

Shefer, Daniel; Modena, Vittorio

**Conference Paper**

## Technological incubators as creators of high-tech firms in Israel

38th Congress of the European Regional Science Association: "Europe Quo Vadis? - Regional Questions at the Turn of the Century", 28 August - 1 September 1998, Vienna, Austria

**Provided in Cooperation with:**

European Regional Science Association (ERSA)

*Suggested Citation:* Shefer, Daniel; Modena, Vittorio (1998) : Technological incubators as creators of high-tech firms in Israel, 38th Congress of the European Regional Science Association: "Europe Quo Vadis? - Regional Questions at the Turn of the Century", 28 August - 1 September 1998, Vienna, Austria, European Regional Science Association (ERSA), Louvain-la-Neuve

This Version is available at:

<https://hdl.handle.net/10419/113581>

**Standard-Nutzungsbedingungen:**

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

**Terms of use:**

*Documents in EconStor may be saved and copied for your personal and scholarly purposes.*

*You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.*

*If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.*

**European Regional Science Association  
38<sup>th</sup> European Congress  
Vienna, Austria  
28 August – 1 September 1998**

**Vittorio Modena\* and Daniel Shefer\*\***

**Technological Incubators as Creators  
of New High Technology Firms in Israel**

**Abstract**

The Israeli High-Tech industry boom in the past decade deserves a thorough study of the local reality as well as an appraisal of the efficiency of existing programs. This paper sets as its main objective an analysis of the effectiveness of the Incubator Program in Israel at the national, regional and local economy level. First, we evaluate the High-Tech incubators as a filter of new technological ideas that subsequently become new technology-based companies. Second, we identify the kind of investors who are willing to participate in funding a project during and after the incubation period. Finally, we analyze the geographical dispersal of the incubators and their contribution to local economic development. Our general conclusion is that although technological incubators constitute an efficient program at both the national and the local level, their wide geographical dispersal negatively effects their performance, since it contrasts with the general tendency of High-Tech industries to agglomerate. It is our belief that the total number of incubators should be reduced, their size enlarged and their locations more precisely determined.

*Key Words: technological incubators; venture capital; locational advantage; high-tech firms, high-tech start-ups.*

---

\* *Modena is a former graduate student in the Graduate Program in Urban and Regional Planning at the Technion.*

\*\**Dr. Shefer is the Lunenfeld-Kunin Professor of Urban and Regional Economics at the Technion.*

## Introduction

The development of a High-Tech industry and the rate of innovation adoption has often been linked to economic growth [Kuznets, 1971]. Although a general framework for technological entrepreneurship as a means of economic growth and industrial renewal was developed by Schumpeter back in the 1930's [Schumpeter 1934, 1939], it was only in the 1980's that interest was renewed in this area. The rationale for public support for the High-Tech industry is based on two suppositions: The first claims that High-Tech industry is a desirable activity for the economy of any country (or for its households) in that it gives a high added value, has many positive externalities that influence other branches of the economy [Plaut and Bental, 1984], and is strongly export-oriented (particularly important to small economies) [JIM, *et. al.*, 1987]. Moreover, High-Tech industry appears to be one of the few branches of the economy that remains employment-creating, relatively unaffected by automation. The second describes the different market failures associated with the High-Tech industry, such as the difficulties of enforcing intellectual rights and therefore retaining the positive effects of new discoveries [Plaut and Bental, 1984], and the need for a critical mass of knowledge and funds in specific areas.

Recently, particular attention has been given to new technology-based firms [Moore and Garsney, 1993; Roberts, 1991; Reynolds, 1987; National Science Foundation, 1981]. In an evolutionary perspective, small new firms provide the pool of young firms from which the big industries of the future will emerge [Reynolds, 1987]. They have proved to be much more flexible and adaptable to new technologies than big firms, thereby helping innovation to reach the market faster [Garsney *et. al.*, 1994].

The spatial distribution of High-Tech industry has been the focus of many studies. Agglomeration of such industries as found in Silicon Valley (California) [Saxenian, 1983] or CambsTec (Cambridge, England) [Segal and Quince, 1985] appears to be the most common distribution pattern, although lately, some studies reported a dispersal trend [Keeble, 1994]. Among the factors associated with the location of High-Tech entrepreneurship, the most common are the need for highly skilled manpower, proximity to a university or a technological institution and the availability of venture capital.

In spite of its trend to agglomerate, High-Tech industry is also very attractive as a means for local economic development for a number of reasons [Bar-El and Shefer, 1989; Malecki, 1984], including

the fact that they generally cause much less pollution than traditional industry. As sensitivity to environmental impacts grows and monetary sanctions against polluting industries are becoming popular almost everywhere, this appears to be a major advantage. Furthermore, High-Tech industries are only minimally affected by transportation costs as the price/weight ratio of its products are relatively high, which implies that at least in this respect, peripheral regions are still suitable for the location of High-Tech industries. Finally, positive effects that hold at a national level such as high “added value” and positive externalities hold at the regional and local level as well.

A wide variety of tools have been developed in different countries and regions in order to give incentive to the High-Tech industry. These can be roughly divided into four categories, each focusing on a different aspect of new-firm development: Fiscal tools, direct financing tools, consulting tools and infrastructure-oriented tools. The technological incubator is an integrative program that provides several different services according to its definition and sponsor. Popular services include the funneling of public and private venture capital to projects, business and marketing consultation, and the provision of low-cost rent and infrastructure. At a national level, the incubators program can be seen as a tool for filtering and developing valuable and original ideas and for providing seed-capital. At a local level the incubator can be seen as a means for local economic development in that it creates a nucleus of small new developing firms in a specific location. It is important to point out that the technological incubator is an economic development program “from below” [Stohr and Taylor, 1981] aimed at fostering technological entrepreneurs from the very beginning of their project’s development. Therefore, the incubator has advantages and drawbacks typical of this kind of program. On the one hand, it can help to create a healthy entrepreneurial culture by empowering local people and encouraging them to develop their own firms locally. On the other hand, it works very slowly. In order to assess the actual impact of the program on employment and economic development, at least 15-20 years are needed. The technological incubator located in a remote region supplies a number of functions that are seldom found in peripheral areas, including venture capital supply, business and legal consulting, and the filtering of valuable ideas. However, it obviously cannot help in increasing the supply of skilled manpower.

## **Research Context and Aim**

In the early 1990’s the Israeli High-Tech industry has blossomed in an unprecedented way. The electronics industry, for instance, which accounts for most of the High-Tech sector, increased its sales

from \$2 billion in 1986 to almost \$6 billion in 1995 [Association of Electronics Industries, 1996]. Formal venture capital funds, almost non-existent until 1990, have totaled some \$1 billion in 1996 [OCS, 1997]. The exceptional growth of Israeli civil High-Tech firms began in 1986 with the closure of the “Lavi” project (the Israeli-designed fighter airplane) which caused a few thousand engineers to leave the military industry for the civil sector and often to become technological entrepreneurs. The boom has been boosted by the massive immigration of highly skilled workers from the former Soviet Union in the early 1990’s.

A crucial role in Israel’s High-Tech growth is played by start-ups. According to the Office of the Chief Scientist (which operates the Israeli R&D public-sector incentives programs), Israel produces the highest absolute number of technological start-up companies per year in the world after the U.S. [OCS, 1997]. While start-up capital is usually provided by venture capital funds, seed capital is often supplied by technological incubators.

Between 1990 and 1993, 28 incubators were established throughout the country, with 26 of them still operating (see Map 1). Each incubator is granted \$184,000 per year and projects \$154,000 per year for a maximum of two years and up to 85% of the approved budget [Ministry of Industry and Trade, 1995]. An additional 15%, the “complementary financing”, is to be supplied by the entrepreneur himself or by a partner in exchange for an equity in the project.

The first objective of our study was to describe technological incubator operation as a filter of new and valuable ideas in the framework of the new Israeli reality. This was done by means of two basic indicators. First, we describe the filtering of ideas as it happens in the “typical incubator” by means of the number of projects surviving at the different stages of the incubation process. Secondly, we examine the investors that took part in the funding of the projects during and after the incubation period.

Map 1: Spatial Distribution of 26 Technological Incubators in Israel.

The spatial distribution of the incubators as shown on Map 1 reflects the will of the Israeli authorities to use incubators as a tool for promoting local economic development regardless of the disadvantages associated with locating the incubators in peripheral areas. Our last objective is to examine the differences between peripherally and centrally located incubators by means of a few selected indicators, thereby assessing the efficiency of incubators as a means of local economic development.

Three basic questions make up the assessment: 1. Is the success rate among projects managed in metropolitan incubators any different than the success rate of projects managed in peripheral incubators? 2. How does the relocation pattern of successful projects relate to their original location? 3. What characterizes the investors of projects in different incubator locations?

## **Data Source**

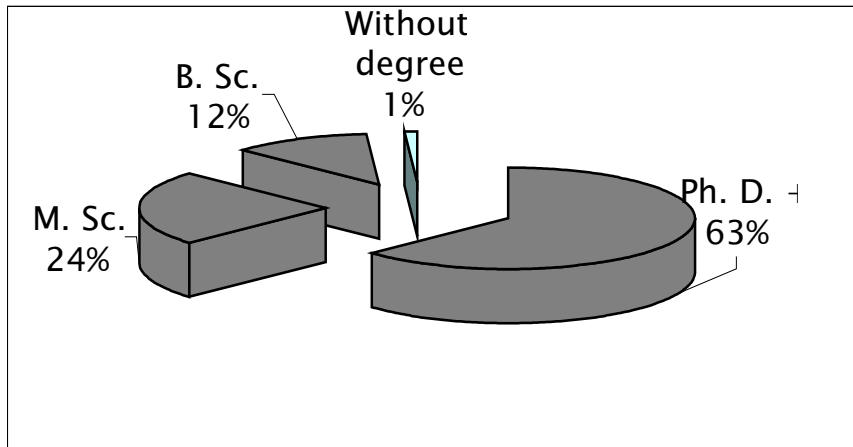
The data employed in this study were collected by means of a questionnaire. The managers of 17 out of 27 incubators agreed to answer our questionnaire and to be personally interviewed. The data cover some 339 projects that were managed by the incubators until September 1996 and 107 of these that have succeeded in finding partners or selling their products after the incubation period. For the purpose of comparison, incubators were divided into peripheral (7 incubators) and metropolitan (6 incubators) categories. Data relating to the remaining 4 incubators are included only in calculations averaging all incubators (see Map 2).

## **Results of the Analysis**

The manpower education is a common indicator for High-Tech firms. Figure 1 shows the education level of the incubators' program entrepreneurs and it is pretty impressive: almost 100% of the entrepreneurs have academic education, 24% of them obtained a M.Sc. degree and as many as 63% of them hold a Ph.D. degree. It should be mentioned that other workers are employed in the projects apart from the entrepreneurs; nonetheless, as firms at this stage are very small (up to 5-6 when leaving the incubator), entrepreneurs make up for at least 20% of a firms' total labor force. Assuming, as a worst case, a project with 6 employees, of which only the entrepreneur holds a degree, the percentage of skilled labor would still be 17%, while the average percentage of scientists, engineers and technicians in Israeli industry is 14% [Ben-Aharon and Toren, 1993]. On these grounds we can safely define the incubators' projects as "High-Tech".







*Figure 1: Entrepreneurs' level of education.*

Our next analysis deals with the performance of the incubator as a filter of new and valuable ideas.

Figure 2 shows the flow of ideas from the moment they are submitted to the incubators' manager until they leave the incubator. Several important conclusions can be drawn from this result:

1. Most of the project selection process is carried out by the incubator's manager and board and not by the central committee of the incubators, although the latter takes the ultimate decision.
2. About half (52.6%) of the projects that are accepted to the incubator succeed in continuing their activity. We define as successful a project that has succeeded in raising funds from private sources and/or in selling his products. By this definition we rule out projects that continue only by means of the entrepreneur's own savings and/or with public funds.
3. Most of the projects that fail in continuing their activity, fail also at the stage of raising additional funds and not at the stage of technological development that is required by the incubator after the first year of the incubation program. Lavi-Steiner and Goldberg [1995] came to similar conclusions and criticized the incubators' management for giving too little attention to the marketing problems upon acceptance of the new ideas.

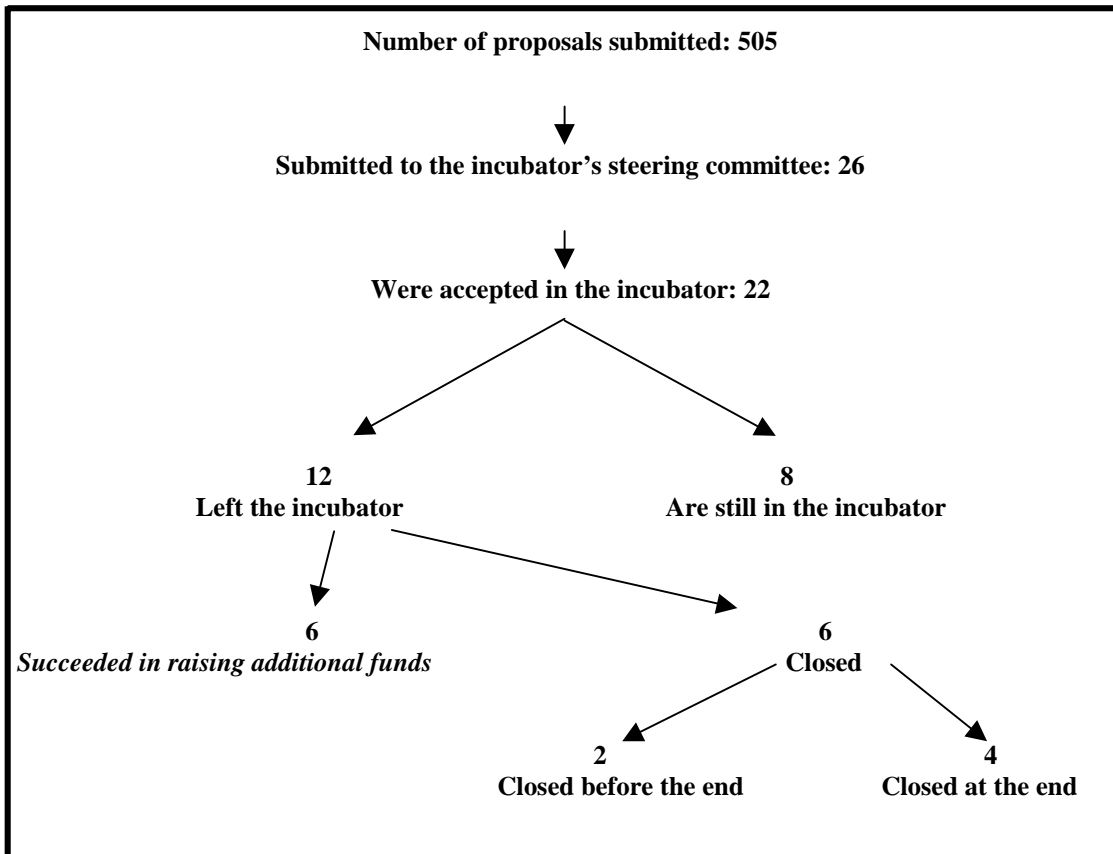


Figure 2: Number of projects surviving at various stages of gestation in a “typical incubator”.

Our second set of results is concerned with describing the investors who fund projects in the incubators during and after the incubation period – the “complementary financing”, and “subsequent financing” stages, respectively. In this case the incubator can be seen as a means of driving public and private funds to valuable projects. It is important to note, in this respect, that the cost of High-Tech projects’ appraisal and follow-up can be so high as to discourage private investors from putting money in them. We can say that public funds supplied by means of the incubator considerably reduce the high “transaction costs” connected with the first development stage of projects. In this way the projects are prepared for private investments.

Figure 3 shows financing sources taking part in the projects that were accepted to the incubator program while Figure 4 shows the sources investing at secondary stages. A few interesting observations should be made:

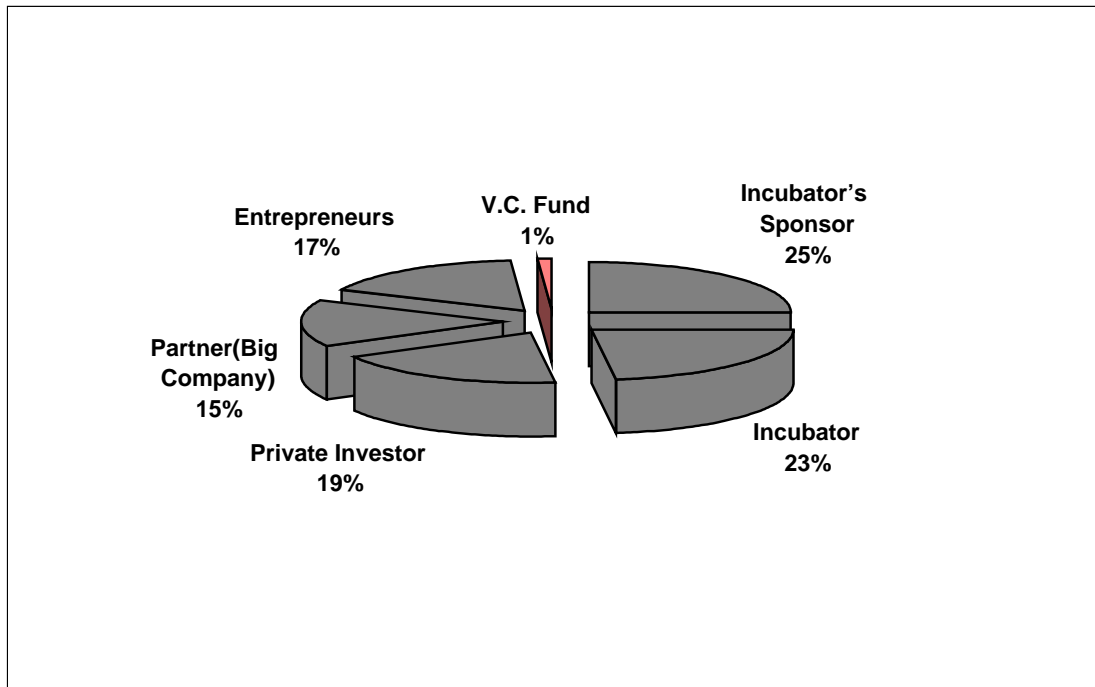


Figure 3: Sources of the “Complementary Financing” (n=275).

1. The integrative financing originates mostly from the incubator itself or from its sponsor (usually a big High-Tech company or holding). It should be mentioned that an attempt was made to understand more deeply the relationships between the incubator and its sponsor through interviews of the incubators’ managers. Nonetheless, probably because of the business sensitivity of this issue, managers refused to give details on it.
2. Venture capital funds investments are extremely rare participants in the integrative financing but begin to be seen in the subsequent financing stage when projects are more mature. Based on the results shown above, on interviews with venture capital funds managers, and on some general literature [Bank of England, 1990], we can state that venture capital funds, among them Israeli funds, do not like seed-money investments, *i.e.* participating in the very inception of a project’s development. Then, we reason that only two kind of private investors have the possibility to professionally filter valuable ideas and give them business consulting similar to the incubator: Venture capital funds and big High-Tech companies. Nonetheless, the former are not ready to invest at the same development stage and the latter are usually only willing to invest in their field of industry. Therefore, it appears that technological incubators do add a new tool to the Israeli “Innovation System” and that it does not have an alternative in the private sector.
3. As far as the subsequent financing is concerned, the first notable result is that the chief scientist tends to support projects leaving the incubators. This shows that there is a consistent policy to

foster new technology-based companies from the very beginning through the first steps of development.

4. Only 16 of the 107 “successful” projects succeeded in selling their products at this stage. This is just another indication that projects at this stage are still in their infancy.
5. A total of 191 investors were counted over 107 projects, indicating an average of 1.8 investors per project.

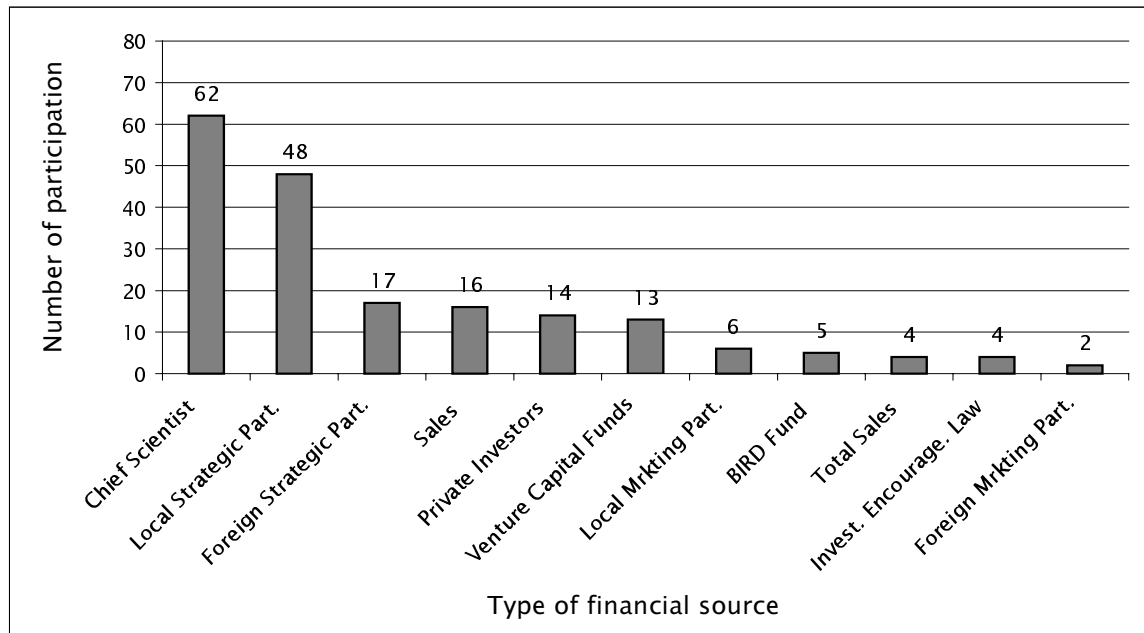


Figure 4: Sources of financing after the incubation period (n=191).

The last stage of our research is concerned with the geographical dispersal of the incubators. A first basic result is the comparison between the success percentages of metropolitan and peripheral incubators. It should be mentioned that definitions of “success” vary widely in the literature [Reynolds and Miller, 1992]. In our case a “successful project” is defined as one that has at least one source of financing that is not public and that is not provided by the entrepreneur himself. In other words, a source that invested in the project on the basis of business criteria alone.

Evidence shows that metropolitan incubators have a significantly higher success rate than their counterparts in peripheral areas (see Fig. 5 and Map 2). One could advance many hypotheses on why this happens, such as the greater availability of skilled manpower and venture capital, shorter distances to business and law services, the presence of large companies working in the same field as the project and various other factors more easily found in core as opposed to peripheral areas. Indeed, as we shall see later on, big firms and formal venture capital funds are frequent investors in the new companies

leaving metropolitan incubators but are rarely found among projects leaving peripheral incubators. Moreover, it should be mentioned that 5 of 6 metropolitan incubators enjoy the sponsorship of a University, whereas no peripheral incubator has even indirect links to one.

It is important to note that while metropolitan incubators clearly outperform peripheral incubators, the peripheral incubator's performance is also quite impressive.

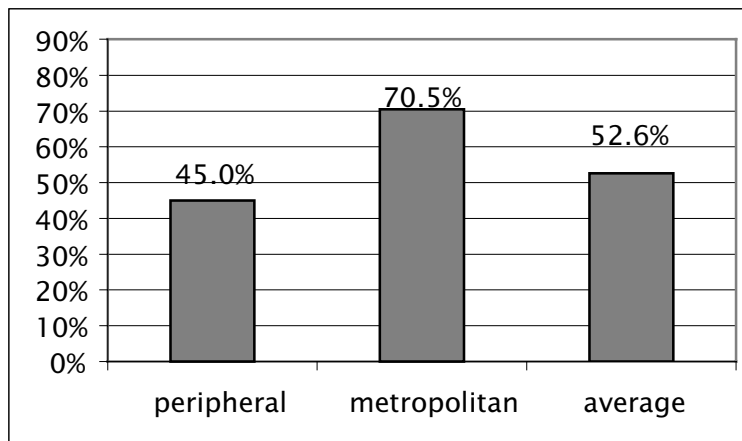


Figure 5: Success rate of “Metropolitan” vs. “Peripheral” incubators and of all incubators.

In order to examine the reasons that might explain the better performance of the metropolitan incubators it was decided to check whether there is a difference between the number of potential ideas submitted to incubators located in metropolitan regions compared to the number submitted to incubators located in peripheral regions. The test was carried out by comparing the “incubator’s manager’s choice”, *i.e.* the percentage of ideas approved as a part of all the proposals received by the incubator. Metropolitan incubators accepted only 2.9% of the proposals submitted while peripheral incubators accepted 4.6% of the proposals. In other words, metropolitan incubators’ managers have a better chance to pick up the “good entrepreneurs” that will succeed in developing their products (see Fig. 6).

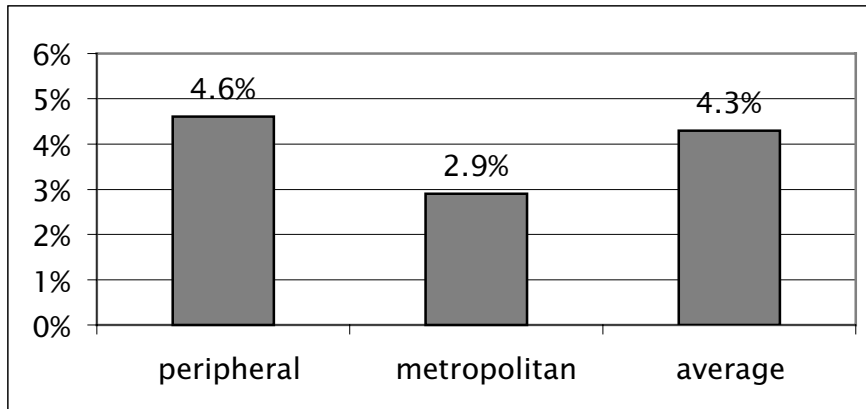


Figure 6: Percentage of proposals accepted at “Metropolitan” vs. “Peripheral” incubators and the average for all incubators.

In order to assess the efficiency of peripheral incubators as a means of local development it was necessary to examine the number of companies that were actually created each year in the same town where the incubator is located. In other words, how many of the successful projects remained in the same town where they completed their incubation period? Table 1 displays the present location of successful projects as a function of their incubator’s location. Several important conclusions can be drawn by examining this table:

1. Regardless of the incubator’s location, many projects chose to locate within the incubator’s area after the incubation period (see also Table 2). This suggests that the incubator can be seen as a technological park growing by means of its own successful projects. At least two reasons can be suggested for this phenomenon: a) The entrepreneur has become used to the services supplied by the incubator and its staff. b) The entrepreneur is living near the incubator and is unwilling to move.
2. A fairly high percentage of the projects (65%) remain in the same city as the incubator (those who remain in the incubator itself plus those who remain in the same city but outside the incubator area). Although this percentage drops to 57% (see Table 2) for projects located in peripheral areas it appears that still a large percentage of the projects continue their activity in their initial location and thus contribute to the local industrial development.
3. Among the projects that leave the incubator, it is more likely to find them in the same locality if they originate at a metropolitan incubator (37%) than if they originate at a peripheral one (19%). This result seems to add to the general claim that peripheral locations are not so favorable for High-Tech firms as compared with metropolitan locations.

4. The northern peripheral region (Galilee) appears to be a more desirable location for successful projects than the southern region (Negev). Among the projects that left their city of origin in the north, 47% relocated in the same region, whereas none of the projects that left their city of origin in the south relocated in the same region. Moreover, among the projects that left metropolitan incubators, 16% relocated in a northern small city while none relocated in the southern region.
5. There is no noticeable trend among peripheral projects to move to one of the Israeli metropolitan centers. For example, small peripheral urban centers were more attractive than big cities for northern peripheral projects.

NEW LOCATION \ ORIGIN	Metropolitan Incubators	Peripheral Incubators		Peripheral (sub-total)	Others	TOTAL
		North	South			
Incubator's area	15 (35%)	5 (33%)	9 (41%)	14 (38%)	12 (44%)	41 (38%)
Same city	16 (37%)	2 (13%)	5 (23%)	7 (19%)	6 (22%)	29 (27%)
Different big city	3 (7%)	0 (0%)	4 (18%)	4 (11%)	5 (19%)	12 (11%)
Small town in the north	7 (16%)	7 (47%)	0 (0%)	7 (19%)	0 (0%)	14 (13%)
Small town in the south	0 (0%)	0 (0%)	1 (5%)	1 (3%)	0 (0%)	1 (1%)
Small town in the center	2 (5%)	1 (7%)	3 (14%)	4 (11%)	4 (15%)	10 (9%)
TOTAL	43 (100%)	15 (100%)	22 (101%)*	37 (101%)*	27 (100%)	107 (99%)*

\* Rounding errors

*Table 1: Location of successful projects after the incubation period as a function of the incubator's location.*

Test	Peripheral	Metropolitan	T-test
1. Success percentage (number of projects)	45% (82)	70.5% (61)	3.18*
2. Severity of choice (number of proposals)	4.6% (3300**)	2.9% (4250**)	---
3. Location in the same locality (number of projects)	57% (37)	72% (43)	1.41
4. Location in the same town except incubator (number of projects)	37% (37)	19% (43)	1.87*
5. Location in the incubator (number of projects)	37.8% (37)	34.9% (43)	0.23

*Table 2.1: Results of the statistical analysis.*

Test	Peripheral-south	Peripheral-north	t-test
6. Preference of north over south (metropol') (number of projects)	0% (43)	16.3% (43)	2.89*
7. Preference of north over south (peripheral) (number of projects)	4.5% (22)	46% (15)	3.09*

(\*) Significance at  $p < 0.05$

(\*\*) Data of the number of proposals submitted to the incubators' managers are based on their estimations, therefore these figures can bear some errors.

Table 2.2: Results of the statistical analysis.

Another interesting insight into the differences between Metropolitan and Peripheral incubators is shown by the kind of investors that participate in the funding of the new projects both at the very beginning (with the “integrative financing”) and at the end of the incubation period. Figure 7 shows the different types of investors as a function of the frequency of their investments in the integrative funding.

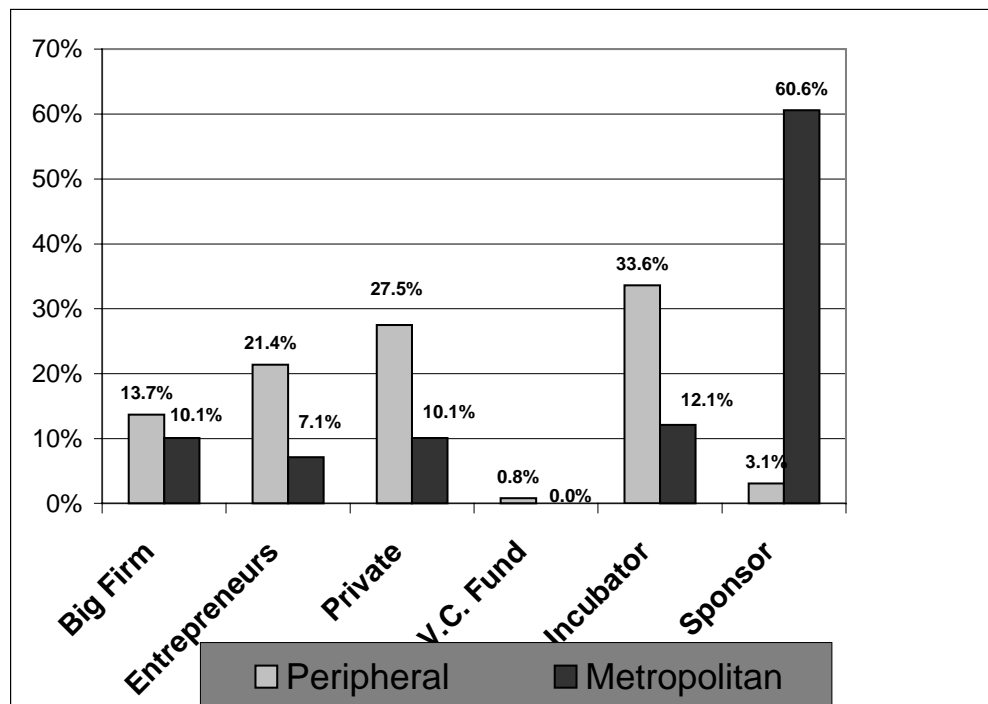


Figure 7: Sources of the “Integrative Financing” as a function of incubator location.

A few interesting results can be derived from the data:

1. The “sponsor” of the incubator (*i.e.* a big company that invests systematically in the projects) is a very frequent investor in metropolitan projects and a very rare investor in peripheral projects. This merely reflects the fact that big companies are most often located in metropolitan areas rather than in peripheral areas.



2. The incubator itself is a frequent investor in peripheral projects and a rare investor in metropolitan projects.
3. Entrepreneurs and private investors are more easily found in the periphery than in the core region
4. Venture capital investment funds are practically absent at this stage of project development. This is an important finding in that it supports the general idea that venture capital funds are reluctant to invest seed-capital in the earliest stages of the projects' gestation. Thus, technological incubators do not compete with venture capital funds. On the contrary, technological incubators appear to provide "additionality" to the national economy.

Together, we get the basic different patterns of investment in metropolitan and peripheral areas.

Figure 8 displays the types of investors that participate in the funding of projects after the incubation period as a function of the incubator's location. A few interesting issues can be noted:

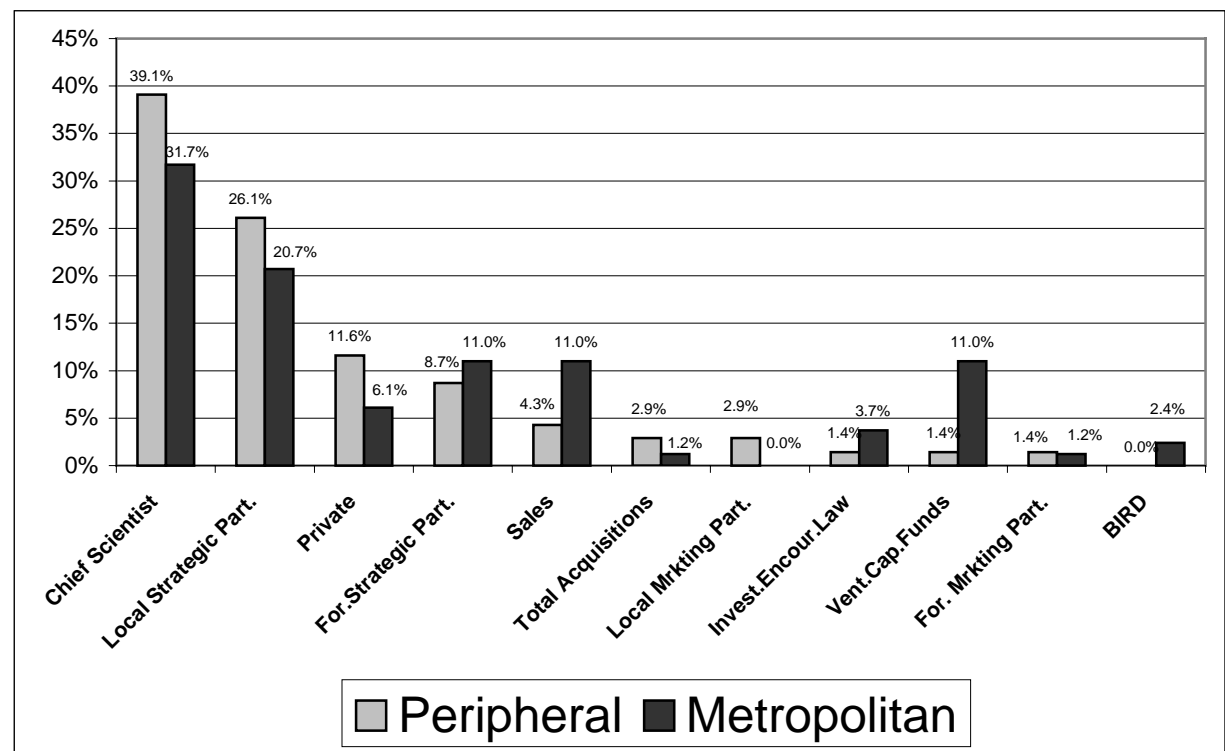


Figure 8: Sources of financing after the incubation as a function of the incubator's location.

1. Venture capital funds are more easily found among investors in projects leaving metropolitan incubators than among those projects leaving peripheral incubators. It appears that venture capital funds can be simply accounted for as features of the core regions. However, it should also be mentioned here that in a small country such as Israel, distances between the peripheral incubators

and business centers are not so great as to rule out venture capital intervention. Factors other than distance may play some role in this respect.

2. Projects of metropolitan origin are more likely to partially support themselves than projects of peripheral origin. This can be seen as just another indication of the better performance of the metropolitan incubators as opposed to the peripheral incubators.
3. The “strange” result showing that 3.7% of the projects leaving metropolitan incubators were supported by the Law for the Encouragement of Investments (which generally targets peripheral regions) is due to the fact that High-Tech projects in Jerusalem qualify under this law for support, although Jerusalem is considered a “core” region in our research.
4. It is interesting to note that private investors are more likely to participate both in the integrative and subsequent funding of projects in the peripheral areas rather than in the metropolitan areas. The incubator can be seen as a way of keeping funds in the same area.

## **Conclusions and Discussion**

The fact that as many as 35% of the successful projects remain in the immediate vicinity of the incubator is a very interesting and important finding. Even more interesting is the fact that there is no significant difference in this ratio between metropolitan and peripheral incubators. This seems to lead us to the conclusion that the incubator can be seen as a self-sustaining nucleus of young industries. Secondly, we note that many “successful” projects tend to remain in their original location. We have to remember that each incubator runs an average of only 8 projects (4 per year) and that, as we saw previously, only about half of them succeed in continuing their activity after the incubation period. Of the two annually successful projects, only one will remain in the vicinity of the incubator! In other words: in spite of the impressive success rate of the incubator and its tendency to keep successful projects nearby, its size is such that it produces only one small new High-Tech firm per year in its location. In this way the small peripheral incubator fails to create the critical mass of firms that is required in order to create a “High-Tech conglomerate”.

The basic mistake associated with attracting High-Technology firms to peripheral areas is that when such enterprises begin to succeed, they need a large number of highly skilled workers that are not

readily available in peripheral areas. This is not felt so critically at the very beginning of the activity because, at that point, the entrepreneurs themselves still account for most of the needed know-how. However, as the company grows, it needs increasing numbers of skilled workers and thus considers moving to a large urban area. An interesting compromise between the core and the periphery approach is provided by the “Technopolis” [Smilor *et. al.*, 1989]. The “Technopolis” is a concept that was put forward in Japan by the “MITI”, the Japanese institution for R&D promotion. In that country, a town is eligible for large governmental contributions if it has a population of at least 100,000, good transportation links to the financial and administrative centers of the country and some existing R&D facilities. The Japanese program appears to be successful, at least at its onset, when as many as 26 towns throughout the country have applied for public assistance.

It is our belief that the “Technopolis” model could also be interesting to implement in Israel as a compromise between the trend of the High-Tech industry to agglomerate in large metropolitan areas and the will of the planning authorities to achieve population dispersal and the economic development of peripheral regions. While only the southern town of Beer-Sheva has more than 100,000 inhabitants, a few other clusters of smaller towns (Carmiel-Tefen, Yokneam, Nazereth and Migdal Haemek) in the north of the country have the potential to develop into small “Technopolises”.

The implications of such an approach for the location of technological incubators would be that instead of having 26 incubators throughout the country, each running some 6-12 projects, there would be about 10 incubators, each running 25-30 projects. These incubators would be located in the three major Israeli metropolitan areas (Tel-Aviv, Haifa and Jerusalem) and in a few selected clusters of smaller urban centers located in peripheral areas. Such a policy would, in our opinion, also lead to an increase in the size of the incubator and of its permanent staff.

## Bibliography

Association of Electronics Industries (1996)  
*Israel's Electronics Industries Profile, May, 1996*

Bank of England (1990)  
*Venture Capital in the United Kingdom*  
 Bank of England Quarterly Bulletin 30(1), pp.78-83

Bar-El E. and D. Shefer (1989)  
*The Suitability of High Technology Industries for Israel's Peripheral Regions*  
 Center for Urban and Regional Studies, Technion – Israel Institute of Technology, Haifa, Israel

Garsney E. W., S.C. Galloway and S.H. Mathisen  
*Flexibility and specialization in question; birth, growth and death rates of Cambridge new technology-based firms 1988-92*  
 Entrepreneurship and regional development, 6 (1994), 81-107

Glasmeier A. (1988)  
*Factors governing the Development of High Tech Industry agglomeration: A Tale of Three Cities*  
 Regional Studies, Vol. 22(4), pp. 287-301

JIM, TELESIS and S. TILLES (1987)  
*Export-Led Growth Strategy for Israel*  
 Jerusalem, Jerusalem Institute of Management

Keeble D. (1994)  
*Regional Influences and Policy in New Technology-Based Firm Creation and Growth*  
 in: R. Oakey, ed., *New Technology-Based Firms in the 1990's*  
 London, Routledge

Goldberg A.I. and O. Lavi-Steiner (1996)  
*The Challenge of Developing an Effective Technological Incubator: The experience of Israel*  
 Technion, Haifa, (Unpublished Research Report), Faculty of Industrial Engineering and Management

Malecki E.J. (1984)  
*High Technology and Local Economic Development*  
 APA Journal, Summer 1984, pp.261-269

Ministry of Industry and Trade (1995)  
*Technological Incubators for Israel*  
 Tel-Aviv, Matimop (October 1995)

Moore I. and E. W. Garsney (1993)  
*Funding for Innovation in Small Firms: The role of Government*  
 Research Policy, 22, pp.507-519

Oakey R.P. and S.Y.Cooper (1989)

*High Technology Industry, Agglomeration and the Potential for Peripherally Sited Small Firms*  
Regional Studies, Vol. 23(4), pp.3-360

OCS-Office of the Chief Scientist (1997)  
*Israel 97 – Start Up & Innovation*  
(February 1997)

Plaut S.E. and B. Bental (1984)  
*The Choice of a Policy towards Industrial Research and Development in Israel*  
Technion, Haifa, The Samuel Neeman Institute for Advanced Studies in Science and Technology  
(Unpublished Research Report)

Razin E. (1995)  
*Shifts in Israel's Industrial Geography In the Wake of Policy Changes In the 1990s*  
The Floersheimer Institute for Policy Studies – The Primary Core Project, Jerusalem  
Working Paper No.3

Reynolds P. (1987)  
*New Firms: Societal Contribution versus Survival Potential*  
Journal of Business Venturing Vol.7, pp.405-417

Saxenian A. (1983)  
*The Genesis of the Silicon Valley*  
Built Environment, Vol. 9, No.1, pp.7-17

Segal and Quince (1985)  
*The Cambridge Phenomenon*  
Norfolk, The Thetford Press

Schumpeter J.A. (1934)  
*The Theory of Economic Development*  
New York, Oxford University Press

Schumpeter J.A. (1939)  
*Business Cycle*  
New York, Mc-Graw-Hill

Smilor R.W., G Kozmetsky, D.V. Gibson (1989)  
*Creating the Technopolis*  
Ballinger Publishing Company

Stohr W. B. and D.R.F. Taylor (1981)  
*Development from Above or Below?*  
Chichester, Wiley