The Organizational-Locational Structure of Industy in Israel and its Effects on National Spatial Policies

E. Razin and A. Shachar
The Hebrew University of Jerusalem, Israel*

The organization of production in multiplant firms and the location of their top management has important repercussions for Israel's national policy of industrial dispersal. This paper presents an empirical analysis of: (a) the location pattern of the headquarters of the 124 largest industrial companies in Israel; (b) the location pattern of head offices controlling the manufacturing activity in Israel's development towns; and (c) the spatial organization of Israel's six largest industrial enterprises. Our analysis shows that control units of large industrial firms in Israel tend to be concentrated in central regions, primarily in the Tel-Aviv metropolis. However, the existence of a substantial number of head offices in the rural-cooperative sector of development regions shows that the dispersal of such functions is possible if social or ideological motives for retaining control functions in peripheral areas exist. The two factors found to be most clearly related to the extent of external control of industry in development towns are the plant size distribution and its distance from the nearest metropolitan area. The most remarkable conclusion drawn from the analysis of specific companies is the relatively small contribution to employment in development regions by the government military-associated industrial companies. This might be partly due to the low response of these government enterprises to the incentives of the spatial policy which are directed mainly toward the private sector.

Industrial dispersal is one of the main elements of the major spatial policy of Israel: that of the dispersion of population. Studies evaluating this policy (Bar-El, 1982; Gradus and Einy, 1981; Gradus and Krakover, 1977) have analyzed various data on manufacturing activities, but neither plant ownership nor the organizational structure of industry were taken into account. The organization of production in multiplant firms and the location of their top management can have important repercussions on urban and regional development. The aim of the present study is to examine the spatial structure of the head offices and the overall control functions in the industrial sector in Israel, as well as the geographical distribution of the largest industrial multilocational firms. Special emphasis is laid on the location of control units of the manufacturing activity in Israel's development towns. The study concludes by assessing implications of the organizational-locational structure of industry on Israel's spatial policies.

* Department of Geography, The Hebrew University of Jerusalem, Jerusalem 91905, Israel.

THE SPATIAL ORGANIZATION OF INDUSTRIAL FIRMS AND REGIONAL DEVELOPMENT

The organizational structure of large industrial firms has a spatial dimension which influences markedly the activity of the firm itself, as well as the regions where its units are located. The geography of industrial multilocational enterprises and its repercussions on urban and regional development have been a major issue of research since the late 1960s, (see reviews by Watts, 1980, 1981; and by Taylor and Thrift, 1986).

The organizational hierarchy in large firms is, in many cases, characterized by the spatial separation between management and production units and between the different levels of management and control. Studies made in various countries indicate that the headquarters of large industrial firms tend to concentrate in a few major metropolitan complexes constituting the country's economic and political centers (Borchert, 1978; Goddard and Smith, 1978; Semple and Smith, 1981; Stephens and Holly, 1981; Taylor and Thrift, 1981; Westaway, 1974), owing to the agglomeration economies provided by the metropolitan areas. The economic benefits include: (a) the ability to have frequent face-to-face contacts with top decision-makers of other firms and of public institutions; (b) access to information generated by public and financial institutions; (c) availability of business services; (d) availability of diversified and, especially, skilled labor; and, (e) good accessibility to the transportation and telecommunication networks (Pred, 1977; Watts, 1980).

Many large enterprises possess an intermediate level of control between headquarters and plant management. This level tends to be located in large urban centers, but is less dependent on the major metropolitan complexes because it fulfills more routine functions which do not necessitate frequent direct contacts with personnel of other firms and institutions. This intermediate level, however, needs to have more direct contact with the production units (Lloyd and Dicken, 1977).

The locational pattern of the production units of large multilocational firms shows greater variability than that of their administrative and control units. The classical location theory of minimum cost largely explains the spatial distribution of the production activity in multilocational firms. The classical issue of finding a location for the production of certain products is most relevant to large multilocational firms, disposing of the necessary resources and focusing on long-term planning. Their information field and their spatial flexibility enable these firms, when locating their plants, to utilize spatial variations in factors of production costs (Hamilton, 1974). The product-cycle model is frequently used to describe the spatial organization of such firms (Norton and Rees, 1978; Tichy, 1984; Watts, 1980).

The organization of the industrial sector in multilocational firms can have both direct and indirect effects on urban and regional development. The direct effects consist of the availability of jobs offered by them in every town and region. Holland (1976) claims that the multilocational and multinational firms prefer to locate their units in leading central regions and not in the periphery. The reasons for this preference are not necessarily economic; the power of the large firms and their ability to transfer their activities from one country to another enable them to withstand governmental pressures brought to bear upon them to disperse their activity to the periphery. On the

other hand, Watts (1980) presents empirical evidence from Great Britain indicating that, in aggregate, large enterprises do not misuse their bargaining strength to evade the governmental regional policy directed toward spatial dispersal of employment.

Other direct and indirect effects on urban and regional development result primarily from the fact that a plant owned by a multilocational firm does not usually fulfill high control functions. This might reduce the availability of top administrative jobs in the region where the plant is located. The spatial organization of multilocational firms may cause a greater regional specialization, which leads to an increasing spatial division of labor between regions specializing in skilled production and management, and those regions specializing in the routine low-skilled operations of later stages of the product cycle. In addition, the local multiplier of externally controlled plants might be relatively small. A region where a large percentage of plants are externally owned might also be more sensitive to economic fluctuations (Dicken, 1978; Massey, 1979; Townroe, 1975).

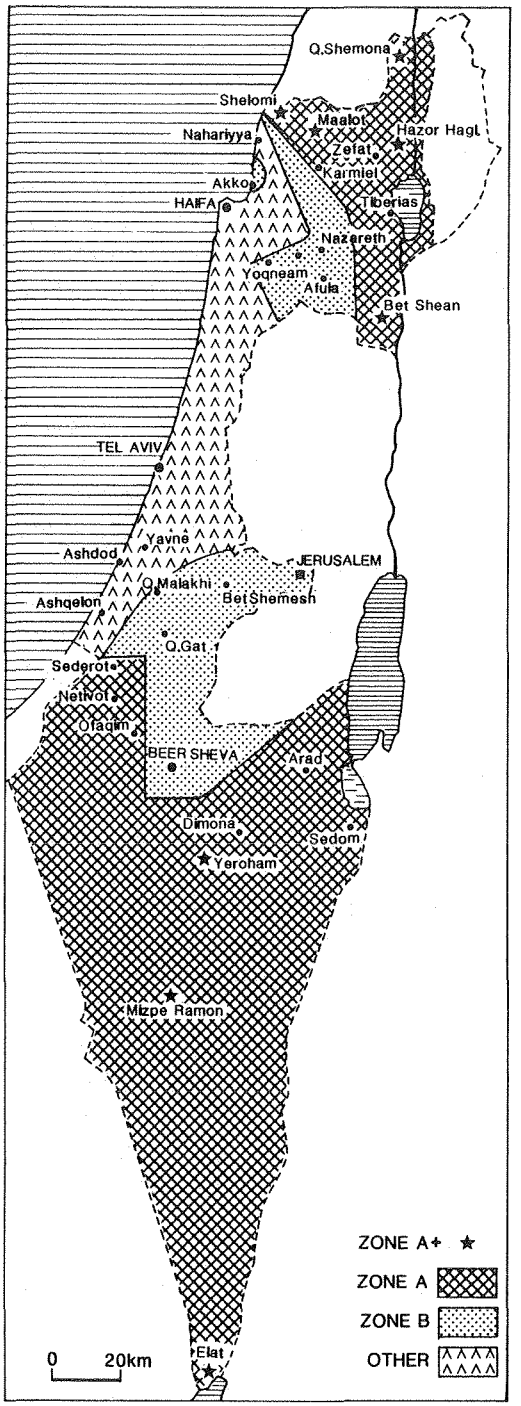
Numerous studies have identified a growing tendency toward external ownership of plants in peripheral regions. These are usually large plants in "growth industries" (Firn, 1975). Other studies have examined the indirect effects of external control on economic activity in peripheral areas, and varified the hypothesis that externally-owned plants tend to lack white-collar jobs and rely less on the local region for business services (Watts. 1981). Increased external ownership of plants by multilocational firms, however, can have certain positive effects on peripheral regions. For instance, large multilocational firms have a "long breath" enabling them to support a failing plant in time of crisis. They may also contribute to a regional improvement in methods of management and in access to new markets.

INDUSTRIAL DISPERSAL POLICY IN ISRAEL

In the years following the establishment of Israel, the government's major efforts to implement its policy of population dispersal were focused on housing, primarily in the founding of numerous new towns in outlying regions. These towns were intended to develop gradually into service centers for the surrounding rural areas. It soon appeared, however, that only slight regional integration occurred between the new towns and the surrounding settlements, so that the supply of services to the rural sector could not constitute a major economic base for such towns (Shachar, 1971). Since the late 1950s, therefore, efforts have been directed toward providing a stable economic base for the development towns, mostly through industrialization. To achieve this goal, the government established and operated basic industries, such as mining, in development areas and, in addition, channeled private investment to these areas by granting various incentives (Zilberberg, 1973).

The map of the preferred zones entitled to benefit from governmental assistance changed in the course of time. In general, the northern and southern regions were always included among the development zones, but not the central coastal plain. The map for 1981 is given in Figure 1. In addition to the preferred areas indicated on the map, an A+ status was granted in the late 1970s to the Jewish settlements established since 1967 in the Occupied Territories.

Figure 1: Israel, Development Zones, 1981.



Industrialization of development towns was aimed, in the first phase, at creating stable jobs for a large number of residents of the new towns, most of whom, originating from underdeveloped countries, had little formal education and no professional skills. Hence, most plants established in development towns in the 1950s and 1960s, among which textile plants predominated, were labor-intensive and capable of utilizing a high percentage of unskilled labor (Gradus and Krakover, 1977). The governmental spatial policies were successful as regards population dispersal and provision of employment, but failed in reducing economic inequalities between central and peripheral regions (Shachar and Lipshitz, 1981). Most development towns have suffered from a high negative migration balance, which was recognized as a major problem in the 1960s, when the number of immigrants that could be directed to development towns dwindled.

The lack of skill-intensive industries in development towns probably constituted a major cause for the exodus of the "strong" population. Bar-El (1982), however, found that the main problem facing the development towns was the low standard of living, and not the number of jobs available. Improvement of the standard of living could have influenced the migration balance in favor of the development towns. The creation of more jobs, however, without taking into account the level of skills and of wages would have resulted in migration flows in both directions and, in the long run, the balance would not have improved.

To solve this problem, the government has encouraged the construction of more skill-intensive plants in development towns since the late 1970s. A change in the priorities of the government's spatial policy since 1977, however, limited the resources available for this goal, some of them being diverted to the new settlements in the Occupied Territories. In addition, the government incentives were especially attractive for capital-intensive non-exporting plants (Schwartz, 1985), and could not affect the location of most high-technology activities (Felsenstein, 1986).

The national spatial policy laid emphasis on housing, agriculture and industry, but not on the tertiary and quaternary sectors. The industrial dispersal policy did not include any provisions as to the location of administrative and control functions of the industrial firms despite the fact that a substantial number of plants are owned by multilocational firms, and their spatial organization would have important repercussions on the industrial dispersal policy.

This study discusses: (a) the location pattern of the headquarters of the large industrial companies in Israel; (b) the location pattern of headquarters controlling the manufacturing plants in development towns; and (c) the spatial organization of Israel's six largest industrial firms. The study shows to what extent control functions of the manufacturing sector are concentrated in Israel's large cities, and particularly, to what extent Tel-Aviv emerges as a dominant core, attracting control functions of distant manufacturing activities. Another hypothesis to be examined is that higher rates of external control on manufacturing activity exist in small, remote and relatively poor development towns. The study also assesses to what extent large multiplant firms contribute to industrial dispersal in Israel, and whether publicly-owned firms of various types are more responsive to the goals of public policy than private firms.

The industrial system in Israel is unique in its division into four ownership sectors: private, government, Histadrut (Labor Federation), and rural-cooperative. Each of these sectors is characterized by different business behavior, and each might react differently to the means used to implement national spatial policy. It may be of special interest, therefore, to assess patterns revealed in these analyses in view of generalizations made in previous research done in other countries.

LOCATION OF HEADQUARTERS OF THE LARGE INDUSTRIAL FIRMS IN ISRAEL

The spatial distribution of the headquarters of the large industrial firms in Israel yields information on the seat of decision-making in the industrial sector, and on the geographic concentration of top level job opportunities. Our analysis is based on a survey of the 124 largest industrial enterprises in Israel, as reported by Dunn & Bradstreet. The list only includes operating companies (i.e., excludes holding or investment companies) in which over 60% of the sales volume is derived from manufacturing. These companies were ranked according to their 1980 total sales volume.

The analysis makes a distinction between head offices and top control units of the large firms. Head offices were defined as headquarters of the firms included in the large industrial enterprises list. These head offices clearly constitute centers of high-level employment and decision-making. However, some of the large firms are affiliated with parent companies which have responsibility for top decision-making in such vital issues as major capital expenditures. A parent company was defined as one holding at least 50% of the shares of the firm in question. Where such a parent company existed, its headquarters was defined as the top control unit. In the few cases of a foreign parent company, the location of its subsidiary head office in Israel was used for the analysis. The following characteristics of the firms were tested insofar as they influenced the location of a firm's headquarters: number of employees, main manufacturing branch, 1980 sales growth, proximity of the head office to the main plant, and year of establishment.

Table 1 gives the data on spatial distribution of head offices which, as expected, is typified by a concentration (44.4% of the total) in the Tel-Aviv Metropolitan Area, the main economic core of Israel. A second, smaller concentration (13.7% of total) of head offices occurs in metropolitan Haifa. Only a few head offices of large firms are located in development towns. This is particularly apparent when the figures are compared to the concentration of manufacturing employment in these towns. A significant number of head offices of large industrial firms, however, can be found in the rural sector of development regions. These are mostly those of industries owned by the kibbutzim (communal settlements), whose populations are better established than those of the development towns.

Unlike most industrial systems, which strive for efficient operations, profits and growth, the kibbutz, as a collective non-wage system, aims to balance revenues and personal welfare. The kibbutz industrial plants, therefore, are usually small and fully controlled by their operators (Kipnis and Meir, 1983). However, to attain scale economics, some plants have grown to a substantial size, and inter-kibbutz partner-

ships have been formed, most of them on a regional basis, in agricultural-related industries. These large firms remain owned and managed by the kibbutzim even though they employ people from nearby towns. It seems, therefore, that when social or ideological motives exist, the location of headquarters of large industrial firms in peripheral regions is possible, even if it might not be optimal.

Table 1: Location of head offices and top control units of the 124 largest industrial firms in Israel, 1981.

	Head offices (percent)	Top Control Units (percent)
Tel-Aviv	26.6	50.8
Tel-Aviv suburbs	17.7	14.5
Haifa Metropolitan Area	13.7	7.3
Other towns in the coastal plain	18.5	8.9
Rural settlements in the coastal plain	6.5	7.3
TOTAL—central regions	83.1	88.7
Jerusalem	3.2	3.2
Beer-Sheva	1.6	0.0
Other development towns	4.8	0.8
Rural settlements in development regions	7.3	7.3
TOTAL—Development regions	16.9	11.3
TOTAL	100%	100%

The rural-cooperative sector in Israel possesses an autonomous economic and social system, as well as local government and services. The regional councils supplying services to rural settlements do not include urban settlements which have a separate local government (Gradus, 1984). Because of this distinction between the rural-cooperative sector and development towns, jobs in head offices of rural industry are held by members of the kibbutzim and, therefore, this only has limited influence on the availability of top level jobs to inhabitants of development towns.

Table 1 also shows the distribution of the industrial firms by indicating the location of the top control unit in the organizational hierarchy. It should be noted that the same unit can be mentioned more than once when it represents the head office of a parent company owning several firms appearing on the large firms list. This table shows,

therefore, where top decisions are made, but provides no clear indication of the generation of top level jobs in the various regions.

As can be gathered from Table 1, more than 50% of the large industrial firms are controlled from Tel-Aviv, a percentage which becomes as high as 65.3% when the Tel-Aviv suburbs are included. Haifa, a much smaller center, has control of the industrial activity of only 7.3% of the large firms. Only a single large industrial firm has its top control unit in a development town. The ultimate control of large industrial firms in the rural sector of development regions is located in the kibbutzim or moshavim owning those companies.

The major factor influencing the location of head offices was found to be the location of the main plant of the firm, and nearly 80% of the head offices of the large industrial firms in Israel are adjacent to their central plant (Table 2).

TABLE 2: Location of head offices of the 124 largest industrial firms in Israel and their proximity to the main plant, 1981.

Location of head office	Head Office Adjacent to Main Plant	Head Office not Adjacent to Main Plant	Total
Tel-Aviv	10	23	33
Tel-Aviv suburbs	19	3	22
Haifa Metropolitan Area	16	1	17
Other towns on the coastal plain	23	0	23
Rural settlements on the coastal plain	8	0	8
TOTAL–Central regions	76	27	103
Jerusalem	4	0	4
Beer-Sheva	1	1	2
Other development towns	6	0	6
Rural settlements in development regions	9	0	9
TOTAL–Development Regions	20	1	21
TOTAL	96	28	124

The only place where head offices not adjacent to a plant are to be found is Tel-Aviv. It can thus be concluded that large firms tend to have their head-office adjoining their

main plant, and if this is not the case, they prefer locating their head office in Tel-Aviv.

Head offices might be established close to the main plant for historical reasons or because of ease of communication with the largest production unit. The general impression from the data gathered suggests that head offices located far from the main plant are usually those of firms possessing many production units scattered over the country, firms whose main plant is situated in a development town, and firms which, in addition to industry, are active in tertiary activities. It should, however, be stressed that the head offices adjacent to the main plant also control, in many cases, additional plants located elsewhere.

The relationship between the head-office location and other characteristics of the firm appears to be weaker. The top control units of large industrial firms, thus, tend to concentrate in Tel-Aviv more than those of smaller firms. Head offices of firms active in skill-intensive manufacturing branches, or which have enjoyed high growth rates in 1980, tend to be primarily located in the Tel-Aviv suburbs and in the Haifa Metropolitan Area.

Firms established before 1948 preferred to locate their head offices in Tel-Aviv or Haifa. Firms established in the early 1950s preferred the Tel-Aviv suburbs and other towns on the coastal plain; whereas those established since the late 1950s again preferred to locate their head offices in Tel-Aviv or Haifa.

THE LOCATION OF THE HEADQUARTERS OF DEVELOPMENT TOWN PLANTS

The basic source of data analyzed in this section was a list of industrial plants in development regions at the end of 1980 prepared by the Ministry of Industry and Commerce. The analysis included all plants employing 20 or more workers located in development towns and in their vicinity, with the exception of those owned by the rural sector.

The plants were classified into three categories according to the type of ownership:

1. Independent plants, where the top control unit is situated in the plant itself or adjacent to it.
2. Plants of single-plant firms whose headquarters are in another town.
3. Plants of multiplant firms whose headquarters are in another town.

The analysis of the data shows that the top management of most plants in development towns is located externally. A certain number of top-control units of development town plants are, however, situated locally (Table 3).

A clear relationship exists between the size of a plant and its type of ownership. Large plants show a higher tendency to be owned by multilocational firms (Table 3). This finding is similar to those indicated for other countries (for example, Firn, 1975). Kipnis (1977) reached the conclusion that the local multiplier of large industrial plants in Israel's development towns is smaller than that of medium-sized plants. It appears from our study that large plants tend to be owned by multilocational firms and it can be assumed that this tendency constitutes at least one of the reasons for the small local multiplier of large plants.

Table 3: Plants in development towns by type of ownership and size of plant, 1980.[1]

	No. of Plants (percent)	No. of Employees (percent)	Average No. of Employees per Plant
Independent plant headquartered locally	42.7	20.4	67.0
Single-plant firm headquartered in another town	9.7	6.8	102.0
Multiplant firm headquartered in another town	47.6	72.7	215.5
TOTAL	100%	100%	
TOTAL (in absolute numbers)	288	40,594	141.0

[1] Table 3 includes only plants with 20 or more employees.

The relationship between the manufacturing branch of the plant and its type of ownership is less clear, and the data analyzed (not shown) do not indicate whether plants owned by multilocational firms tend to be in the category of "growth" or "laggard" industries when compared to independent plants. The differences in the location of head offices of branches are explained, to a great extent, by differences existing in plant size distribution.

A substantial variance was found along development towns regarding the extent of external management of their industrial activity. The distance of the town from the nearest metropolitan area (Haifa, Tel-Aviv or Jerusalem) was found to be the main factor influencing the extent of external management. Large plants in development towns distant from metropolitan areas tend more often to be owned by multilocational firms, than large plants at commuting distances from one of the metropolitan areas. Of the 13 plants employing over 200 people situated at a convenient commuting distance from one of the metropolitan areas (up to 30 km), four are headquartered locally. Of the 13 such plants situated at a less convenient commuting distance (31-60 km.), only two are headquartered locally; and of the 27 such plants situated out of commuting range (more than 60 km), none are headquartered locally. It seems, therefore, that proximity to a metropolitan complex is an important consideration in determining the location of top control units of large plants in development towns. This conclusion holds good for large plants and not for smaller ones, where there is no relationship between the type of ownership and the distance from the metropolis.

The correlation coefficients (R^2) between the percentage of plants headquartered locally and other characteristics of development towns—population size and economic well-being—were found to be low (0.13 and 0.09).[1] The only clear finding was that

plants in small and economically-poor development towns tend to locate their headquarters in another town, even when they are not owned by a multiplant firm.

It was further observed that the head offices of externally owned plants in development towns were mostly concentrated in the Tel-Aviv Metropolitan Area; a much smaller concentration was found in the Haifa Metropolitan Area, and only a few head offices were located in Beer-Sheva, Jerusalem and other towns. Whereas the head offices in the Tel-Aviv metropolis manage plants all over the country, those in the Haifa region and in Beer-Sheva usually control plants located in adjacent development areas.

It can be concluded that factors most clearly related to the extent of external control of industry in a development town are the plant size distribution in that specific town, and its distance from the nearest metropolitan area. The Tel-Aviv metropolis is the main center controlling industrial activity in development towns, while the Haifa region and other towns constitute relatively small sub-centers of control.

SPATIAL ORGANIZATION OF THE LARGEST MULTILOCATIONAL FIRMS IN ISRAEL

The analysis covered the six largest firms in Israel, in terms of the sales volume: (1) Israel Aircraft Industries, the largest industrial government-owned concern, employing 20,000 people in 1980; (2) Israel Military Industries, which is not properly a firm, but a unit of the Defense Ministry, with 14,000 employees in 1980; (3) Israel Chemicals, a holding company for the mining and inorganic chemicals firms owned by the government,with 5,600 employees in 1980; (4) Koor Industries, the largest industrial corporation in Israel, owned by the Histadrut (Israel's General Federation of Labor), with some 30,000 employees in 1980; (5) Clal Industries, a subsidiary of a Clal (Israel) Holding Company, the majority of whose voting shares are held by two of the largest banking groups in Israel, with some 10,000 employees in 1980; and (6) Discount Bank Investment Corporation, an industrial holding company owned by IDB Bankholding Corporation, employing only 2000 people directly in 1980, but 5200 more in subsidiaries, where the company holds a minority of 20% or more of the shares.

The headquarters of all these firms are located in the Tel-Aviv Metropolitan Area, four of them in the city of Tel-Aviv. Israel Chemicals and, to some extent, Koor Industries are the only firms where a large part of the subsidiary and divisional head offices are located outside the Tel-Aviv metropolis, mostly in the Haifa and Beer-Sheva regions.

A comparison of the spatial distribution of employment in these firms was made by computing the mean centers and the standard distances of employment in their plants. In addition, the distribution of employment was analyzed and location quotients of employment were calculated for each firm by region and economic branch. Only partial data was available on the Israel Military Industries.

The standard distances of employment (Table 4) reveal that, in Israel Chemicals, employment is the most dispersed of the large firms, while the lowest dispersion level is that of Israel Aircraft Industries. Most of the production of the governmental Israel

Chemicals is oriented toward raw materials and, therefore, has to be located in the development regions of southern Israel. The employees of the two governmental firms, which mainly produce military equipment are concentrated in the central regions. About 60% of the employees of Israel Aircraft Industries are working in plants located in the outskirts of the Tel-Aviv Metropolitan Area near Ben-Gurion Airport, and only 7% are in development regions (see Table 5). The Israel Military Industries have been establishing plants in development regions since 1967, but its activities are still mainly concentrated in the central regions.

TABLE 4: Standard distance[1] of the number of employees in plants of the largest industrial firms in Israel.

	1954	1969	1980
Israel Aircraft Industries	NA	NA	21.8[2]
Israel Chemicals	NA	NA	86.1
Koor Industries—total	58.8	58.6	58.3
total—excluding electrical and electronic equipment	59.0	64.8	67.8
electrical and electronic equipment	NA	17.2	22.6
Clal Industries—total	NA	NA	68.2
total—excluding textiles, clothing & leather	NA	NA	48.5
textiles, clothing & leather	NA	NA	81.8
Discount Bank Investment Corp.	NA	NA	42.1
Israeli Jewish population	48.1	54.5	54.9

[1] For definition of the Standard Distance measure, see Bachi (1962).
[2] Data of 1979.
NA Not available.

TABLE 5: Employees of large industrial firms located in development regions, by manufacturing branch (in percents)[1]

Manufacturing Branch	Employed in development regions[2]							
	Aircraft Industries 1979	Israel Chemicals 1980	KOOR 1954	KOOR 1969	KOOR 1980	Clal Industries 1980	Discount Investment 1980	Total Industry in Israel 1978
Food, beverages and tobacco	–	–	–	–	16.8	x	–	26.0
Textiles, clothing and leather	–	–	x	–	37.5	87.8	x	28.9
Mining and quarrying	–	100.0	–	–	–	–	–	71.1
Non-metallic mineral products	–	–	6.8	21.2	42.3	21.1	–	33.9
Chemical, rubber and plastic products	x	37.8	x	78.2	43.0	x	100.0	34.7
Basic metals	–	–	47.5	53.6	45.7	27.8	0.0	41.9
Metal products, machinery and transport equipment	10.1	–	0.0	46.9	51.8	21.3	6.1	21.6
Electrical and electronic equip.	1.1	x	x	3.6	3.0	0.0	x	11.3
Total[3]	7.3	78.0	12.4	30.0	27.7	46.1	25.8	25.9

[1] Key: – The firm has no activity in the branch.
x The firm has less than 300 employees in the branch.

[2] Percent of total number of employees in the firm occupied in the specific branch. Development regions—see Fig. 1

[3] Including other branches not shown in this table (wood, paper, diamonds, printing, etc.).

It would seem reasonable to assume that government-owned companies would be more responsive to the goals of the government spatial policy, but, at least for the firms analyzed, this, in fact, was not the case. This might be partly explained by the relatively low response of governmental firms to such things as grants or loans at subsidized interest rates and the use of subsidized land and infrastructure, which are incentives mainly directed toward the private sector, which faces the problem of raising capital for large investments. Plans to relocate large portions of the military industries to the sparsely populated south, where large extensions of undeveloped land isolated from metropolitan centers are available, have existed for many years. However, these plans were not implemented, partly because of the high cost of such relocation, and probably also because of the unenthusiastic attitude of management and employees toward moving from the Tel-Aviv area to the arid peripheral region of the Negev.

In the United States, the expanding military high technology industries had, according to Markusen and Bloch (1985), shifted investment, jobs and people toward new lands in the outskirts of the metropolitan areas and in the south and western regions. Defense spending was more pronounced than average in high income, non-declining, low unemployment areas. Although the location patterns of military-high technology industries in Israel are different, in both countries this sector does not contribute significantly to the development of deprived regions.

Koor Industries is the largest and most diversified industrial firm in Israel. Koor operates like all other business enterprises, but being owned by the Labor Federation, it is officially committed to goals other than the maximization of profits (Barkai, 1983), one of these being the industrialization of development towns. Koor was, therefore, one of the first firms to invest heavily in the peripheral new towns. The main trends of change in its spatial distribution of employment between 1954 and 1980 consisted in a sharp decrease in the concentration of employment in the Haifa sub-district (from 53.2% of the total employment in 1954 to 21.5% in 1969, and to only 15.5% in 1980), and in an increased concentration of employment in the Tel-Aviv area and in the Beer-Sheva sub-district. As can be observed from Table 5, a rapid increase in the percentage of workers employed in development regions occurred between 1954 and 1969, and a slight decrease (from 30% to 27.7%) between 1969 and 1969.

The changes indicated in distribution of employment were part of the general trends of change observed in industry location in Israel. Most prominent, however, was the decline of Koor in the Haifa sub-district. In the past. Haifa had been the most powerful center of Labor Federation enterprises and Koor had developed there, largely due to its proximity to the headquarters of Solel Boneh, which, until 1958, had been its parent company. The transfer of the top decision-making functions of Koor to Tel-Aviv explains to some extent the decline in Haifa's status in the 1960s. The poor relations existing between the Haifa Labor Council and the Koor management probably also deterred the latter from investing in Haifa.

The decrease in the percentage of total employment in the Koor plants in development regions between 1969 and 1980 appears to result mostly from the firm's general shift to the production of electrical and electronic equipment, which is concentrated in central regions. During this period, employment in this manufacturing branch grew from 28% to 34% of Koor's total employment, most of it in Tadiran,

which is the third largest high-technology military-oriented enterprise in Israel (Aircraft Industries and Military Industries being the first two). The percentage of employment in the more dispersed branches has declined: from 19.5% to 11.7% in non-metallic mineral products; from 20% to 7.8% in basic metals; and from 20.8% to 14.7% in metal products. Table 4 shows that between 1954 and 1980 the standard distance of Koor's total employment had not increased, but the calculation of separate standard distances of electrical and electronic equipment branch and of all other branches reveals that Koor's dispersion level of employment, excluding electrical and electronic equipment, has increased. In the latter branch, the standard distance, which was very low, also increased. Nevertheless, the total dispersion level did not go up, owing to the change in composition of Koor's branches.

Employment in Clal Industries is more dispersed than at Koor (Table 4), and a larger percentage of it is found in development regions (Table 5). Examination of each manufacturing branch separately reveals, however, that a high dispersion level exists only in the textile, clothing and leather branches (40.3% of the total employment in Clal Industries) where most of the employment is concentrated in three large plants located in development regions. The other branches of Clal Industries are primarily concentrated in central regions (Tables 4 and 5).

SUMMARY AND CONCLUSIONS

1. The headquarters and divisional or subsidiary head offices of large Israeli industrial firms tend to be concentrated in central regions, mostly in the Tel-Aviv metropolis. A relatively large number of head offices located in development regions are of the rural cooperative sector, and only a few are of the urban sector.
2. Headquarters of parent companies and of the largest industrial firms tend to be located in the Tel-Aviv Metropolitan Area more often than those of divisional, subsidiary and smaller firms. Tel-Aviv is also the only place where head offices which are not adjacent to their main plant are concentrated. In many cases, head offices located in the Tel-Aviv metropolis manage plants established in development towns all over the country, while head offices in other cities tend to manage industrial activity in neighboring development regions.
3. Most industrial plants in development towns are owned by firms whose headquarters are located in central regions. Large plants in these towns show a higher tendency than smaller ones to be owned by multilocational firms controlled from external locations.
4. Large plants located in towns which are within commuting ranges of one of the metropolitan areas are less likely to be owned by multilocational firms and to be managed externally than are large plants distant from a metropolis. No clear relationship exists between the size and economic welfare of a town and the percentage of its plants owned by multiplant companies. Plants in relatively small and economically poor towns, however, tend to locate their head office in a central region, even when they do not form part of a multiplant firm.
5. The spatial distribution of second-level control units and manufacturing labor varies considerably among large multiplant companies. Activities of private and

governmental companies are concentrated in central regions, except for the textile plants of the privately-owned Clal Industries, which primarily employ unskilled labor, and for the governmental Israel Chemicals, most of whose activities are oriented towards raw materials. The contribution of Koor—owned by the Labor Federation—to the development of peripheral regions is probably higher in most branches, but employment in Koor's largest and most advanced branch, electrical and electronic equipment, is concentrated in the central regions.

Our study enables us to assess the direct effects of industrial multilocational companies on the urban and regional development in Israel. Head offices of large industrial firms offer senior administrative positions mainly in the Tel-Aviv metropolis and, to some extent, also in the Haifa Metropolitan Area. Tel-Aviv is the only place where such positions are not tied to the location of manufacturing activities. The few headquarters of large firms located in development towns in Northern Israel are all within commuting distance of Haifa; their employees can live in Metropolitan Haifa, thus contributing little to the growth of the development towns. The location of a development town within commuting distance from Haifa, however, may have some positive effects, since the inhabitants can avail themselves of the job opportunities Haifa can offer.

Beer-Sheva is the largest development town and the only one where substantial employment can be found in control units of large industrial firms. Beer-Sheva, however, is still far from constituting a center of control comparable to the large control centers in the central regions. It is possible that externally-controlled manufacturing plants in development towns might have a smaller local multiplier than independent ones and might offer less white-collar job opportunities than would be available if the plants were locally controlled. It should be remembered, however, that this argument should only hold true if such plants were to have been established and maintained as independent firms without the backing of large multilocational firms.

POLICY IMPLICATION

Can our data be used to draw general conclusions about national spatial policy in Israel? This study only provides a preliminary analysis of the issues concerned and does not give a normative answer to the questions of whether the organization of industrial activity in Israel by large multilocational firms has a positive or negative effect on spatial policy. Conclusions relevant to this issue can be reached, however, regarding the contributions of specific companies. Most remarkable is the relatively small contribution to employment in development regions by the governmental military-associated industrial companies. The manufacture of import-substituting military equipment has been considered a major national goal of Israel since 1967. In the 1970s, military-associated industry became a leading industry in growth, exports and technology. Industrialization of peripheral regions was, therefore, only one of a set of national goals that included other goals such as substitution for military imports and export promotion. As a result, firms involved in military production could get government aid even if they were located in central regions; therefore, the national policy primarily resulted in dispersal of non-growth industries characterized by low

levels of technology and exports. The two large governmental military-associated enterprises did not contribute much to the economy of development regions, because they could easily raise capital for investments. Government incentives that were designed to encourage dispersal offered them no significant advantages. They therefore located in the more desirable central regions instead of development towns.

The case of Koor further exemplifies the selective effect of Israeli spatial industrialization policy. Officially committed to population dispersal, Koor led the dispersal of many mature and well-established manufacturing activities. Meanwhile, however, young high-technology subsidiaries located in the Tel-Aviv metropolis, have shown the highest growth rates in Koor. Thus, despite all efforts, an overall dispersal of employment in Koor has not been achieved since the late 1960s.

Another point relevant to the spatial policy is related to the importance of encouraging the transfer of management functions of the industrial firms to development towns. The location of control functions there could also be accompanied by other quaternary units, such as research and development. This would increase the supply of high-skilled and well-paid jobs in these towns and would have relatively large local multiplier effects. Encouragement of the dispersal of quaternary activities appears more problematic than that of dispersal of manufacturing plants, and should be accompanied by promoting advanced producer services in the problem regions (Martinelli, 1985). The data presented in this study indicates, however, that dispersal of control functions in development towns is possible, especially if it decreases the distance separating the unit of control from those of production. The existence of head offices in Beer-Sheva, and especially in the rural sector of development regions, shows that dispersal of these functions is possible. Such location may not be optimal, but the example of the rural cooperative sector shows it is possible when social or ideological motives for dispersal exist.

A potential strategy can be to promote dispersal of control functions into a limited number of nodes (Westaway, 1974a), where essential services can attain minimal threshold and communications disadvantages are tolerable. In large firms, where location of headquarters in a metropolitan area is essential, the policy should aim at dispersal of such quaternary units as research and development and data processing, which are less dependent on central locations. Recent developments in telecommunication technologies might render further dispersal possible in the future, provided that the Israeli public telecommunication infrastructure improves. An alternative strategy to overcome negative repercussions of external control is to promote local entrepreneurship in development towns. The obstacles facing indigenous industrial growth were outlined in Razin (1988). Nevertheless, future modifications of Israeli spatial policy should consider the strategies mentioned above, which have been disregarded for the last thirty years.

NOTES

1. Rates of car ownership were used as proxies for economic well-being. The number of observations (development towns) was 25.

REFERENCES

Bachi, R. (1962) Standard distance measures and related methods for spatial analysis. *Papers of the Regional Science Association,* 10:83-132.

Bar-El, R. (1982) *Industrialization and Development.* Rehovot: Settlement Study Center (in Hebrew).

Barkai, H. (1983) Theory and praxis of the Histadrut industrial sector. *The Jerusalem Quarterly,* 26:96-108.

Borchert, J. R. (1978) Major control points in American economic geography. *Annals of the Association of American Geographers,* 68:214-32.

Dicken, P. (1976) The multiplant business enterprise and geographical space: Some issues in the study of external control and regional development. *Regional Studies,* 10:401-12.

Felsenstein, D. (1986) *The Spatial Organization of High Technology Industries in Israel.* Jerusalem: The Hebrew University, Institute of Urban and Regional Studies.

Firn, J. R. (1975) External control and regional development: The case of Scotland. *Environment and Planning A,* 7:393-414.

Goddard, J. B. and Smith, I. J. (1978) Changes in corporate control in the British urban system, 1972-1977. *Environment and Planning A,* 10:1073-84.

Gradus, Y. (1984) The emergence of regionalism in a centralized system: The case of Israel. *Society and Space,* 2:87-100.

Gradus, Y. and Einy, Y. (1981) Trends in core-periphery industrialization gaps in Israel. *Geographical Research Forum,* 3:25-37.

Gradus, Y. and Krakover, S. (1977) The effect of government policy on the spatial structure of manufacturing in Israel. *Journal of Developing Areas,* 11:393-409

Hamilton, F.E.I. (1974) A view of spatial behavior: Industrial organizations and decision-making. In F. E. I. Hamilton (ed.) *Spatial Perspectives on Industrial Organization and Decision Making.* London: Wiley, pp. 3-43.

Holland, S. (1976) *Capital Versus the Regions.* London: Macmillan.

Kipnis, B. A. (1977) The impact of factory size on urban growth and development. *Economic Geography,* 53:295-302.

Kipnis, B. A. and Meir, A. (1983) The kibbutz industrial system: A unique rural-industrial community in Israel. In F.E. I. Hamilton and G. J. R. Linge (eds.) *Spatial Analysis, Industry and the Industrial Environment.* Vol. 3. Chichester: Wiley, pp. 463-84.

Lloyd, P. E. and Dicken, P. (1977) *Location in Space.* London: Harper and Row.

Markusen, A. R. and Bloch, R. (1985) Defensive cities: military spending, high technology and human settlements. In Castells, M. (ed.) *High Technology, Space and Society.* Beverly Hills: Sage, pp. 106-20.

Martinelli, F. (1985) Public policy and industrial development in southern Italy. *International Journal of Urban and Regional Research,* 9:47-81.

Massey, D. (1979) In what sense a regional problem? *Regional Studies,* 13:233-43.

Norton, R. D. and Rees, J. (1979) The product cycle and the spatial decentralization of American manufacturing. *Regional Studies,* 13:141-51.

Pred, A. (1977) *City-Systems in Advanced Economies*. London: Hutchinson.

Razin, E. (1988) The role of ownership characteristics in the industrial development of Israel's peripheral towns. *Environment and Planning A*, 20:1235-52.

Schwartz, D. (1985) Effective incentive: The Law for Encouraging Capital Investment. *Economic Quarterly*, 32:12-21 (in Hebrew).

Semple, R. K. and Smith, W. R. (1981) Metropolitan dominance and foreign ownership in the Canadian urban system. *The Canadian Geographer*, 25:4-26.

Shachar, A. S. (1971) Israel's development towns: evaluation of national urbanization policy. *Journal of the American Institute of Planners*, 37:362-72.

Shachar, A. and Lipshitz, G. (1981) Regional inequalities in Israel. *Environment and Planning A*, 13:463-73.

Stephens, J. D. and Holly, B. P. (1981) City system behavior and corporate influence: The headquarters location of U.S. industrial firms, 1955-1975. *Urban Studies*, 18:285-300.

Taylor, M. J. and Thrift, N. J. (1981) Spatial variations in Australian enterprise: The case of large firms headquartered in Melbourne and Sydney. *Environment and Planning A*, 13:137-46.

Taylor, M. and Thrist, N. (eds.) (1986) *Multinationals and the Restructuring of the World Economy*. London: Croom Helm.

Tichy, G. (1984) A sketch of a probabilistic modification of the product cycle hypothesis to explain the problems of old industrial areas. Paper presented at the UNIDO-IGU Commission on Regional Systems and Policies Symposium, Vienna, 20-24 August.

Townroe, P. M. (1975) Branch plants and regional development. *Town Planning Review*, 46:47-62.

Watts, H. D. (1980) *The Large Industrial Enterprise. Some Spatial Perspectives*. London: Croom Helm.

Watts, H. D. (1981) *The Branch Plant Economy: A Study of External Control*. London: Longman.

Westaway, J. (1974) Contact potential and the occupational structure of the British urban system 1961-1966: An empirical study. *Regional Studies*, 8:57-73.

Westaway, J. (1974a) The spatial hierarchy of business organizations and its implications for the British urban system. *Regional Studies*, 8:145-155.

Zilberberg, R. (1973) *Population Distribution in Israel 1948-1972: Results of Population Dispersal Policy*. Jerusalem: Finance Ministry, Authority for Economic Planning (in Hebrew).