A. with the employees' residences as adequate?

NOT AVAILABLE POOR MEDIUM GOOD EXCELLENT (Q2)

3. As regards your final products, to what percentage they are carried to demand points, using transportation

Road:	up to20%	20-40%	40-60%	60%or more	
Sea:	up to20%	20-40%	40-60%	60%or more	
Train:	up to20%	20-40%	40-60%	60%or more	
Air:	up to20%	20-40%	40-60%	60%or more	(Q3)

4. Evaluate the Railway connection of the I.A. and availability

(Code: 1=Not available, 2=Poor, 3=Medium, 4=Good, 5=Excellent)

-Railway proximity to the firm's grounds (1 2 3 4 5)

-Speed and efficiency of cargo handling (1 2 3 4 5) (Q4)

5. Evaluate the roads connection and availability

(Code: 1=Not available, 2=Poor, 3=Medium, 4=Good, 5=Excellent)

-Roads within the I.A. (1 2 3 4 5)

-Connecting roads with strategic points. (1 2 3 4 5)

-Speed of connecting roads (1 2 3 4 5) (Q5)

6. How would you spend a total of five hypothetical financial tokens for Road development or for Railway connection or improvement ?

Roads: (0 1 2 3 4 5) Railways: (0 1 2 3 4 5)

Comment:_____(Q6)

b.Land

1.How would you assess the price of the land you bought, given the infrastructure provided, in comparison with other possible sites within this Geographical Department?

CHEAP ADVANTAGEOUS COMPETITIVE EXPENSIVE (Q7)

c.Telecommunications

1. How many external lines does your company have? _____

How are they spread among:

a:Telephone_____ b.Fax:_____ c.Telex:_____

d:Computer data transfer:_____ e:Other:_____ (Q8)

2.Have you applied for more lines? YES NO

If YES how long ago? _____

Give average number of fails for long distance calls

0 1 2 3 4 or more

Assess lines clarity: POOR MEDIUM GOOD EXCELLENT (Q9)

3. Do you experience entrepreneurial and/or organisational drawbacks due to telecommunication lines limitations?

NONE SMALL SERIOUS VERY SERIOUS (Q10)

d.Power Supply

1.What is your monthly consumption of electricity?_____KWH

Do you produce electricity for yourself? YES NO

If YES,how much?_____KWH (Q11)

2.a.How many times a year you experience power failure/cuts?

1-2 3-5 6-9 10 or more

Estimate average annual total of hours of power failure:

0-8 hrs 8-16 hrs 16-24hrs 24-48hrs 48hrs or more

b.Have you installed electricity generators for emergency use? YES NO

If YES, of what kind?_____ (Q12)

e.Marketing

1. Is your firm's main market within the I.A.'s region? YES NO

Give approximate percentage of your sales in :

-This Region _____ %

-Athens _____ %

-Rest of Greece _____ %

-Abroad _____ %

TOTAL . . . . . 100 % (Q13)

2. Is there assistance by the I.A. as regards products marketing? YES NO

If YES, Have you ever used it? YES NO

If YES, evaluate POOR MEDIUM GOOD EXCELLENT (Q14)

f.Safety

1. How would you assess the safety/security organisation within the I.A.?

(Code: 1=Not available, 2=Poor, 3=Medium, 4=Good, 5=Excellent)

-Fire safety facilities (1 2 3 4 5)

-Night security reliance (1 2 3 4 5)

-Emergency seminars (1 2 3 4 5)

-Emergency drills (1 2 3 4 5) (Q15)

2. Evaluate the efficiency of the existing First Aids Station in the I.A.

NOT AVAILABLE INEFFICIENT MEDIUM GOOD EXCELLENT (Q16)

g.Facilities

1. Is there a Conference/ Social Events / Exhibition space? YES NO

If YES: How many days is it used annually?

0-3 4-10 10-20 20-40 40 and over

Estimate any annual benefits (cost savings..) for your company due to this.

_____

If NO: How much money would you expect such a centre to save from your company's marketing and public relations budget, annually?_____ (Q17)

2.a. Are there sports grounds in the I.A.? NO MEDIUM GOOD EXCELLENT

b. Is there care of the landscape? NO MEDIUM GOOD EXCELLENT

If NO would you wish to pay your share for such provision? YES NO (Q18)

Part 3. Technology in Industrial Area

a.Information.

1.Does this I.A. offer consultation regarding technology and innovations information? YES NO

IF YES, Do you make use of it? YES NO

Estimate the annual cost savings for your firm from this_____

IF NO, Does your firm receive external consultation on new technologies? YES NO

If YES, what is the annual cost for your firm, if any._____ (Q19)

2. Do you attend conferences on technological issues?

NO 1 / YEAR 2 / YEAR 3 or more /YEAR

Would you find it helpful if I.A. organised sectoral conferences on technological issues, with speakers from Universities, other Firms (i.e.those producing, or importing technology)etc.?

NOT INTERESTING GOOD VERY IMPORTANT (Q20)

b.Innovations

1. What you consider the TWO greatest necessities in adopting latest technology production methods?

-Information ( )
-Capital/ Finance ( )
-Markets for more production ( )
-Job losses ( )
-Adequately trained staff ( )
-Other:_____ ( ) (Q21)

2. Do any of your competitors in the region, but out of the I.A., use more advanced technology in production methods? YES NO

If YES what are the TWO most basic reasons?

-Multinational branches ( )
-More capital ( )
-Larger scale production ( )
-Proximity to the centre ( )
-Other_____ ( ) (Q22)

3. How many years ago was your latest upgrade in:

-Production Method	1	2-3	4-6	7,or more years	
-Data processing	1	2-3	4-6	7,or more	
-Internal firm communications	1	2-3	4-6	7,or more	
-Telecommunications	1	2-3	4-6	7,or more	
-Office equipment	1	2-3	4-6	7,or more	(Q23)

c. Technology Orientation

1. Put in order of importance to your firm, the following policies, if undertaken by the State:

-Subsidies for annual employment growth	(1 2 3)	
-Subsidies for firm's exports	(1 2 3)	
-Subsidies for new technology installation	(1 2 3)	(Q24)

2. Put in order of importance to your firm, the following policies, if undertaken by the I.A. administration:

-Marketing of products guidance/help	(1 2 3)	
-Workforce training in relative skills	(1 2 3)	
-Technological innovations guidance	(1 2 3)	(Q25)

3. Put in order of importance to your firm, the following policies, if undertaken by the State:

-Venture capital provision, exchanged with equity share:.....(1 2 3)

-Soft Loans.....(1 2 3)

-Grants for research on development of new technologies.....(1 2 3)(Q26)

d.Local Technology Production

1. What percentage of your production equipment is imported?

-upto 20% 20-40% 40-60% 60-80% 80-100% (Q27)

2. Have you made modifications to these equipment to better fit your needs?

YES NO

Does this firm make any efforts to improve technology used, or to innovate production methods with research and development? YES NO

If YES, to what extent? OCCASIONALLY STAFF_____

CONTINUOUSLY STAFF_____ (Q28)

3. Development Law 1262/82 and 1892/90 support financially R&D departments. What more is needed? Choose ONE:

MORE INFORMATION ( )
MORE FINANCIAL SUPPORT ( )
MORE EXPERTS IN REGION ( )
OTHER ( ) (Q29)

e.Safety of Workforce

1. Are there safety of workforce seminars held by the I.A. ? YES NO
If YES, has your firm participated? YES NO
If NO, would you share the cost for such seminars? YES NO (Q30)

f.Anti-Pollution Measures

1. Is there air-pollution measurement within the I.A.? YES NO
Do you think it is necessary? YES NO (Q31)

Part 4 : Local Characteristics

1. Do you think that the local governments in the geographical department support the I.A.?

NOT AT ALL A LITTLE CONSIDERABLY VERY MUCH (Q32)

2. Do you think that this geographical department has developed advanced industrial skills that help productivity of investments?

NOT AT ALL A LITTLE CONSIDERABLY VERY MUCH (Q33)

3. In your firm, what % of staff lived here before being employed in this firm?

-upto 20% 20-40% 40-60% 60-80% 80-100% (Q34)

Part 5 : Evaluation of Industrial Area

1. a.Would this firm have located in this Geographical Department if there was not the I.A.? YES NO

b.How important was the existence of the I.A. in your location decision?

NOT AT ALL A LITTLE CONSIDERABLY VERY MUCH (Q35)

2. Do you feel you have operational and entrepreneurial advantages after locating in the I.A?

NOT AT ALL LITTLE CONSIDERABLE VERY HIGH (Q36)

3. Do you cooperate with other firms in the I.A.?

Vertical production links ( )

Joint raw material orders ( )

Joint security costs ( )

Other linkages _____ (Q37)

4. Do adopted innovations spread among similar firms within the I.A. environment faster than in other locations?

YES NO (Q38)

5. Do you regard that this I.A. has effectively attracted local/external capital?

Local NOT AT ALL LITTLE CONSIDERABLE VERY MUCH

External NOT AT ALL LITTLE CONSIDERABLE VERY MUCH (Q39)

6. Do you think

a.that the region has improved its financial position due to the I.A.?

NOT AT ALL A LITTLE CONSIDERABLY VERY MUCH

b. that the poorest areas have gained?

NOT AT ALL A LITTLE CONSIDERABLY VERY MUCH (Q40)

7. How important is the role of the I.A. in diversifying the region's economic basis?

NOT AT ALL A LITTLE CONSIDERABLE VERY HIGH (Q41)

8. Give in free format some suggestions you may have for the more efficient operation of this Industrial Area.

Appendix Two

The result data from the firms' questionnaire

1. The semi processed results of the firms' responses, by question

Semi-processed data from the firms questionnaires. Result data by question. Responds by individual firms are averaged for each Industrial Area (IA)

Q.1: Modes of employees transportation to Industrial Area

IA	Employees	Public Transp.	Company Bus	Private Car
Iraklio	752	11%	15%	74%
Patra	1244	4%	55%	41%
Volos	1853	2%	49%	48%
Xanthi	375	2%	47%	52%
Komotini	880	2%	50%	49%

Percentages based on number of employees of surveyed firms in each area

Q.2: Evaluation of the public transportation connecting the Industrial Area

IA	Not available	Poor	Medium	Good	Excellent
Iraklio	6%	78%	17%	0%	0%
Patra	0%	90%	10%	0%	0%
Volos	21%	71%	7%	0%	0%
Xanthi	33%	33%	0%	33%	0%
Komotini	0%	60%	40%	0%	0%

Percentages based on number of surveyed firms in each area

Q.3: Modes of products transportation

IA	Road	Sea	Rail	Air
Iraklio	65%	35%	0%	0%
Patra	84%	16%	0%	0%
Volos	91%	9%	0%	0%
Xanthi	92%	8%	0%	0%
Komotini	88%	10%	2%	0%

Percentages based on number of surveyed firms in each area

Q.4: Evaluation of railway connection (1-5)

IA	Availability	Proximity	Handling
Iraklio	No	–	–
Patra	No	–	–
Volos	Yes	2.21	1.64
Xanthi	No	–	–
Komotini	No	–	–

Key:
1: Not available
2: Poor
3: Medium
4: Good
5: Excellent

Q.5: Evaluation of Roads (1-5)

IA	Within	Connections	Connect. Speed
Iraklio	4.33	1.33	1.44
Patra	3.80	1.70	2.20
Volos	4.36	4.07	4.21
Xanthi	3.33	3.67	3.33
Komotini	4.40	2.40	2.10

Key:
1: Not available
2: Poor
3: Medium
4: Good
5: Excellent

Q.6: Hypothetical spending of five financial tokens on Roads or Railways

IA	Roads	Rail
Iraklio	-	n/a
Patra	4.60	0.40
Volos	3.86	1.14
Xanthi	5.00	0.00
Komotini	3.60	1.40

Q.7: Land prices in the Industrial Areas

IA	Cheap	Advantageous	Competitive	Expensive
Iraklio	11%	56%	33%	0%
Patra	0%	60%	30%	10%
Volos	7%	57%	36%	0%
Xanthi	0%	100%	0%	0%
Komotini	0%	60%	30%	10%

Percentages based on number of surveyed firms in each area

Q.8: Number of telephone lines

IA	Employees	Lines	Empl. / line	Lines/firm
Iraklio	752	138	5.45	7.67
Patra	1244	76	16.37	7.60
Volos	1853	97	19.10	6.93
Xanthi	375	26	14.42	8.67
Komotini	880	52	16.92	5.20

Q.9: Quality of telephones

IA	Poor	Medium	Good	Excellent	Long distance success %
Iraklio	33%	56%	11%	0%	37%
Patra	30%	30%	40%	0%	63%
Volos	29%	43%	29%	0%	58%
Xanthi	0%	100%	0%	0%	31%
Komotini	50%	50%	0%	0%	22%

Percentages based on number of surveyed firms in each area

Q.10: Problems due to telecommunications

IA	No	Small	Considerable	Serious
Iraklio	22%	39%	33%	6%
Patra	40%	20%	30%	10%
Volos	14%	64%	21%	0%
Xanthi	67%	0%	33%	0%
Komotini	0%	20%	80%	0%

Percentages based on number of surveyed firms in each area

Q.11: Electric energy consumption (monthly)

IA	MWH	MWH/firm	MWH/100 empl
Iraklio	1075	60	143
Patra	4553	456	366
Volos	5503	393	297
Xanthi	281	93	75
Komotini	1364	137	155

Q.12: Electricity provision reliability (annual)

IA	Power Cuts	Total Hours	Generators
Iraklio	9	16.67	11%
Patra	7	7.80	60%
Volos	3	7.71	29%
Xanthi	9	6.00	33%
Komotini	11	42.00	40%

Percentages based on number of surveyed firms in each area

Q.13: Firms' destination markets

IA	Same Region	Athens	Rest Greece	Abroad
Iraklio	53%	9%	22%	16%
Patra	8%	31%	44%	18%
Volos	13%	31%	41%	14%
Xanthi	23%	39%	26%	12%
Komotini	16%	21%	32%	32%

Percentages based on number of surveyed firms in each area

Q.14: Assistance in marketing by the Industrial Area

IA	Yes	No	Use
Iraklio	0%	100%	-
Patra	0%	100%	-
Volos	0%	100%	-
Xanthi	0%	100%	-
Komotini	0%	100%	-

Percentages based on number of surveyed firms in each area

Q.15: Evaluation of site safety and security (1-5)

IA	Fire Safety	Night Security	Drills	Seminars
Iraklio	1.11	1.33	1.00	1.00
Patra	1.40	1.00	1.00	1.00
Volos	2.57	1.29	1.14	2.71
Xanthi	1.00	1.00	1.00	1.00
Komotini	4.00	1.00	1.00	1.00

Key:
1: Not available
2: Poor
3: Medium
4: Good
5: Excellent

Q.16: Efficiency of first aid / health centre

IA	Not available	Inefficient	Medium	Good	Excellent
Iraklio	0%	61%	33%	6%	0%
Patra	50%	40%	10%	0%	0%
Volos	7%	93%	0%	0%	0%
Xanthi	100%	0%	0%	0%	0%
Komotini	100%	0%	0%	0%	0%

Percentages based on number of surveyed firms in each area

Q.17: Existence and use of conference/exhibition hall

IA	Existence	Days Used	Participation
Iraklio	yes	3	17%
Patra	no	-	-
Volos	no	-	-
Xanthi	no	-	-
Komotini	yes	5	80%

Q.18: Landscape care, sports grounds

IA	Not available	Medium	Good	Excellent	Would pay share
Iraklio	100%	-	-	-	64%
Patra	100%	-	-	-	40%
Volos	71%	29%	-	-	79%
Xanthi	100%	-	-	-	100%
Komotini	100%	-	-	-	60%

Percentages based on number of surveyed firms in each area

Q.19: Technological help available in the Industrial Area

IA	Use ?	External Techn. Help	Cost/firm (mil)
Iraklio	0%	72%	0.90
Patra	0%	80%	4.06
Volos	29%	64%	2.02
Xanthi	0%	100%	7.20
Komotini	0%	90%	5.33

Percentages based on number of surveyed firms in each area

Q.20: Conferences on technology (potentially in Industrial Area ?)

IA	Attending annually	No Interest	Good	V. Important
Iraklio	1.22	6%	44%	50%
Patra	1.00	30%	30%	40%
Volos	1.29	0%	79%	21%
Xanthi	1.00	0%	33%	67%
Komotini	1.70	0%	20%	80%

Percentages based on number of surveyed firms in each area

Q.21: Latest technology necessities

IA	Information	Capital	Markets	Job Losses	Specialists	Other
Iraklio	35%	53%	35%	6%	47%	6%
Patra	10%	40%	50%	0%	50%	30%
Volos	43%	29%	64%	0%	0%	14%
Xanthi	33%	100%	33%	0%	33%	0%
Komotini	50%	60%	40%	0%	50%	0%

Percentages based on number of surveyed firms in each area

Q.22: Are Competitors using more advanced technology?

IA	NO	If YES why? (15 firms, 2 votes each)				
		Multinationals	More Capital	Larger Scale	Near to Centre	Other
Iraklio	94%					
Patra	50%					
Volos	64%	33%	23%	20%	13%	10%
Xanthi	67%					
Komotini	70%					

Percentages based on number of surveyed firms in each area

Q.23: Age of firm's latest upgrade (in years)

IA	Production	Data Process.	Telecommun.	Internal Comm.	Office Equipment
Iraklio	2.6	3.0	4.7	4.2	5.4
Patra	3.3	3.5	4.7	5.6	4.1
Volos	2.7	2.9	3.8	4.6	3.8
Xanthi	5.3	6.0	3.3	5.0	4.3
Komotini	6.1	5.2	5.0	5.6	5.2

Figures are average of responds in each area

Q.24: Firms' preferences amongst potential state subsidies on

IA	Technology	Exports	Employment
Iraklio	50%	22%	28%
Patra	70%	30%	0%
Volos	58%	21%	21%
Xanthi	100%	0%	0%
Komotini	20%	50%	30%

Percentages based on number of surveyed firms in each area

Q.25: Type of help that the firms would require from the Industrial Areas

IA	Technol. consultation	Employment trainning	Marketing
Iraklio	22%	67%	11%
Patra	20%	60%	20%
Volos	21%	29%	50%
Xanthi	33%	33%	33%
Komotini	20%	30%	50%

Percentages based on number of surveyed firms in each area

Q.26: Firms' favourite pattern of state financial support

IA	Subsidy for technology	Capital for shares	Soft loans
Iraklio	28%	28%	44%
Patra	20%	30%	50%
Volos	64%	0%	36%
Xanthi	67%	0%	33%
Komotini	10%	20%	70%

Percentages based on number of surveyed firms in each area

Q.27: Proportion of imported machinery

IA	Imported
Iraklio	64%
Patra	73%
Volos	80%
Xanthi	83%
Komotini	84%

Q.28: Change-to-fit technological improvements

IA	YES	NO
Iraklio	83%	17%
Patra	80%	20%
Volos	71%	29%
Xanthi	67%	33%
Komotini	40%	60%

Research and Development

No R&D	Partial R&D	Full R&D
39%	39%	22%
40%	20%	40%
43%	7%	50%
67%	0%	33%
60%	0%	40%

Percentages based on number of surveyed firms in each area

Q.29: Perceived necessities for research and development

IA	Information	Finances	Specialists	Other
Iraklio	28%	50%	11%	28%
Patra	60%	10%	20%	40%
Volos	43%	29%	14%	29%
Xanthi	0%	67%	33%	0%
Komotini	30%	20%	40%	20%

Q.30: Seminars on safety of work held in the Industrial Area

IA	Available	Participation	Willing to share cost
Iraklio	no	-	50%
Patra	no	-	60%
Volos	yes	21%	36%
Xanthi	no	-	100%
Komotini	no	-	80%

Percentages based on number of surveyed firms in each area

Q.31: Pollution measurement in the Industrial Area

IA	In operation	It Should be
Iraklio	no	61%
Patra	no	100%
Volos	no	93%
Xanthi	no	0%
Komotini	no	60%

Percentages based on number of surveyed firms in each area

Q.32: Local support to the Industrial Area

IA	No	Little	Considerable	Very much
Iraklio	72%	28%	0%	0%
Patra	40%	50%	10%	0%
Volos	14%	43%	43%	0%
Xanthi	33%	33%	33%	0%
Komotini	60%	40%	0%	0%

Percentages based on number of surveyed firms in each area

Q.33: Regional labour skills (productivity)

IA	No	Low	Considerable	Very high
Iraklio	22%	39%	33%	6%
Patra	60%	30%	10%	0%
Volos	7%	14%	64%	14%
Xanthi	33%	67%	0%	0%
Komotini	60%	30%	10%	0%

Percentages based on number of surveyed firms in each area

Q.34: Percentage of local employees in the Industrial Area

IA	Employees	Locals	Percentage
Iraklio	752	632	84%
Patra	1244	809	65%
Volos	1853	1557	84%
Xanthi	375	289	77%
Komotini	880	722	82%

Percentages based on number of employees of surveyed firms in each area

Q.35: Firms relocated into the region. Importance of Industrial Area

IA	Relocated	No	Little	Considerable	Very high
Iraklio	6%	33%	28%	33%	6%
Patra	70%	0%	10%	80%	10%
Volos	71%	14%	14%	21%	50%
Xanthi	0%	100%	0%	0%	0%
Komotini	60%	10%	30%	50%	10%

Percentages based on number of surveyed firms in each area

Q.36: Locational / operational advantage in Industrial Area

IA	No	Little	Considerable	Very high
Iraklio	22%	33%	44%	0%
Patra	0%	21%	64%	14%
Volos	40%	30%	30%	0%
Xanthi	33%	67%	0%	0%
Komotini	20%	60%	10%	10%

Percentages based on number of surveyed firms in each area

Q.37: Cooperation amongst firms in Industrial Area

IA	Yes	Production	Raw materials	Security	Other
Iraklio	61%	44%	17%	0%	6%
Patra	60%	30%	10%	0%	40%
Volos	71%	43%	7%	7%	21%
Xanthi	33%	0%	0%	0%	33%
Komotini	70%	60%	0%	0%	30%

Percentages based on number of surveyed firms in each area

Q.38: Innovations are spreading faster within the Industrial Area

IA	Yes
Iraklio	0%
Patra	10%
Volos	29%
Xanthi	0%
Komotini	30%

Q.39: Attractiveness of Industrial Area to local and external capital

IA	No	Little	Considerable	Very high	
Iraklio	0%	28%	67%	6%	
Patra	30%	70%	0%	0%	
Volos	0%	21%	71%	7%	**(local)**
Xanthi	67%	33%	0%	0%	
Komotini	20%	60%	20%	0%	
Iraklio	22%	78%	0%	0%	
Patra	20%	80%	0%	0%	**(external)**
Volos	0%	36%	64%	0%	
Xanthi	67%	33%	0%	0%	
Komotini	10%	70%	20%	0%	

Percentages based on number of surveyed firms in each area

Q.40a: Regional economic benefit

IA	No	Little	Considerable	Very high
Iraklio	11%	50%	39%	0%
Patra	10%	50%	40%	0%
Volos	0%	50%	43%	7%
Xanthi	33%	67%	0%	0%
Komotini	0%	20%	80%	0%

Q.40b: Poor parts benefit

Iraklio	22%	56%	22%	0%
Patra	10%	60%	30%	0%
Volos	7%	50%	36%	7%
Xanthi	33%	67%	0%	0%
Komotini	10%	50%	40%	0%

Percentages based on number of surveyed firms in each area

Q.41: Differentiation of regional production basis

IA	No	Little	Considerable	Very high
Iraklio	6%	22%	61%	11%
Patra	10%	50%	40%	0%
Volos	0%	14%	86%	0%
Xanthi	0%	67%	33%	0%
Komotini	0%	20%	60%	20%

Percentages based on number of surveyed firms in each area