The Spatial Pattern of Arab Industrial Markets in Israel

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This paper examines the structure of industrial linkages of Israeli-Arab entrepreneurs, members of an ethnic community at the periphery of contemporary Israel. This case study delineates some of the challenges that ethnic peripheral minorities have to face in their attempts to integrate into late capitalist economies. It begins with the simultaneous construction of the pattern of sales linkages on micro- and macrolevels. In the first stage, based on a GIS application, we decompose the overall pattern of industrial linkages into a number of significant subpatterns, each corresponding to a specific market. In the second stage, we explore the planar representation of a graph of the plants' participation in each of the hypothesized markets. Investigation of this graph discloses the routes of expansion into or withdrawal from the different markets. This methodology provides a basis for studying the relative impact of peripherality and ethnicity on market formation and, thus, on economic development. Our investigation reveals the pattern of operation of a sector that is still highly disadvantaged and distanced from opportunities and resources. Despite these circumstances, Arab industry in Israel has been undergoing a restructuring process since the 1970s. In the course of restructuring, Israeli-Arab entrepreneurs have abandoned their traditional mimicking strategy and begun to show considerable willingness to take greater risks in exploiting any narrow window of opportunity. In their search for markets, Arab entrepreneurs have channeled sales to a wide range of more distant markets, crossing ethnic and regional boundaries. Moreover, even smaller enterprises have shown notable flexibility in choosing markets, and have displayed a remarkable ability to overcome barriers. Arab entrepreneurs, however, have had only limited success in overcoming the barrier of monopolistic strategies exercised by Jewish corporations; moreover, their status as ethnic minority has not helped them in their effort to mobilize government support on their behalf. *Key Words: sales linkages, network decomposition, ethnic markets, plants, participation in markets, ethnicity, peripherality, Arab industry.*

Ethnic entrepreneurship is a frequent focus of discussion in studies of ethnic economic development and interethnic economic integration (Aldrich and Waldinger 1990; Barrett et al. 1996). The intensity and dynamics of inter-firm linkages and networks are recognized indicators of industrial growth, as intensive linkages may generate economic multipliers along with other economic benefits to the local and the regional economy (Scott 1991; Felsenstein 1992). A key issue in these investigations is the degree to which firms are embedded in various markets through their relationships with competitors, suppliers, regional and national business organizations, and public decision-making forums (Best 1990; Harrison 1992; Markusen 1994; Lakshmanan and Okumura 1995).

In the context of interethnic relations, we ask to what extent do ethnic entrepreneurs succeed in developing economic networks with society at large, or, alternatively, to what extent are they limited to intraethnic enclaves? The investigation of economic networks may be relevant for the understanding of entrepreneurial dynamics, as well as for the study of social integration for various reasons. Entrepreneurship is a major route for economic mobility among ethnic minorities. Its success, therefore, may represent a key step toward closing economic gaps with more privileged groups. Economic encounters with other ethnic groups may open new interethnic social networks for their members, and expose them to other worldviews. Interethnic interactions among members of various groups may also break uneven relations in those labor markets where members of marginal groups are generally employed by members of more privileged groups.

Entrepreneurs from ethnic minorities may be affected by two major tendencies, which generally influence the sociospatial structure of economic

relations: spatial inequalities between core and peripheral regions under capitalist regimes, and marginalization of ethnic minorities into segregated enclaves. Our study focuses on ethnic entrepreneurs' expansion into various emerging submarkets in the sociospatial context of ethnicity and peripherality. In this study of the entrepreneurs' behavior, we investigate whether such minorities break barriers of economic development and sociospatial boundaries towards economic take-off and sociospatial integration into society at large. This paper examines the form and degree of Israeli-Arab industrial expansion into new markets, with emphasis placed upon the forms of breaking through sociospatial boundaries. The Israeli-Arab case is an example of the impact of ethnicity and peripherality on marginal groups' economic development and integration into the economies of pluralistic societies. The key question in this context is whether Arab industry in Israel has managed to develop new markets beyond the intrasettlement linkages that characterized it until the late 1970s (Shmueli et al. 1985; Meyer-Brodnitz and Czamanski 1986). If so, to what extent have these enterprises managed to break through ethnic and peripheral boundaries?

To answer these questions, we investigate Arab industrial linkages in Israel as a case study for Arab businesses in general. Historically, Arab urbanization and industrialization in Israel has lagged behind the rest of the country, with production based on cottage industries that supplemented the rural economy. The current form of industrialization has been evolving since the 1970s, after Israel's economy had already shifted to a corporate capitalist system dominated by large Jewish corporations with monopolic or oligopolic power over national markets (Schnell et al. 1995). We could have focused the study on both industrial purchasing and sales linkages, whose intensity and complexity indicate the degree of integration into the national economy. Purchasing linkages seem to show a simple pattern clearly dominated by links with the Jewish metropolitan cores, with the remainder purchased mainly from local Arab agriculture. By comparison, sales linkages are more complex, being characterized by higher degrees of sociospatial integration into the national economy. We focus on industrial sales because industry was a leading branch in the transformation of Israeli Arab settlements from a peasant to urban economy (Meyer-Brodnitz and Czamanski 1986).

The first section deals with the development of Arab industry in Israel and the structural setting of its development. The second suggests a theoretical model of market expansion ruled by industrialization, and is followed by a discussion of the research methods employed in the study. The fourth section analyzes actual industrial sales patterns in the Arab economy at the aggregate level; the fifth analyzes individual plants' forms of participation in the linkage patterns discovered at the aggregate level. We conclude with a discussion of the relative impact of the two sets of structural barriers, ethnicity and peripherality, on market expansion.

Arab Industrialization in Israel

The Arab population of the State of Israel (not including the Palestinian Arabs living in the Gaza Strip and the West Bank) amounted in 1997 to about 1.2 million, or 19 percent of the total national population of some six million. The Arab population is concentrated mainly in three regions in Israel: about two-thirds live in the mountainous region of the Galilee, twenty-two percent in the Little Triangle area at the fringe of the central coastal plain and bordering on the West Bank, and about ten percent in the Beer-Sheba area in the south (see Figure 1 for locations). The rest reside in mixed towns and sparsely populated areas. There are about 130 Arab settlements in Israel, most with a population ranging up to 30,000. One exception is Nazareth, which, with about 60,000 inhabitants, has become the core of an Arab metropolitan area of more than 150,000, as well as the central place for the Arab population in Israel. About half of the total Israeli Arab population lives in urbanizing towns, the majority of which were transformed from rural settlements in the 1960s and now range from 5,000 to 30,000 inhabitants. Population growth dropped from approximately 4 percent annually in the 1950s to approximately 3 percent in the 1990s. Throughout this period, migration rates for most of the Arab settlements remained low.

In terms of integration into labor markets, Israeli Arabs made two major shifts, one during the 1960s and one during the 1970s (Table 1). Between the late 1950s and 1960s, agricultural employment decreased from about two thirds of the workforce to eighteen percent. Those who left agriculture joined "secondary labor markets," primarily construction and services, but also, to
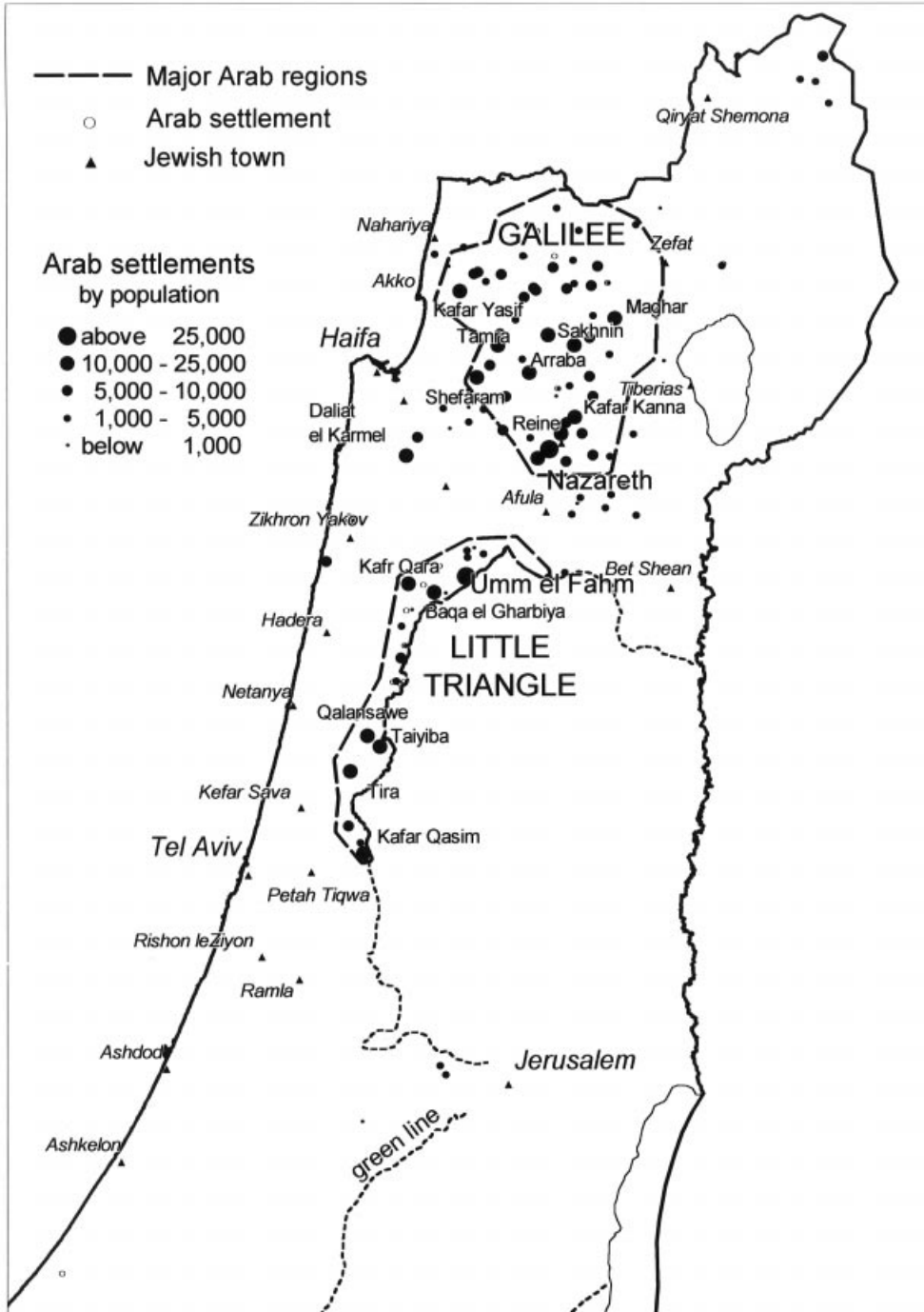
Figure 1. Arab settlements in the Galilee, the Little Triangle, and other regions by population size.

Table 1. Employment Distribution of Israeli
Arabs by Year and Economic Branch (%)

	1954	1961	1972	1986	1994
Agriculture	58.2	42.2	18.4	8.2	4.6
Industry	10.0	16.6	12.5	24.9	23.3
Electricity, water		0.8	0.3	0.5	0.4
Construction	8.5	14.4	26.6	15.6	19.3
Transport	2.5	4.2	7.8	7.1	5.3
Commerce	6.5	6.7	15.0	15.1	13.5
Financing		0.8	2.8	5.0
Public services	10.9	11.8	13.5	19.2	20.1
Personal services	1.6	3.3	5.1	6.6	8.5
Total	100.0	100.0	100.0	100.0	100.0

Sources: Central Bureau of Statistics, 1954–1995.

some extent, commerce within the Arab settlements, and transportation. The second shift took place in the 1970s, when many Arab workers were recruited to organized labor markets, mainly as blue-collar workers in industry and, to some extent, as white-collar workers in public services. Two thirds of the workforce regularly commuted to the metropolitan centers in the national core. Since the 1970s, significant numbers of Israeli Arabs were mobilized into white-collar professions, while some managed to open independent enterprises. Industry made very slow progress until the 1970s, when the number of plants began to grow rapidly.

The Economic Context

Arab industrialization must be understood within its historical context, starting from Israel's war for independence in 1948. The Arab urban sector had been decimated in the war, and the small remaining community was largely rural, restricted to its villages by martial law. The existing production facilities were small, characterized by low levels of capitalization and intensive labor utilization, drawn primarily from the extended family. Most plants were involved in coal and lime production, stone quarrying, olive oil pressing, flour milling, and pottery making.

Soon after independence, the Israeli economy shifted to a state-managed capitalist system in which national capital was channeled to absorb Jewish refugees from the Holocaust and Arab countries and to securing housing and full employment in new Jewish towns. The Arab economy was almost completely excluded from national development plans. Only during the late 1950s did the government remove some of the

martial-law restrictions that channeled more than half of the Arab workforce into commuting to "secondary labor market" jobs in the national core, in branches such as construction, agriculture, low-paying industries, and personal services. The number of Arab workers employed in industry grew to 5,700 in 1955 and 10,900 in 1963. Some 3,500 of these workers were employed by about 1,000 Arab-owned workshops, about 2,000 of them as salaried employees (Zarhi and Achiezra 1966).

Government policies began to incorporate the Arab sector into the national economy in response to the acute poverty manifested by incidences of malnutrition in the villages that were blocked by martial law. National policies were oriented first toward the transformation of Arab peasants into proletarian workers and consumers of the growing Israeli production and, since the late 1960s, toward integration into the national economy as a marginal ethnic sector. These transformations in the forms of Arab economic integration into the general economy, along with the ensuing development of Arab industry, were marked by three phases of restructuring of the Israeli economy, but the impact of these phases on Arab industry was felt only after a certain delay.

During the initial phase (1955–1967), opportunities for industrial entrepreneurship in the Arab sector remained severely limited for several reasons: a lack of capital and professional skills; a lack of experience in a market economy; and, most particularly, the absence of a rudimentary physical infrastructure in Arab communities (Haidar 1993). Risk-minimization strategies induced Arab entrepreneurs to imitate proven successful enterprises and to refrain from investing in areas where other Arab entrepreneurs had failed (Czamanski and Taylor 1986). As a consequence, only three branches—food, woodworking, and construction materials—showed significant growth (Khamaisi 1984). Enterprises in these branches relied on newly emerging local markets stimulated by high fertility rates and sociocultural norms that encouraged young couples to construct their homes before marriage. Given the lack of productive investment opportunities, the capital accumulated by Arab manual workers was largely spent on housing. This gave rise to the establishment of plants geared to the local housing market (Schnell 1994).

After the Six-Day War in 1967, the national economy restructured once more, this time into

a corporate-dominated system (Hasson 1981). During this stage, large corporations, headquartered in the Jewish core, developed production plants in the Jewish periphery, thereby creating jobs for Arab workers in neighboring Jewish towns. By the late 1970s, almost a decade after the transition of the Israeli economy into a corporate one, the conditions for the second phase of Arab economic restructuring emerged. Government policies emphasized the linkage of Arab settlements into national infrastructure networks, as well as the establishment of municipal authorities and educational systems in the Arab settlements. At the end of this phase, most Arab settlements had acquired a basic infrastructure, thousands of Arab workers employed in Jewish-owned firms had gained industrial and professional experience, and Arab educational levels had risen. In addition, women began to join the labor force and sought employment in firms either in their own or in neighboring towns. On the other hand, discriminatory government policies continued to deprive Arab industry of needed resources and opportunities. Spread effects created during this phase were channeled solely to the Jewish periphery, leaving the Arab periphery almost totally dependent on either growth from below or subcontracting for Jewish corporations.

The most significant change during this period was the introduction of textile and clothing plants, managed by Arab subcontractors, employing the large reserves of Arab women who had low geographic mobility. As clothing plants and sewing shops rapidly became the major industrial employers, local labor became largely dependent on these plants for employment. Other branches of industry, such as construction and food, also experienced rapid growth rates, establishing regional markets in the national periphery. Two firms even succeeded in competing in national markets with Jewish corporations, eventually joining the stock market.

If not based on local and regional markets in the periphery, the Arab industries that developed at that stage operated as subcontractors to Jewish-owned textile and food producers, with only a few succeeding to challenge the large corporations. In 1983, Khamaisi (1984) counted 415 plants in Arab settlements. Only one-third of them employed more than ten workers, and the majority were not Arab-owned but were subsidiaries of Jewish-owned plants. More than 40 percent supplied construction material, woodworking,

and metals for construction projects in the Arab settlements; one third were in textiles and clothing; and the bulk of the remainder were in food. In that year, Arab industry (in plants employing at least three workers) employed about 3,000 workers, 70 percent of whom were women.

Between 1983 and 1992, the number of Arab-owned firms employing at least three workers more than doubled, reaching more than 900, with the number of industrial workers employed in Arab settlements rising to about 13,000 by 1992 (Atrash 1993; Schnell et al. 1995). Nevertheless, Arab industry remained marginal to the national economy (Gradus et al. 1993). In 1992, Arab-owned enterprises employing five workers or more represented nearly 5.5 percent of all such factories in Israel, and Arab workers employed in those plants accounted for some 3.2 percent of the labor force in factories (Central Bureau of Statistics 1995). The average size of Arab-owned plants grew from about seven workers in 1983 (Khamaisi 1984), to about fifteen in 1992 (Schnell et al. 1995). Almost all were owned jointly by family members, and only about one quarter were organized as formally registered firms (Table 2). Textile became the leading branch, having the largest number of plants and workers as well as sales per plant. Construction-material plants intensified their production, introducing modern machinery, and branches like woodworking and metal began to diversify their product line. In addition, some new plants arose in more sophisticated branches.

Arab Industrial Space

By the end of the second restructuring phase, Arab industry had infiltrated into most settlements with more than 5,000 inhabitants. Industrial plants were found in some sixty Arab settlements, the majority of which were located within the Galilee and the Little Triangle regions (Schnell 1994). At the level of the individual settlement, five stand out as industrial centers, housing a relatively large number of factories. The large number of plants in Nazareth (seventy-nine) and Umm el Fahm (fifty-two) stems from the status of these cities as the two largest Arab centers in Israel. Baqa el Gharbiya, Tamra, and Yirka succeeded in using their locational advantage in the fringe of the Jewish cores to expand

Table 2. Selected Characteristics of Arab Plants in 1992

Economic Branch	Percentage of Plants	Percentage of Plants Organized as Registered Firms[a]	Average Number of Employees per Plant	Percentage Age of Plants with Annual Sales of + $150,000[a]
Food	19	1	5.8	8
Textile & clothing	26	28	36.7	37
Woodworking	17	6	5.5	15
Construction materials	17	29	10.2	35
Metals	8	4	6.2	11
Printing	5	0	3.8	4
Rubber & plastic	6	13	6.0	9
Others	2	17	20.0	17
Total	100			

[a] All plants within branch taken as 100 percent.
Source: Schnell et al. (1995).

their markets to the surrounding Jewish vicinities (Figure 2).

The second phase of restructuring was also characterized by expansion into new markets. This became possible when Arab entrepreneurs began to adopt the mechanisms for financial planning and marketing commonly employed in the Jewish sector. In addition, the introduction of new technology, better quality-control mechanisms, and responses to the changing pattern of demand in the Jewish sector improved Arab competitiveness (Sofer et al. 1995). Falah's (1993) study suggests that, as late as 1988, markets were still drawn mainly from local and neighboring Arab towns. Unfortunately, his nonexclusive categories do not enable clear identification of the distribution of meaningful submarkets, although a significant number of plants seem to have started to develop more complex markets on a broader regional basis.

Currently, a new phase of economic restructuring is taking place in Israel, characterized by flexible or global production (Hagey and Malecki 1986; Storper and Scott 1989; Amin and Robins 1990; Digiovanna 1996). So far, its impact on the Arab economy in Israel is limited due to the closure of about half the textile plants in Arab towns during the last two years and their relocation in Jordan, Egypt, and the Palestinian authority. As a consequence, unemployment has dramatically risen in Arab textile-oriented settlements. At this stage, it is too early to foresee any new directions in Israeli-Arab industry.

Sales Linkages of Peripheral Ethnic Groups

In this paper, we investigate the sociospatial patterns of sales linkages as they emerged during the 1990s (second phase of restructuring) into a corporate capitalist system. Like other minorities, Israeli-Arab entrepreneurs compete from an inferior position for their share in the marketing chains. Their marginalization is also reflected in their location in the national sociospatial periphery. We argue that the theory of ethnic economies may best explain the formation of Israeli-Arab industrial linkages. But since Israeli-Arab entrepreneurs are forced to operate as a peripheral minority, theories of market linkages under the capitalist space economy may supplement that explanation by bringing new insights to the understanding of their structures of opportunities. This section analyzes the impact of ethnicity and peripherality on the pattern of sales opportunities. Based on this analysis, we then construct a conceptual model of Arab markets in Israel.

The Structure of Ethnic Markets

The theory most relevant to ethnic economies appears to be that of ethnic entrepreneurship. The "ethnic enclave" version of this theory argues that ethnic economies call for the development of detached, self-supporting economies that generate a variety of inputs and outputs within themselves.
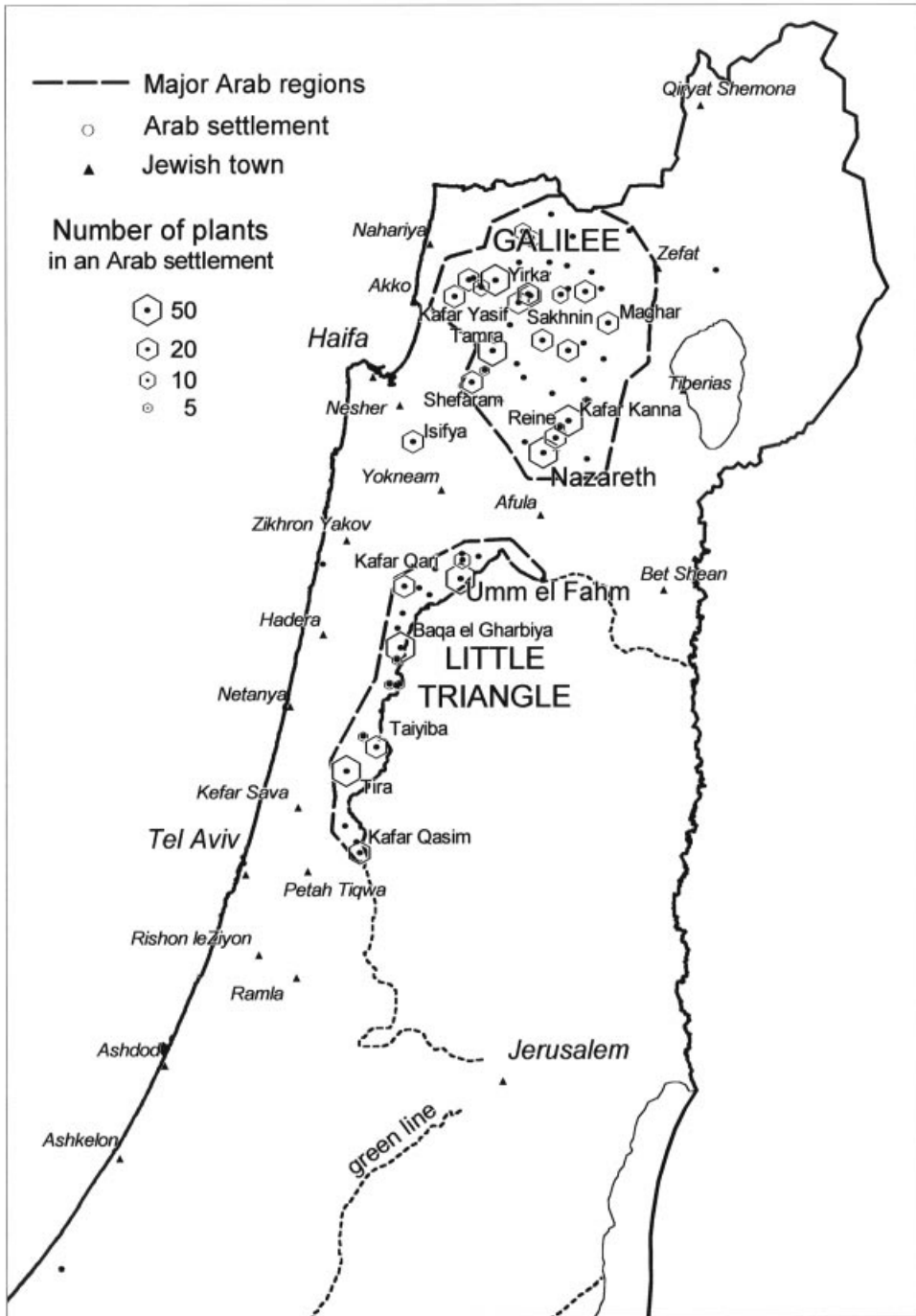
Figure 2. Number of Arab-owned plants in the studied Arab settlements.

Profits and earnings are ploughed back into the ethnic community, producing multiplier effects as firms and earners buy from intraethnic suppliers (Waldinger 1993). Different studies have shown mixed evidence for the ethnic-enclave hypothesis. Some studies have concluded that enclave economies do emerge and that they are beneficial to ethnic communities (Portes and Jensen 1989; Jensen and Portes 1992; Zhou and Logan 1989). Other studies have questioned the benefits of limited and deprived enclave economies to ethnic communities (Nee and Sanders 1987; Sanders and Nee 1992). Studies of ethnic entrepreneurship, however, rarely analyze the structural context in which ethnic industries develop (Barrett et al. 1996). Aldrich and Waldinger (1990) suggest a theoretical framework that incorporates structural aspects into a theory of ethnic economies and entrepreneurship. They stress the impact of three major factors on the degree and types of ethnic entrepreneurship. First, there is the "opportunity structure" as formed in a historical context and by political decisions. Forms of capitalist accumulation are an example of such a factor, one that may structure selective opportunities on both sides of the ethnic divide. Second, access to enterprise ownership may channel ethnic groups either to low-reward enterprises or to a segregated ethnic economy, depending upon the degree of interethnic competition. Third, ethnic-group characteristics may steer the group's orientation toward entrepreneurship.

Two ethnic forces, cultural and social, seem to affect ethnic entrepreneurs in their choice of markets. From the cultural point of view, entrepreneurs on both sides of an ethnic divide tend to operate in different business cultures. Therefore, members of the marginal group are typically disadvantaged in interethnic markets because they are forced to adapt to the dominant business culture. This may result in mounting difficulties, which must be overcome in order to establish business connections among bodies on the two sides of the ethnic divide (Camagni 1991; Ratti 1992). From the social point of view, members of a minority group may be marginalized and even excluded from certain markets as a result of racism (Miles 1989) and the tendency of dominant groups to split and control lower-class workers (Webber et al. 1991). In response, ethnic minorities may enhance social solidarity—that is, a spirit of mutual trust, cooperation, and collective self-help—as a facilitator of ethnic-enterprise development (Light 1984; Light and Bonachich 1988).

Ethnic entrepreneurs may use this sense of solidarity to enlist production factors, such as labor, capital, management, and markets, from more accessible internal sources (Aldrich and Waldinger 1990).

With respect to ethnic barriers, following Jones et al. (1992), we can identify four marketing categories according to the size of the markets' hinterland (local and nonlocal) and to ethnic boundaries (intraethnic or Arab, and interethnic or Arab-Jewish):

- *Local intraethnic markets.* According to "ethnic enclave theory" (Semyonov and Lewin-Epstein 1993), local intraethnic markets may develop as a minority's reaction to interethnic communication rifts and to marginalization processes. Such markets rely on intraethnic resources, often reducing the risks inherent in entrepreneurship. In line with this theory, local intraethnic markets may provide the solid foundation necessary for ensuring the survival of the business and, by doing so, make it possible for entrepreneurs to take the calculated risks attendant upon penetration into new markets beyond the intraethnic system.
- *Local interethnic markets.* Such markets may develop as a strategy for expanding beyond the limited ethnic markets in the entrepreneurs' vicinity (Ward 1985). This is achieved by concentrating chiefly on low-order firms unattractive to majority entrepreneurs. In this way entrepreneurs can better compete due to the absence of monopolistic competition. Thus they are able to reduce their risks while fighting to overcome the resistance of the more demanding, yet rewarding markets outside the ethnic enclave (Jones et al. 1993). Entrepreneurs from ethnic minorities may also try to reduce risks by operating as subcontractors for larger corporations owned by members of the majority (Roberts 1978, 1996).
- *Nonlocal intraethnic markets.* Such markets may develop when ethnic barriers remain durable while economic opportunities grow within ethnic markets elsewhere. In this case, an autonomous ethnic economy may emerge, possibly including high-order firms and wholesalers supplying that economy. In addition, entrepreneurs may use ethnic solidarity in order to create multiplier effects within the ethnic economy, both for their own interests as well as for their group's workforce.
- *Nonethnic nonlocal markets.* These markets may emerge when potential markets are unbounded (Jones et al. 1993). In this case, entrepreneurs

may access any available market with no spa-
tial or ethnic limitations, and thus achieve
higher integration within the larger economy.
Ethnic economies have been studied, in most
cases, in the context of immigrants who settled
within the inner cities of large metropolitan cen-
ters in more developed countries. In contrast,
Arab industry in Israel has had to face the chal-
lenges of entrepreneurship and market expansion
from the national periphery. Furthermore, Arabs
are required to make efforts to integrate into the
national economy from their position as an in-
digenous underdeveloped minority. Previous
studies have shown that Arab white-collar work-
ers and entrepreneurs gain status advantages
within their Arab-sheltered economy. In con-
trast, salaries in jobs within the Arab economy
remain somewhat lower than in interethnic labor
markets. In addition, several studies show that
Arab entrepreneurs tend to search for inter-
ethnic economic networks (Semyonov and
Lewin-Epstein 1993; Schnell et al. 1995). These
contradictory results, as well as the unique posi-
tion of Israeli Arabs as a peripheral ethnic minor-
ity, call for an analysis of the structural impacts of
peripherality on Arab sales markets.

**The Structure of Market Linkages of Firms
in the Periphery**

Location in the national sociospatial periphery
may place an added economic burden on ethnic
entrepreneurs. Within socioeconomic space, dis-
tance from large markets and complementary
economic activities upon which the functioning
of the plant depends obviously reduces opportu-
nities. Moreover, remoteness from economies of
scale, from information on market conditions,
and from the business infrastructure dedicated to
evaluating opportunities may block growth op-
portunities even further (Pred 1977; Van Geen-
huizen and Nijkamp 1995). Peripheral industries
found in the early stages of integration into a
capitalist economy tend to suffer from a lack of
risk-reducing mechanisms. As a consequence,
entrepreneurs find it almost impossible to take
risks necessary in competing with capital-inten-
sive corporations. In many cases, only govern-
ment intervention can create a risk-reducing
entrepreneurial milieu (Grossman 1984). Given
the lack of risk-reducing institutions, entrepre-
neurs may adopt a mimicking behavior strategy—
that is, they may tend to imitate successful ven-

tures in their surroundings. This strategy leads to
the opening of a large number of similar small
enterprises that make do with the low profits
afforded by limited local markets (Czamanski and
Taylor 1986).

Once such entrepreneurs gain some en-
trepreneurial experience and succeed in breaking
local barriers, their development routes may be
channeled by the large corporations which domi-
nate capitalist production. Industries in the pe-
ripheral areas of corporate capitalist economies
tend to expand into marketing chains in a clear
spatial division of functions. The first types in-
clude large plants characterized by labor-inten-
sive mass production of inexpensive standardized
products for national markets. Here, most sales
are directed to the sizeable markets located pri-
marily in large metropolitan core areas. The sec-
ond type includes small businesses existing
alongside larger enterprises. These plants mainly
manufacture intermediate products which consti-
tute inputs for the larger enterprises in their regions,
or serve the demand created by the local end-users.
Most products from these plants are thus sold within
the peripheral region itself (Felsenstein 1992).

The literature contains an ongoing discussion
of a more complex pattern of markets that may
appear in economies displaying a shift towards a
flexible form of production and capital accumu-
lation (Hagey and Malecki 1986; Storper and
Scott 1989; Amin and Robins 1990; Digiovanna
1996). But these new developments, which have
hardly affected Israeli-Arab entrepreneurship,
are beyond the scope of our analysis.

A Conceptual Model of Arab Markets

It would thus appear that ethnicity and
peripherality may place cumulative burdens on
the processes of industrial growth and market
expansion (Schnell et al. 1995). Both factors tend
to channel sales towards a set of sociospatially
structured submarkets. Peripheral ethnic entre-
preneurs, whose plants are in the initial stages of
integration into capitalist systems, tend to sell
mainly to local intraethnic markets. In later
stages, after either ethnic or peripheral barriers
are broken, they may expand into nonlocal, more
complex markets. While the discussion on ethnic
economies has emphasized the dichotomy be-
tween local and nonlocal markets, the discussion
on peripherality subdivides nonlocal markets into

regional and national markets, either in the core or in the periphery, and international markets.

These developments may take place in intra- or interethnic spaces. When ethnic and peripheral barriers are difficult to overcome, plants may expand into regional spaces within the ethnic enclave and the national periphery. Regional markets may follow either the middle-person model (Ward 1985) or an integrative model. Where peripheral barriers are breached, plants may expand into national markets dominated by sales to the national core. Where ethnic barriers are broken, interethnic markets may develop on regional, national, and international scales.

A schematic model of the possible markets of peripheral ethnic minorities is offered in Figure 3a. Two factors, the capitalist space economy and ethnicity, determine a division of potential markets into four sections, each subdivided into a number of scales. In applying the general model to the case of Arab industry in Israel (Figure 3b), several patterns can be recognized. Historically, Israeli Arabs have relied on mimicking strategies and local intraethnic markets. It is only since the 1980s that an increasing number of Arab enterprises have begun to reach out to new, more demanding, and riskier markets. At present, the mode of industrial growth and the newly emerging markets are determined by two forces, each of them associated with specific spatial patterns: first, ethnicity may divide space into Arab versus Jewish markets; and second, the capitalist space economy may divide into core versus peripheral regions. Each of the peripheral and core markets may be subdivided into growing ranges of submarkets (Figure 3a). Some of the hypothetical markets, however, are irrelevant for Arab industry in Israel, where all local markets are Arab, and all core markets are Jewish by definition. In addition, all the Arab settlements' home regions are located in the national periphery. Therefore, the application of the general model to the specific case of Arab markets in Israel produces nine possible markets (Figure 3b). We now examine which of the hypothesized routes of market expansion Israeli-Arab industrial entrepreneurs have actually followed since the 1980s.
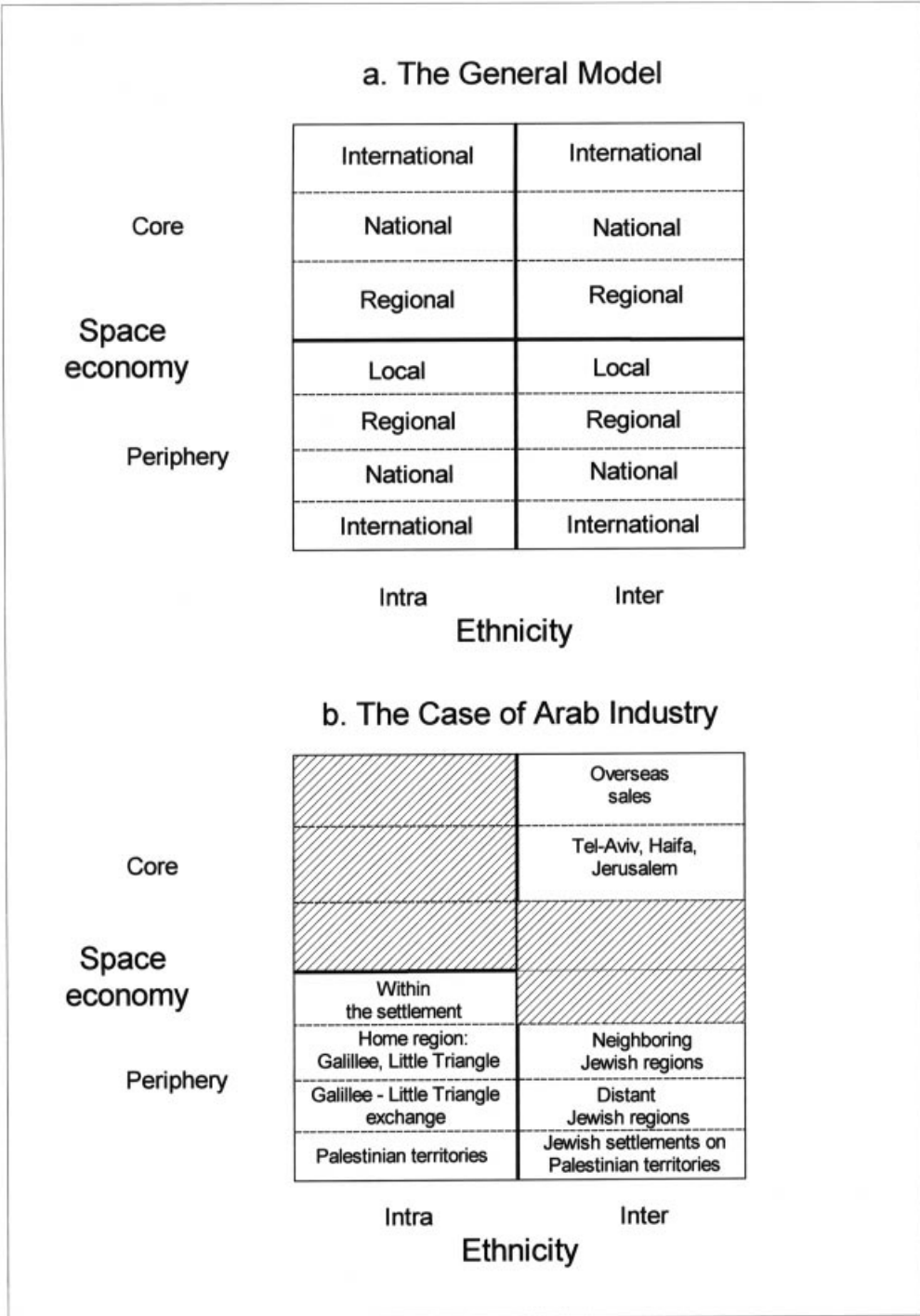
Research Methods

Our analysis of the pattern of Arab industry in Israel decomposing it into subpatterns along ethnic and spatial economic dimensions raises three research questions. First, into which of the nine theoretically deduced submarkets (Figure 3b) did Israeli-Arab entrepreneurs manage to expand in practice? Second, is it possible to distinguish among types of enterprises according to the number of markets into which each of them expanded, and the order of expansion into these markets? Third, to what extent did entrepreneurs break ethnic and peripheral barriers, thus enabling them to expand into interethnic and interregional markets, and exploiting opportunities in an increasing number of sections of the Israeli economy? In answering these questions, we have adopted a methodology that makes use of the flexibility of GIS-based data analysis. We have avoided a deductive approach, which limits us to the consideration of a priori, theoretically deduced hypotheses. Instead, the visualization methodology we suggest here may allow the recognition of new sales patterns and the identification of new explanatory factors.

Sample

A sample of Arab settlements and enterprises was surveyed in 1992 within the context of an extensive study of Arab industry and industrial enterpreneurship in Israel (Schnell et al. 1995). An Arab enterprise was defined as any plant, directly owned by Arabs, that acted as a production unit employing at least three workers. Of the 900 Arab-owned enterprises operating in 1992, the managers and owners of 514 plants (57 percent of the total) were interviewed. These respondents were located in thirty-five of the sixty-one settlements having industrial plants. This included 80 percent of the settlements in the mountainous Galilee and the Little Triangle regions (Figure 1). Settlements in other areas, and several settlements in the Galilee and the Little Triangle with less than seven plants each, were excluded from the sample because industry was marginal to their economy. In most of the thirty-five settlements all the plants were surveyed, except in the four largest ones, i.e., Nazareth, Shefaram, Taiyibe, and Um el Fahm, where we conducted a random sample. In Nazareth, which contains the largest amount of plants, the survey covered 25 percent of the total, while in the other three settlements 70 percent of the plants were included in the sample. For the aggregated analyses, the data for these settlements were weighted by a factor determined by the size of the sample.

a. The General Model

	Intra	Inter
	International	International
Core	National	National
	Regional	Regional
	Local	Local
Periphery	Regional	Regional
	National	National
	International	International

Intra   Inter

Ethnicity

b. The Case of Arab Industry

	Intra	Inter
Core	/////	Overseas sales
	/////	Tel-Aviv, Haifa, Jerusalem
	/////	/////
	Within the settlement	/////
Periphery	Home region: Galillee, Little Triangle	Neighboring Jewish regions
	Galillee - Little Triangle exchange	Distant Jewish regions
	Palestinian territories	Jewish settlements on Palestinian territories

Intra   Inter

Ethnicity

(Left axis labels: Space economy / Core / Periphery)

Figure 3. A schematic model of the theoretically deduced market patterns: a. the general model considering the effect of space economic and ethnic structures of the market; b. the specific case of Arab industrial markets.

The survey was comprehensive, including data on the origin of inputs, the destination of outputs, and related characteristics such as sector and product line (Schnell et al. 1995).

Data Analysis

The data were analyzed in two stages, each of which responds to one research question. First, the pattern of all sales from all the settlements was decomposed (broken down) into a number of subpatterns, each corresponding to a common type of destination (e.g., metropolitan cores). Each subpattern was associated with a different market. Second, groups of plants, participating in common configurations of submarkets, were analyzed in order to investigate the entrepreneurial routes of expansion and subtraction of markets. In the final part of the investigation, we analyzed the relative impact of the two structural forces—namely, ethnicity and space economy—on the emerging pattern.

The first stage of decomposition seeks to overcome the fundamental problems of hypothesis formation encountered in interpreting a complex structure of industrial linkage patterns. The decomposition was performed with a GIS-based methodology. The application of ArcCAD GIS, designed by the authors, allows an interactive recurrent tabulation of the industrial linkages and presentation of results as a "table of maps" (Benenson et al. 1996, 1998). The decomposition process is similar to conventional methods of cross-tabulation and residual analysis. The basic unit of analysis is a sales *link* established between the settlement of origin and the settlement of destination. What differentiates ours from the conventional approach to cross-tabulation is how the units are classified and the manner in which the set of observations (links) that fall into each cell of a "table of links" are exhibited and characterized. When classifying numerical observations, we characterize the cell data by their mean, variance, row/column/cell frequency, etc. When we classify links, the links of a table cell constitute a specific linkage subpattern that can be represented on a map. Instead of comparing cells' statistics by means of standard statistical methods, we rely on the flexibility of human visual interpretation of maps to discern the patterns in the cells.

The overall pattern of industrial sales links is decomposed in the recursive procedure shown in Figure 4. First, at each step of the recursion, (an)

ad hoc factor(s) that can influence the pattern of sale links is (are) hypothesized. Second, the links that belong to an inscrutable part of the sale relations are tabulated according to the factors' classes. Third, if any shared meaningful pattern is recognized in the cells of the same row or column of a table, it is extracted. Fourth, a statistical analysis is performed on the extracted pattern, in order to further analyze its structure. The next step of the recursion proceeds with the residual set of links. The analysis can reach a dead end if, at some step of the recursion, no common pattern is identified for the selected factor(s). In such a situation, the process can be restarted from one of the previous steps, with (a) new factor(s) and a different path followed. This approach is employed below to decompose the pattern of sales linkages identified in our sample into a number of simpler components.

At the first stage of the analysis, we identified five subpatterns associated with each market. The analysis at the second stage is based on these results. The basic unit of analysis at this stage becomes a vector that represents a plant's participation in these markets. We call this vector a "plant's market profile." The profile is a Boolean vector with the number of components equaling the number of submarkets discerned, and each component designating expansion into a certain market. To understand the evolution of the individual plants within the set of markets, as well as the development of the markets themselves, we use Partial Ordinal Scalogram Analysis (POSA) (Guttman 1968). The conclusions concerning market development are based on the assumption that a decision to enter or to withdraw from a market is made by the entrepreneur in a prestructured milieu. Therefore it is highly feasible that such decisions are repetitive and follow the existing structure of markets. POSA unravels common paths of market entry and withdrawal. It operates with a graph of "market relations" on which the nodes correspond to profiles and are arranged in descending order according to the number of markets in which the plants participate. The lowest level consists of nodes corresponding to one-market profiles, the preceding one of two-market profiles, etc. The edges of a graph connect nodes of adjacent levels only; two nodes are connected if the profile on the upper level includes all markets on the lower level. The aim of POSA is to construct a "scalogram," that is, to represent a graph of market relations in a *planar* form.
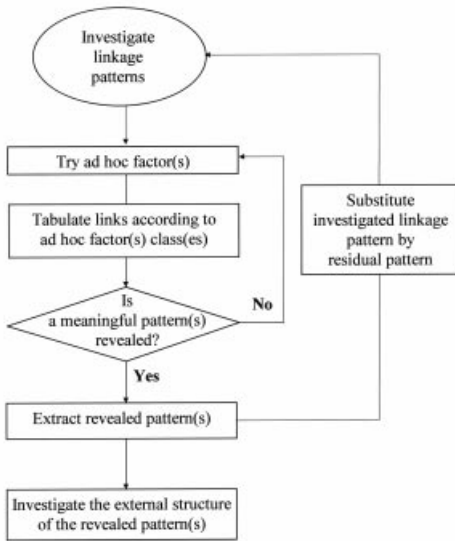
Figure 4. A flow chart describing steps in the analysis of spatial network patterns.

In general, the question of whether a scalo-gram (i.e., planar presentation) can be constructed for a given graph is a complicated mathematical problem (Harary 1969). The graph of market relations we analyze in this paper (i.e., Arab plants) cannot be represented in such a fashion. For this more complex situation, we consider the "most planar" presentation of a graph of relations, that is, we arrange the nodes in such a way that the number of intersecting edges is minimized. In consequence, we are able to obtain a representation of the graph of market relations that is very close to planar. The resulting extended scalogram displays the expansion or withdrawal of individual plants from the respective markets (Lingoes 1973). Based on the scalogram, we can conclude the second stage of the investigation with an analysis of the plants' breakthroughs into interethnic and interregional markets.

Decomposition of Sales Linkages Patterns

The goal of this section is to unravel the markets that Israeli-Arab enterprises are utilizing. We start the analysis from a map that presents the overall pattern of industrial sales from Israeli-Arab-owned plants (Figure 5). It is worth noting here that links within settlements have zero length at the chosen scale and, thus, are represented on the map as points.

The initial map is too complex to be visually interpreted, and thus requires decomposition into simpler submarkets. In the decomposition, we investigate how many submarkets Israeli-Arab enterprises actually participate in out of the nine hypothetical markets derived by the theoretical operationalization of ethnicity and peripherality (Figure 3b). We conclude the decomposition procedure with five recursions, corresponding to the five actualized markets plus a few residual sales links. Figure 6 summarizes the investigation of market patterns. While the detailed description of each recursion is described later, it may be concluded here that four patterns of linkages describe 95 percent of all the sales destinations. An additional 3 percent is directed towards interregional destinations, and the other four possible markets attract the remaining 2 percent.

We turn now to each step of the decomposition recursion. As described above, each step involves cross-tabulation of the linkages according to ad hoc hypothesized factors. At the first stage, using the ArcCAD application, we test a number of factors such as age of the plant, its location, and distance from metropolitan centers. The first selected pair of factors, which entails a coherent pattern in the cells of a classification table, consists of industrial branch and firm size (measured by volume of sales). The choice of these factors is based on the common-sense hypothesis that larger plants have better opportunities to expand into wider markets outside their settlements, and that the chosen markets may be dependent on product characteristics. In the resulting table of linkage patterns identified at stage 1 (Figure 7), the rows correspond to industrial branch and the columns to three categories of annual sales volume: (1) < \$150,000, (2) \$150,000–750,000, and (3) > \$750,000. In this and the following figures, the link is expressed by a line connecting the plants' settlement with the sales-destination settlement. This line has a width of zero at the origin, broadening in proportion to the value of the sales volume at the destination.

Visual analysis and comparison of linkage patterns in the first step of the decomposition recursion (Figure 7) yields coherent patterns in all three cells of the textiles and clothing branch
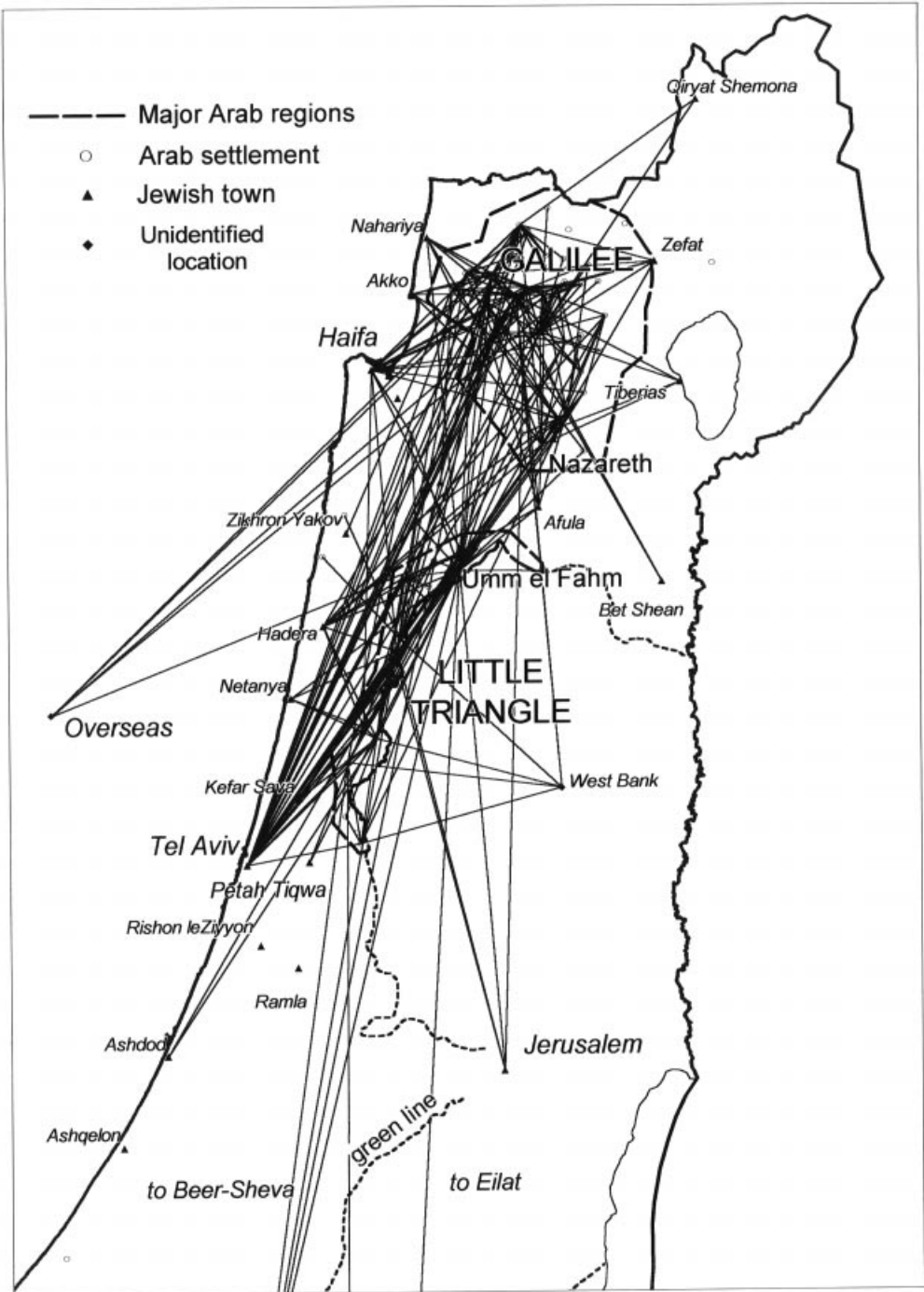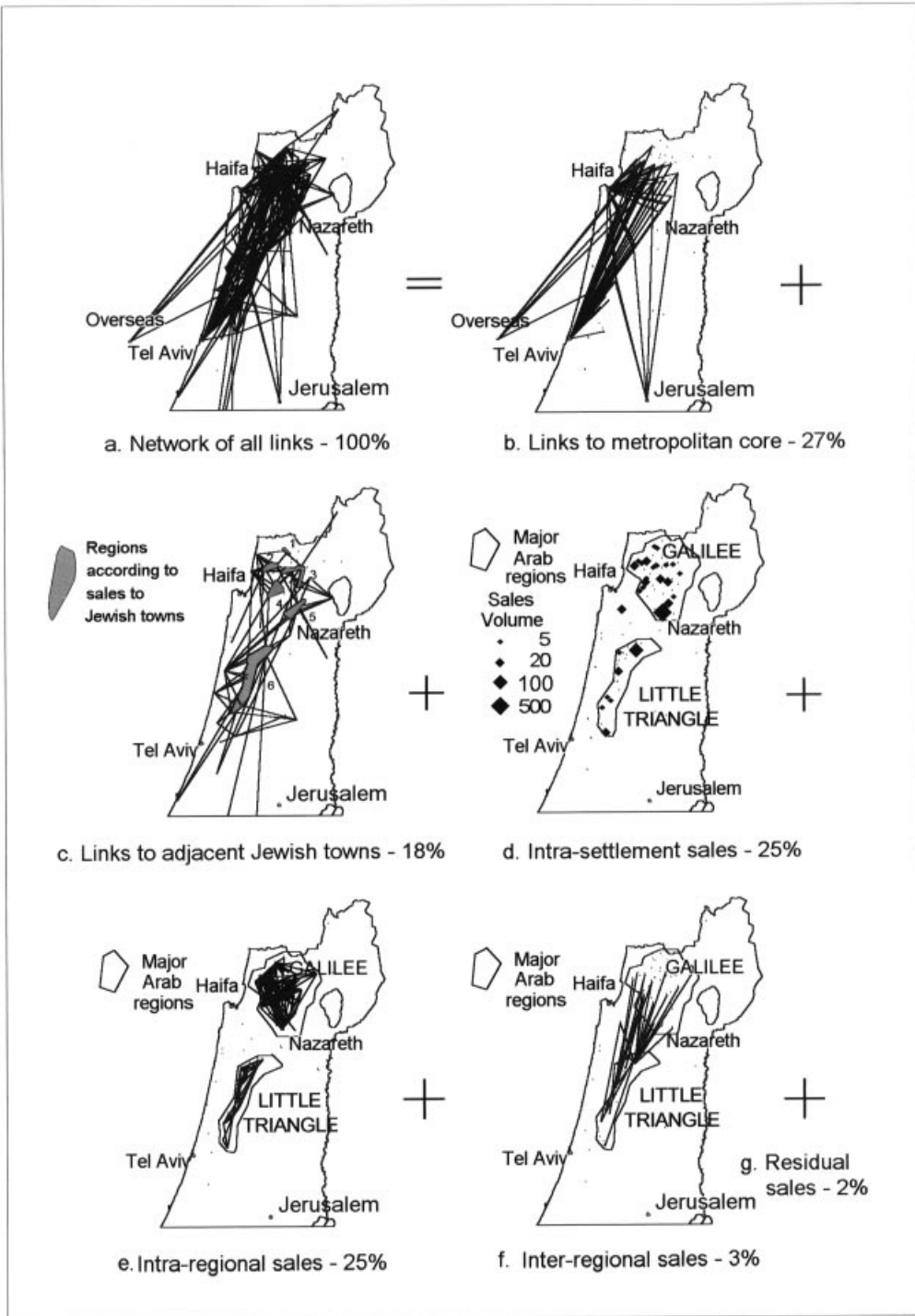
Figure 5. The spatial distribution of all sales linkages. The map emphasizes the complexity of the distribution to a degree that no clear pattern can be identified.

Figure 6. Decomposition of the sales linkages into the five major Arab submarkets and the distribution of sales among these markets (%).

(Figure 7, upper row). All three subgraphs, regardless of plant size, follow the same basic pattern distinguished by sales to the Jewish-dominated metropolitan areas of Tel Aviv and Haifa, and overseas. This can be explained by the fact that most Arab-owned textile and clothing plants operate as subcontractors for large Jewish-owned companies in these metropolitan areas. Even larger plants have failed to free themselves from Jewish corporations in order to develop independent markets. The significance of the aforementioned pattern is demonstrated by the rate of sales to the Tel Aviv and Haifa metropolitan cores, to Jerusalem, and to destinations abroad, which accounts for 89.9 percent of the total sales volume of this branch. But two other observations can be read regarding this industry. First, an increase in the size of the industrial operation, as identified by the volume of sales, is accompanied by an increase in the percentage of exported output. Second, as the size of the industrial operation grows, Haifa diminishes sharply in importance, leaving Tel Aviv and overseas as the two principal destinations. We may conclude that textile subcontractors hardly contribute to local and regional markets while they remain obligated to produce for corporations in the Jewish national core.

Smaller and medium-size plants in the woodworking and food branches do not display a clear sales pattern (Figure 7, middle rows), but in the case of the larger plants there appears to be a pronounced trend of sales to Jewish metropolitan areas. Viewed separately, food industry factories with large sales volumes have high-intensity links with the Tel Aviv metropolitan area, whereas for the woodworking industry the stronger links are with the Haifa metropolitan area. Therefore, the aspect identified in the first recursion step by a visual inspection of Figure 7 is the existence of a sales pattern defined by Jewish customers located in the metropolitan areas (as emphasized by Figure 6b). This is also characteristic of textiles and clothing enterprises. These sales to the Jewish core account for 27 percent of the total sales of Arab industry in Israel.

The remaining maps in Figure 7 present more complex patterns that call for a second step of decomposition recursion. Some hints for a new pattern may be seen in the sales of construction material plants (Figure 7, lower row), the second largest branch in the Arab industrial sector. This new pattern is characterized by sales to Jewish towns. Proceeding to the second recursion step, we analyze only the residual pattern obtained by

excluding the sales links to the destinations of Tel Aviv, Haifa, Jerusalem, and overseas from the overall pattern presented in Figure 5. By tabulating links of the residual pattern against various ad hoc factors, the trend of sales to adjacent Jewish regional centers and their hinterlands becomes visually more evident (Figure 6c). This is especially apparent when links are tabulated according to two factors: a two-class factor termed "ethnicity of the customer" (Jewish or Arab); and sales volume, divided according to the same three categories employed above. Twenty-one Jewish towns, of which seven were particularly dominant (the towns of Tiberias, Afula, Nahariya, Akko, Hadera, Netanya, and the towns of the Sharon represented on Figure 5 by Kefar Saba) were found to purchase 18 percent of all plant production in the four major branches. As visually represented, most of these sales are directed to adjacent towns and their vicinity. Moreover, neighboring Arab plants seem to be grouped by a common sales destination to Jewish towns. This finding was further studied by verifying the clusters of Arab plants according to a predesignated set of Jewish customers.

The cluster analysis was performed at the settlement level by merging the sales of plants located in each. A settlement was then characterized by a vector demonstrating the volume of sales of its plants to customers in Jewish towns. The number of total components of this vector was equal to the number of destination settlements, i.e., 21. Each component represented the flow of sales of all plants in a given settlement to a specific destination. In order to reveal the clusters, we proceeded with the SPSS/PC statistical package clustering procedure with a φ^2 measure of proximity between the two sales vectors (Norcliffe 1977). Six clusters of Arab settlements emerged from the analysis. They represent six compact regions of Arab settlements, each of which is composed mainly of neighboring settlements, the sole exception being Maghar, which belongs to the region of Nazareth instead of Saknin. The plants located in the settlements of a given cluster sell to customers in the same Jewish towns. For example, the enterprises in the region consisting of Yirka, Kafar Yasif, Judeida-Makr, and Julis in the Western Galilee, sell most of their products to the adjacent Jewish towns of Akko and Nahariya. In the same manner, the plants located in the settlements of the Little Triangle sell most of their products to their Jewish neighboring towns of Hadera, Netanya, Kefar Sava,
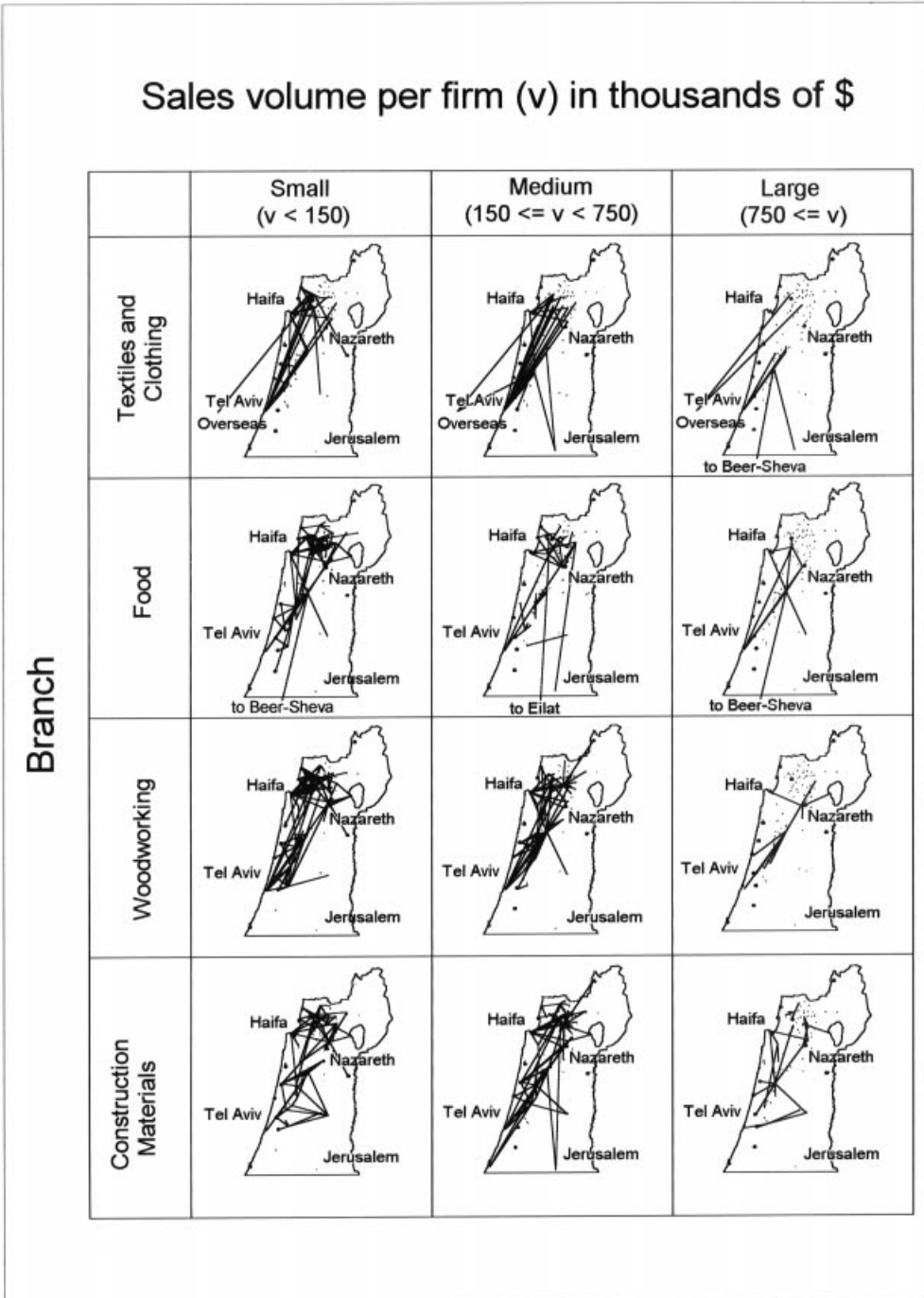
Figure 7. The spatial distribution of sales linkages of plants by major branches and sales volume in dollars.

and Petah Tiqwa. The analysis of the second recursion exposes an interethnic market arranged around six Arab regional settlement systems selling to Jewish markets within their home regions. These sales amount to 18 percent of the total.

In the third step of decomposition recursion, we explore the sales pattern obtained after the links to Jewish metropolitan cores and to Jewish neighboring towns are extracted. The residual pattern consists of links among and within Arab settlements. The pattern of links within settlements is quite significant, accounting for some 25 percent of total sales (Figure 6d). After being extracted, the residual sales are expanded in the fourth recursion into links between the Galilee and the Little Triangle (Figure 6f), and sales within each of these two regions of Arab industry (Figure 6e). Interregional intraethnic sales between Arab regions comprise about 3 percent of total sales, 85 percent of which are from the Little Triangle to the Galilee, with only 15 percent in the opposite direction. Most of these intraethnic interregional linkages exist among the larger settlements, particularly Umm el Fahm and Baqa el Gharbiya in the Little Triangle, both of which sell to several towns in the Galilee. The regional factor further divided the residual network into two regional markets: the Galilee in the north and the Little Triangle in the south. These intraethnic regional markets add 25 percent to the total sales (Figure 6e). We halted the analysis at this stage because we could not discern, either visually or with the help of cluster analysis, any pronounced patterns of sales within these two regions.

At this point, it could be concluded that, of the nine theoretically deduced patterns suggested by Figure 3b, five were actually identified in Arab industry in Israel (Figure 6). The most frequent are sales to Jewish metropolitan core areas, then to intraregional and intrasettlement markets, followed by Jewish markets in neighboring regions. One market (interregional, intraethnic) remained only marginal, with a mere 3 percent of total sales. The last three markets indicated by Figure 3a (Palestinian territories, Jewish settlements in Palestinian territories, and distant Jewish regions) remained insignificant, accounting altogether for only 2 percent of the sales linkages (Figure 6g).

The major conclusion to be drawn from the analysis in this section is that since the 1970s and even more since the 1980s, Arab plants have succeeded in expanding into new markets beyond the local ones previously penetrated. By 1992,

they had already expanded into five of the nine possible markets. Although half of the linkages are still within intraethnic local and regional markets, this major part of the remaining linkages (45 percent) indicates a preference for expanding into interethnic markets instead of expanding into Arab markets in Israel and the Palestinian authority.

Plant Participation in the Different Markets

In this section, we analyze the configuration of participation in the five different markets identified in the former section, and the order in which entrepreneurs add or subtract markets. Unlike the above analysis, in which the basic unit was a sales link, in this section, we focus on the plant as the basic unit of analysis and ask what types of market configurations different plants create for themselves. A number of suggestions may be formulated regarding the order in which a given plant adds or subtracts each of the five actual markets identified in the analysis. It may be hypothesized that smaller and younger plants participate mainly in local markets, being more vulnerable to structural barriers, while larger plants participate in a greater number of broader markets because they are more successful in breaking interregional and interethnic barriers. These and similar hypotheses are tested and the association between plant turnover and the form of participation in the respective markets is analyzed.

Each plant in the POSA is characterized by a "participation profile," which depicts participation in the five markets differentiated above. We present the results of the POSA in two scalograms, one for textiles and clothing-market expansion alone and one for the other branches. The reason is that textiles and clothing firms, unlike other branches, are highly dependent on links to the national core. While the scalogram for textiles and clothing is simple and planar (Figure 8), that for the other branches is complex, although approaching a planar form. We succeeded in arranging 91 percent of the plants in a planar order, or 99 percent in the close-to-planar order, with only three pairs of edges intersecting (Figure 9).

The number of all possible participation profiles for plants with five potential markets equals $2^5 - 1$ or 31. In practice, twenty forms of participation profiles were identified, with two thirds of

the plants characterized by only four profiles. This means that most Arab plants in Israel expand into those markets in a few well-structured ways. The most frequent profile, presented in Figure 9, represents 112 plants that sell to customers within both the settlement and the home regional market (**000HS,** n=112). The second most frequent profile, which differs from the first by adding the neighboring Jewish markets to the two former markets, is practiced by eighty-eight plants (**0J0HS,** n=88). The planar scalogram for textiles and the near-planar one for the other branches highlight five (nonexclusive) structured trends of market expansion and withdrawal. They are represented in Figures 8 and 9 by arrows of different shapes and intensity. The first trend characterizes the textiles and clothing industry (sixty-two plants). Seventy percent of these enterprises, including the larger plants that act as subcontractors for large corporations in Israel, sell only to metropolitan markets (Figure 8, profile **M0000**). No other profile dominates textile plants' market configuration.

For the other branches, the form of participation ranges between expansion to more distant markets and narrow sales to markets in the plant's vicinity (Figure 9, broad continuous line). The simplest form of participation concentrates on local markets within the settlement (**0000S**). The pattern reveals that new markets are added in the following order: home regional markets (**000HS**); either Jewish neighboring markets (**0J0HS**) or metropolitan markets (**M00HS**); the two remaining markets (**MJ0HS**); and finally participation in all five markets (**MJAHS**-profile). All told, 328 plants participate in profiles following this most dominant trend, although some also show additional patterns of participation.

Profiles of the second most-dominant trend (Figure 9, broad fragmented line) apply to 209 plants. These enterprises start by selling to the Jewish sector in neighboring Jewish regions, the metropolitan cores, or both (**0J000, M0000, MJ000**). Once Jewish markets are chosen as destinations, entrepreneurs return to local Arab markets (**M000S, 00J0S, MJ00S**) and then expand to distant Arab markets (**MJ0HS**) and finally to all five markets (**MJAHS**).

The plants that expand according to the third most frequent trend (profiles applying to 185 plants) restrict themselves to Arab intraethnic markets before turning to Jewish markets (Figure 9, gray discontinuous line). In addition to those plants that sell to local and home regional mar-

kets, which are exclusively Arab (profiles **0000S** and **000HS**), twenty-five plants fail to break ethnic barriers even when they expand into a third market. Instead, they restrict themselves to Arab markets in their home settlements, region, and other Arab regions (profile **00AHS**). The last trend, characterizing up to 20 plants, refers to those that concentrate on metropolitan markets: **M0000, M0A00, M0A0S, MJA0S, MJAHS** (Figure 9, gray continuous line).

The association between the number of markets in which a plant participates and its size in terms of turnover is relatively weak. For branches other than textiles and clothing, the average turnover of the plants that participate in only one market is significantly lower, and for those participating in five markets is significantly higher, than for the plants on the three intermediate levels (Figure 9, ANOVA with Schaffe pairwise comparisons at 5 percent significance level). For the textiles and clothing industry, the situation is reversed. The plants that participate in only one market (selling to the metropolitan cores) are larger than the others (Figure 8), but the differences are not significant. Thus, except for the extreme categories, the ability to expand into a new market does not seem to depend on a plant's turnover. Cross-tabulation of plants according to size and the number of markets in which they participate yields $\chi^2=20.4$ with df=20, corresponding to p $\cong$ 0.4. It would appear, therefore, that even small plants have a good chance of successfully expanding into any of the five markets in which Arab enterprises are already involved, including distant and interethnic ones, thus proving the ability of this sector to break the structural barriers in terms of sales.

Structural Forces as Market Barriers

The relative impact of each of the two barriers, peripherality and ethnicity, on the expansion of sales linkages may be deduced from the decisions taken by entrepreneurs when choosing their markets. Table 3 shows the percentage of enterprises in all branches, excluding textiles and clothing, that has overcome any of these two barriers by the number of markets into which the enterprise has expanded. To construct this table, we determined that a plant would be said to have broken the barrier of ethnicity when neighboring Jewish (**J)** or metropolitan (**M)** markets were
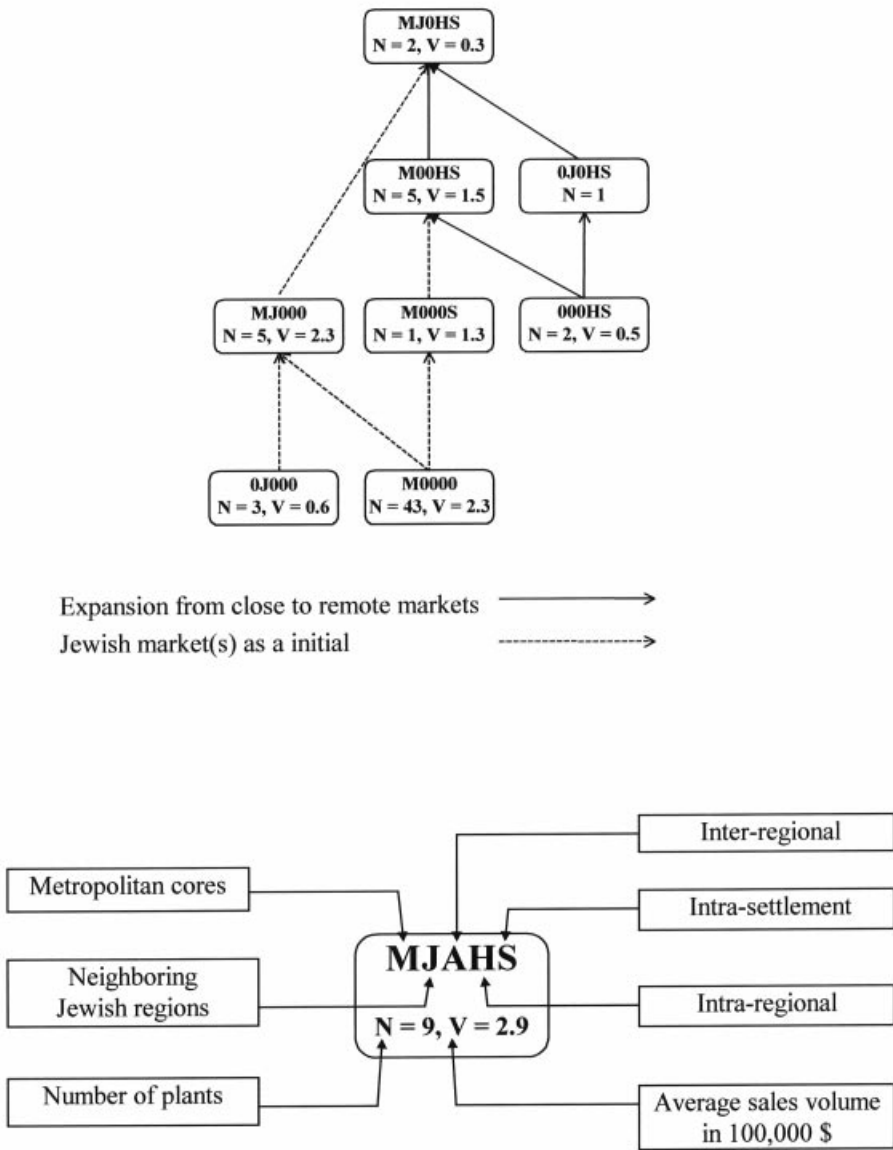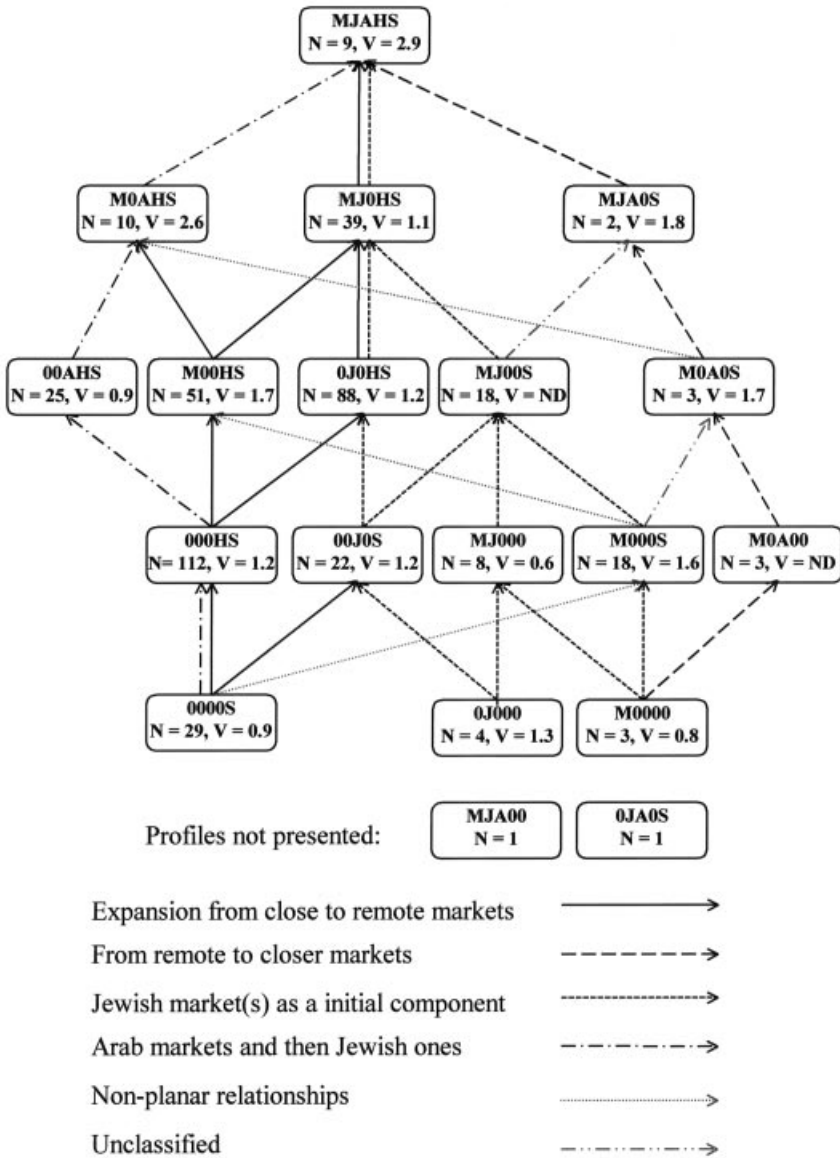
Figure 8. Scalogram describing the planar order of market expansion and withdrawal of textiles and clothing plants.

utilized, and the barrier of the peripherality when the plant sold to metropolitan (**M**) markets.

Table 3 indicates that as soon as plants participate in two markets the ethnic barrier is broken by almost one third, while the barrier of peripherality is overcome by only 18 percent. When plants expand into their third market, the ethnic barrier falls and almost all these enterprises have links with

Jewish markets, while about half still do not sell to the metropolitan cores or to markets beyond their home regions. Thus, the barrier of peripherality (location in social and geographic space) appears to be more salient to market expansion than ethnicity. Regarding peripherality, Arab entrepreneurs are channeled into markets in their own vicinity within the national periphery, or into

Figure 9. Scalogram describing the planar order of market expansion and withdrawal of all branches except textiles and clothing.

metropolitan cores as subcontractors, especially in the case of textiles and clothing. With regard to ethnicity, the analysis shows that Arab entrepreneurs enjoy a good chance of expanding into Jewish markets, and some do so even in the early stages of their development. Arab industry, however, does not entirely acquire the advantage of sharing in Jewish markets. As shown by Schnell (1998), the volume of sales to Jewish markets

is significantly lower than might be anticipated according to a gravity model that assumes a boundless market space.

These findings concerning the dominant impact of peripherality on the pattern of the sales network were further confirmed in interviews with a sample of seventy entrepreneurs. Most stressed three major points: the fact that ethnic barriers impede Arab entrepreneurship; the

Table 3. Barriers Overcome by Plants through Market Expansion

Number of Markets Entered	Barriers Overcome[a]	
	Ethnicity	Peripherality
1	19	8
2	31	18
3	96	43
4	100	100
5	100	100

[a]by percentage of plants in survey.

feeling that once barriers are broken and Arab entrepreneurs develop their reputation on the one hand, and learn to operate in the Jewish business milieu on the other, they are treated fairly in the market; and strong optimism as to their ability to overcome these market barriers. Many of those who succeeded in expanding into wider markets added that once barriers were broken and they learned to adapt to Jewish business practices and modern market requirements they did not experience any disadvantages.

It also appears that the ability to break ethnic barriers is highly dependent on entrepreneurs' worldviews. One older, less-educated entrepreneur expressed a pessimistic attitude:

> Jews refuse to buy concrete blocks from an Arab industrialist because they want to give business to Jews, not to Arabs. I sell high quality products at cheaper prices, but I don't get Jewish customers. . . . I have not applied for the seal of the Israeli Bureau of Standards since my customers in the village know the quality of my products and Jewish customers won't buy from me in any case.

In contrast, many other entrepreneurs, typically younger and/or more highly educated (high school education and above), seem to better understand the Israeli business milieu existing beyond their home region, and make a special effort to reach Jewish markets, as explained by one such entrepreneur:

> A relative from my extended family is a building contractor who works for Jewish customers in the new towns and villages in the Galilee. I asked him to buy the materials for the houses he builds from my plant. I promised his clients attractive prices and short delivery time. The latest tendency among Jews in new towns in the national periphery to build their own homes has given small plants like mine a good opportunity to compete for these markets.

Some entrepreneurs originally opened their plants with the intention of reaching Jewish markets. One furniture manufacturer from a settlement near Tel Aviv even hired a Jewish designer and secretary on the assumption that they would be better able to communicate with and understand the tastes of Jewish clients. The textiles and clothing plants, on the other hand, display different models of market expansion. One typical example is an entrepreneur from Kafar Manda in the lower Galilee:

> First I worked as a driver. I drove the [women] to the Delta factory [the production unit of a large Jewish-owned parent company in a neighboring Jewish town]. Later I opened a sewing shop in my home as a subcontractor for Delta. Today I work for everyone—for stores in the village, for Nazareth and for businesses in Tel Aviv. I have even started to export. When you are reliable and do a good job, people get to know you and you get a lot of work. We, the Arabs, have to be better and cheaper in order to succeed, but if you do a good job, you can make it.

This example demonstrates how subcontracting has the potential to support entrepreneurship and enable enterprises to expand into new markets. Thus far, none of the Arab subcontractors has succeeded in becoming independent, but this trend offers hope that the breakthrough will take place in the foreseeable future.

In addition, younger and more educated entrepreneurs seem better prepared to operate in the complex milieu of a modern interethnic economy, and many have succeeded in breaking through these barriers. The most difficult impediment, however, which few Arab entrepreneurs have managed to overcome, is the need to compete against large corporations. Yet resourcefulness, perseverance, judicious exploitation of relative advantages, and skill in the art of negotiation all served the owner of a pita-bread bakery in a settlement in the Eastern Galilee when he was forced to compete against a large bakery that dominated the regional market:

> It was hard to compete against the bakery's monopoly because they forced customers to buy their pita if they wanted their bread. Our pita is better, we supply it twice a day instead of once, we give credit and we have personal contacts with our customers. We were forced to buy bread in Haifa in order to fight the monopoly. Today we have an agreement with the large bakery. They sell the bread and we

bought the right to use their marketing system to sell our pita.

Such interviews lend support to our conclusion that Jewish markets may be open to Arab firms as long as they do not threaten the broader markets dominated by large corporations. When the interests of large corporations are threatened, Arab entrepreneurs, who are marginalized from the political and economic elite, lack the necessary resources to compete with the monopolies. Their only advantages are their strong determination, flexibility in serving customers, and willingness to settle for lower profits.

Conclusions

This paper offers a two-stage methodology for the understanding of industrial sales patterns as representing sociospatial relations and their impact on entrepreneurship. In the first stage, we decompose the overall pattern of industrial linkages into a number of patterns relating to different markets. The process of decomposition is based on the technological advantage of GIS in simultaneously processing large amounts of both geographical and numerical information. The identification of a common pattern takes advantage of the flexibility of human visual capacities in discerning complex images. This stage provides us with the appropriate decomposition of an overall set of sales linkages into a number of sales patterns, each one generated by a given market.

In the second stage, we analyze the forms of plant participation in the markets identified in the first stage and the trends of expansion into, or withdrawal from, those markets. This is done by investigating the graph of the relationships between the plants' market profiles. The planar or close-to-planar presentation of the graph reveals that routes of expansion or withdrawal from markets are highly structured and therefore predictable. This analysis makes it possible to study the impact of peripherality and ethnicity, all the while keeping in mind that they operate simultaneously.

In addition to its flexibility, this methodology has the potential to close the gap between micro- and macrostudies concerning the relations between entrepreneurship and regional and/or sectoral development (Markusen 1994). In this investigation, we decomposed the sales patterns of individual plant sales linkages, and then analyzed the macrolevel organizing structure based on entrepreneurial decisions regarding expansion into or withdrawal from particular markets.

Our investigation revealed the behavior of an industry that is still highly disadvantaged and distanced from opportunities and resources. Nevertheless, Arab industry in Israel has been undergoing a restructuring process since the 1970s. Arab entrepreneurs are abandoning their traditional mimicking strategy and beginning to engage in more competitive participation in the economy. This study showed that in their search for wider markets Arab entrepreneurs have channeled sales to at least five different markets and opened marginal ties with the other four. Even smaller enterprises have shown considerable flexibility in choosing a form of participation in markets, including sales to distant and interethnic markets. Plants have utilized twenty of the thirty-one possible forms of participation in the market, expanding into a variety of new markets, an indication that Arab entrepreneurs who perceive the barriers of ethnicity and peripherality as being surmountable are adopting a new competitive strategy. These findings are consistent with those obtained in our previous study, in which the analysis of entrepreneurial decisions revealed highly determined entrepreneurs willing to take risks and to make personal sacrifices in order to exploit any available opportunity (Schnell et al. 1995).

The proposed model is representative of industries in deprived regions of the national periphery of economies dominated by large corporations. According to the theories discussed above, industries located in national peripheries of corporate systems tend to develop two kinds of markets. Smaller plants tend to concentrate on regional markets in the periphery, selling to end-users and adjacent larger production units. Larger plants, usually owned by major corporations, tend to channel their products to the main national and international markets concentrated around the metropolitan cores. In our study, the majority of Arab enterprises indeed channeled their production to regional markets located in the periphery. One-third of the plants, almost exclusively in the textile and clothing industry regardless of size, sold to the metropolitan cores, but only as subcontractors. The small number of more intensive linkages with distant markets is a result of the disadvantaged status of Arab industry in Israel. Government policy allocates industrial parks and subsidies mainly to new Jewish towns, in some

cases in the vicinity of Arab settlements. Therefore, large corporations have no incentive to invest in the development of production units in Arab towns (Bar-El 1993). Smaller local enterprises, like most Arab-owned plants (with very few exceptions), are incapable of competing against the strategies employed by monopolistic corporations whenever their status is threatened. This leaves only restricted market niches open to Arab entrepreneurs.

It would thus appear that Israeli-Arab entrepreneurship is constrained more by its peripheral status than by ethnic subordination. Arab entrepreneurs frequently fail to compete with Jewish monopolies, the latter blocking their ability to grow and to open larger markets. Because Arab industrialization began after Jewish corporate hegemony had already been institutionalized, the impact of that structure has been devastating to Arab entrepreneurship. Evidence from the interviews reveal that ethnic barriers may be broken more easily than peripherality, although ethnic barriers further distance Arab entrepreneurs from national core markets. It would seem that a highly determined and flexible ethnic entrepreneurship in the periphery might be capable of breaking through some socioeconomic barriers. Despite this, peripheral entrepreneurs probably do not have the power to change basic structural relations in a corporate capitalist system by themselves.

Three essential questions must be posed at this point. First, are entrepreneurs who have overcome market barriers able to close economic gaps between the Arab and the Jewish sectors regardless of government policy? Second, to what extent can successful entrepreneurs influence the balance of power between the two ethnic sectors? Third and more generally, a question concerning the impact of ethnic cultural differences on interethnic networks and economic opportunities may be posed. On the one hand, these differences may pose difficulties on ethnic entrepreneurs' ability to compete in the majority's entrepreneurial culture. On the other hand, members of the majority may use ethnicity as a means to discriminate against ethnic entrepreneurs. So far, our research does not show any evidence that the highly determined Arab entrepreneurs were able to restructure interethnic power relations. Their attempts to challenge monopolistic interests were less than successful, and they failed to channel public policies in support of their interests. Despite it, entrepreneurs' determination has

proven successful in exploiting even narrow windows of opportunities (in our case, opening new markets) as a means for socioeconomic mobility.

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