Regional Corporate Spawning and the Role of Homegrown Companies

Gil Avnimelech1
Faculty of Business Administration
Ono Academic College

Maryann Feldman
Department of Public Policy
University of North Carolina at Chapel Hill

Abstract
This paper presents the results and policy implications of a study that examined the spawning of founders who had previously been employed at large corporations. We found that spawning of founders is positively associated with the parent companies' productivity, innovativeness, and headquarter location. Furthermore, we found that the spin-off per employee rate is higher in smaller establishments. We also found that the local entrepreneurial culture is significant in explaining local spawning of founders. Finally, we present new empirical evidence on the crucial role of successful homegrown companies in regional cluster development. More specifically, we found that the existence of successful homegrown companies is significantly correlated with the level of the regional entrepreneurial activity. This finding is consistent with the finding of many cluster development case studies. Thus, we argue that successful homegrown companies have a unique role in cluster development. This role can seldom be replaced by nonhomegrown companies. This is related to the notion that prior to the development of an entrepreneurial cluster, some intangible precondition should be realized such as the appearance of local role models and a shift toward a more entrepreneurial culture. In a more general perspective, these results support the notion that knowledge-based regional development is a complex process that requires a long-term and continuously adjusting supporting policy rather than being based mainly on attracting established companies’ R&D centers to the region.

KEY WORDS: corporate spawning, spin-offs, founders, entrepreneurship, regional economic development

1. Introduction

Buffalo hunting to attract large established companies has become a well-accepted economic development strategy. The underlying logic is that large corporations not only provide immediate employment and knowledge spillovers (Markusen & Venables, 1999), but also create a pool of skilled labor that will generate further rounds of economic growth through local start-up creation (Fosfuri, Motta, & Rønde, 2001; Görg & Strobl, 2002). Certainly, this logic is part of the industrial genesis of Ireland (Barry & Bradley, 1997; Görg & Strobl, 2000; Haug, 1986), the Research Triangle area (Link, 1995, 2002; Link & Scott, 2003), the Asian Tigers (Hobday, 1995; Lall, 1996), and India (Arora, Arunachalam, Asundi, & Fernandez, 2001). However, this strategy was less successful in many other places (Akinlo, 2004; Borensztein, De Gregorio, & Lee, 1998; Dimitratos, Liouka, & Young, 2009; Dunning & Lundan, 2008; Orsenigo, 2001; Schneider, 2005). A key policy question concern is which factors affect both the ability of corporations to spawn founders and the ability of regions to capture them. In a broader perspective, a key issue is whether buffalo-hunting strategy can work as a...
standalone regional development strategy, or should it be part of a comprehensive long-term regional development strategy.

In Avnimelech and Feldman (2010), we examine the role of large corporations in creating a pool of local entrepreneurs who subsequently found companies. Investigations of this question have been hindered by the lack of systematic data on company founders who were previously employed by large corporations. We developed a new unique database to examine this question based on an online professional network tool. We compared the spin-off activity of 280 large corporations at the global level, and then focused on the 20 largest ICT corporations located in 10 different U.S. regions. Thus, we could track corporate, establishment, and location attributes to the corporate spawning process. In this paper, we present briefly the findings of Avnimelech and Feldman and expand the policy implication of these findings. In addition, we add an empirical analysis of the role of homegrown companies in cluster development based on the online professional network. Finally, we discuss the implication of these new findings in the context of the accumulated knowledge on innovation-based regional cluster development.

Avnimelech and Feldman (2010)'s main findings were that spawning of founders is positively associated with companies' productivity and innovativeness, with the entrepreneurial culture of the corporate headquarter/origin environment, and with the local entrepreneurial culture of the spawning establishment. In addition, we show that headquarters tend to spawn more founders than other types of establishments, and that the spawning per employee rates of small establishments are higher than those of large establishments. In this paper, we integrate these findings with the growing literature on regional cluster development (e.g., Avnimelech & Teubal, 2004, 2006; Braunerhjelm & Feldman, 2006; Bresnahan & Gambardella, 2004; Bresnahan, Gambardella, & Saxenian, 2001; Buenstorf & Fornahl, 2009; Feldman, 2001; Feldman & Francis, 2004; Feldman, Francis, & Bercovitz, 2005; Menzel & Fornahl, 2009). More specifically, we present empirical data that examine the role of homegrown companies in cluster development. Based on this new evidence and on the existing cluster life cycle literature, we suggest that while attracting R&D centers of leading corporations is important, a precondition for rapid indigenous sustainable growth of a local cluster is the appearance of a few successful homegrown companies. These successful homegrown companies often become local role models and a main source of spin-offs (e.g., see Buenstorf & Fornahl; Ellis, Drori, & Shapira, 2008; Klepper, 2007b).

The remainder of the paper is structured as follows: Section 2 presents the relationship between entrepreneurship and economic growth. Section 3 presents the role of local characteristics in enhancing local entrepreneurship. Section 4 presents the role of business sector firms in enhancing entrepreneurship through spin-offs. Section 4.1 briefly presents the findings of the empirical work on corporate spawning. Section 5 presents the role of homegrown companies in regional spawning. Section 6 presents a discussion of policy implication for regional development.

2. Entrepreneurship and Economic Growth

Entrepreneurs are the prime force in economic development (Schumpeter, 1934) and at the heart of national competitive advantage (Porter, 1990). Acs and
Audretsch (1990) argued that entrepreneurs play an important role in the economy, serving as agents of change, being a considerable source of innovation activity, stimulating industry evolution and cluster emergence. More specifically, entrepreneurs create new businesses, and new businesses in turn create new jobs, intensify competition, and knowledge spillovers (Acs, 2006). Audretsch and Fritsch (2002) suggest that since the 1990s, the engine of the economic growth shift from general knowledge generation toward entrepreneurial-based knowledge generation. Moreover, an entrepreneurial spirit is considered to be one of the most significant elements in recent economic development (Zimmerer & Scarborough, 2001). Acs, Audretsch, Braunerhjelm, and Carlsson (2009) suggest that entrepreneurs close the gap between new knowledge and new commercialized economic knowledge.

**Entrepreneurship and Regional Economic Growth**

A high level of new firm creation contributes to regional economic development and sustainability (Lee, Florida, & Acs, 2004). Coffey and Polèse (1984, 1985) have placed entrepreneurship at the center of the process of regional economic development. Eakin and Kao (2003) found that entrepreneurship at the regional level has a positive impact on productivity growth. Audretsch and Fritsch (2002) found that regions with higher start-up foundation rates exhibit higher growth rates. Callejon and Segarra (1999) found that both start-up foundation rates (i.e., efficient variation creation) and start-up closure rates (i.e., effective market selection mechanism) contribute positively to the growth of total factor productivity in regions and thus to economic growth. In addition, an entrepreneurial region is assumed to have the capability to move across technological paradigms and renew itself through new technologies and new business models and firms (Etzkowitz & Klofsten, 2005). Consequently, entrepreneurial regions grow faster and exhibit more sustainability.

**3. Regional Characteristics and Entrepreneurship**

Entrepreneurial opportunity depends on regional parameters, such as the availability of risk capital, the existence of an entrepreneurial supporting environment, and the economic conditions (Van Praag & Cramer, 2001). Similarly, according to Acs (2006), regional entrepreneurial activity depends on three conditions: the regional economic conditions, the strength of the regional scientific knowledge and human capital, and the regional entrepreneurial support systems. Armington and Acs (2002) suggested that regional variation in new firm formation is associated with factors such as population density, industrial structure, human capital, university research, the availability of early stage financing, and entrepreneurial culture. Saxenian (1990, 1991, 1994) and Sorenson (2003) argued that regional firm founding rate is associated with the embeddedness of the regional networks. Lee and others (2004) and Florida (2008) argue that social diversity and creativity have a positive relationship with firm formation. Saxenian (2002) and Lee and others have suggested that regional rates of entrepreneurship are associated with openness and high levels of immigration. Overall, the literature suggests that regions are expected to vary in the level of entrepreneurial activity even when they have similar
levels of economic and innovation activity. This diversity in the regional entrepreneurial activity levels is associated with cultural, institutional, and structural characteristics of the different regions.

**Entrepreneurship and Local Culture**

Davidsson (1995) argued that firms in different regions exhibit different attitudes toward entrepreneurship. Malach-Pines, Levy, Utasi, and Hill (2005) argue that culture influences the degree and quality of entrepreneurship in a society. Thus, in a region where entrepreneurs are viewed as cultural heroes, individuals will be more involved in entrepreneurial activity (Malach-Pines et al.). For example, in Israel, which is one of the leading ICT centers in the world, the entrepreneur has become a cultural hero and role model for many young Israelis (Lerner & Avrahami, 1999). On the other hand, in the Research Triangle area of North Carolina, despite the advanced industrial R&D sector, the significant presence of large innovative corporations and the strong basic science in the academic institutions, the levels of entrepreneurs are relatively low. This might be related to the conservative culture of the area and the limited numbers of substantial homegrown companies’ successes.

4. **Corporate Spawning**

Van Praag and Cramer (2001) argue that to start a new company, both motivation and opportunity are essential. Established companies provide entrepreneurs both motivation and opportunity. The evidence is that established business sector firms, rather than universities, government facilities, or other organizations, tend to be the main source for entrepreneurs (Cooper, 1985; Dahlstrand, 1997, 1999; Meyers, 2004). After all, such firms perform the greatest share of applied R&D in the economy. These R&D efforts lead to new ideas that are meant to be developed within existing firms. However, as Gompers, Lerner, and Scharfstein (2005) presented there are two main reasons why spin-off companies might develop to exploit ideas originating in established firms. First, mature established firms experience great difficulty responding to radical technological changes that disturb their successful core businesses (Henderson & Clark, 1990; Utterback, 1994). Second, high-level managers in established companies may be unable to evaluate revolutionary entrepreneurial opportunities (Berger, Nathan, Mitchell, Raghuram, & Stein, 2002; Scharfstein, 1998; Scharfstein & Stein, 2000; Stein, 2002), or deliberately choose to ignore potential new ideas outside their core business (Berger & Ofek, 1995; Mitchell & Lehn, 1990; Schoar, 2002). Klepper (2007a) and Klepper and Thompson (2010) also suggest that asymmetric information and strategic disagreements between leading engineers and the corporate top management about the potential of new ideas originating at the corporate level often enhance corporate spin-off.

In addition, large firms provide their employees the technical and managerial expertise that aid subsequent entrepreneurial activity. Successful firms, in terms of financial indicators and innovativeness, are likely to provide high-quality technological and managerial skills that facilitate the transition to entrepreneurship (Klepper, 2001, 2002; Klepper & Sleeper, 2005; Zahra, 1996; Zahra & Covin, 1995; Zahra & Garvis, 2000). Moreover, working in leading firms in an industry provides
employees with broad industry knowledge and specific information on entrepreneurial opportunities related to the firm activity (Freeman, 1986; Shane & Khurana, 2003). In addition, organizations are social contexts where individuals acquire social resources that could assist them in future entrepreneurial activity (Aldrich & Wiedenmayer, 1993).

Finally, the decision to start a new company is also affected by the degree to which the parent company’s strategy supports entrepreneurship. More specifically, whether the corporate culture encourages or discourages employees from leaving the firm to establish their own firms. For example, Rad-Bynat Group in Israel is famous for supporting employees that want to create their own firms, and as a result, they have many spin-offs and a very large genealogy (see Ellis et al., 2008). In contrast, other firms, such as the SAS Institute in the Research Triangle area, discourage employees from leaving and focus on developing employees’ innovations internally. As a result, the rate of founders’ spawning from SAS Institute at the Research Triangle area is quite low.

To conclude, while working in established companies, employees acquire three types of resources that may be helpful in future entrepreneurial activity. These resources include: general technological and managerial knowledge and skills, industry-specific knowledge and skills, and networks. Studies on spawning of firms have shown how various organizational routines, capabilities, and attitudes affect the emergence, evolution, and performance of ventures founded by their ex-employees (Agarwal, Echambadi, Franco, & Sarkar, 2004; Gompers et al., 2005; Klepper & Sleeper, 2005). According to these studies, the inheritance process that is embedded in the interrelationships between parent firms and their spin-offs can be envisioned as reproduction of a “genetic code” (Dosi & Nelson, 1994).

4.1 The Regional Context of Corporate Spawning

In the following section, we present partial results from an empirical study on the attributes to corporate spawning in the regional level (for full results and comprehensive methodology description see Avnimelech & Feldman, 2010). Data was generated from an online professional network. We collected data on the individuals who had founded companies in one of the 10 regional clusters studied and who also had prior work experience with at least one of the 20 leading ICT companies in our sample. We rely on an innovative data-collection procedure. Each member in the network provides a professional profile that includes present and prior work experience and positions held. While there is always a chance that a member will present incorrect information, there is an incentive to report correctly because the profile is viewed and verified by other members. Thus, there is a transparency that may make these data more accurate than survey data. We compare this data on founders and their prior work experience with a comprehensive database on high-tech firms and founders in the Research Triangle area, and find that it is quite comprehensive and there is no evidence of any systematic bias. The first set of regressions, which analyzed the global spawning patterns of 280 companies, found empirical evidence that spawning of founders is positively associated with the parent companies’ productivity, innovativeness, and headquarter/origin location.
Table 1 provides a summary of the results from Avnimelech and Feldman (2010)’s estimation of the regional corporate spawning of founders. The regional empirical analysis focuses on 10 U.S. regions out of the list of 50 leading high-tech clusters in the United States (see DeVol et al., 2009). Model 1 provides a baseline model. The number of local employees has a positive effect. Squared number of employees has a negative effect. This means that the rate of spawning per employees is higher in smaller establishments. Local innovativeness has a significant and positive effect on local spawning. Model 2 adds an origin dummy indicating that the corporation was established in the region. This variable has a significant and positive impact on local spawning. Model 3 adds the corporate and the local entrepreneurial measures, both are positive (with a diminishing effect) and statistically significant.

5. Homegrown Companies and Regional Spawning

This section presents supporting evidence that homegrown companies have a unique role in the regional cluster development process. As mentioned before, entrepreneurs are fundamental to regional development, and established companies are the main source for potential entrepreneurs. However, there is growing evidence on the unique role of homegrown companies in regional development.

Homegrown Companies and Local Networks

Freeman (1986) and Aldrich and Wiedenmayer (1993) suggest that organizations are social contexts where individuals acquire social resources to create new firms. Stuart and Sorenson (2003) suggested that entrepreneurs’ networks are often acquired through working in existing firms in the industry and the region prior to founding their own firm. Saxenian (1994) argued that local entrepreneurial activity
is embedded within the regional network and social capital. Social capital and networks are essential for entrepreneurs both in the identification of entrepreneurial opportunity (Shane, 2000; Sorensen & Sorenson, 2003) and in the mobilization of resources to exploit this opportunity (Sorensen & Sorenson). Thus, skilled entrepreneurs will often materialize in companies that have strong local networks.

Lechner and Dowling (2003) find that during the early stages of development firms intensively interact with their host region. Therefore, we can assume that homegrown companies have stronger local networks than other corporate establishments active in the region.

**Homegrown Companies and Cluster Development**

Feldman and Francis (2004) suggest that a key component of the new regional development strategies is the recognition of the importance of homegrown entrepreneurship, instead of relying on attracting successful firms from other regions. Malach-Pines et al. (2005) argue that homegrown companies are more often viewed as cultural heroes. Avnimelech and Teubal (2006) suggested that in the process of regional cluster development, often prior to the stage of rapid entrepreneurial growth, there is a stage where a few successful homegrown companies will emerge and develop into local role models. These role models will become both a significant source of spin-offs (Buenstorf & Fornahl, 2009; Ellis et al., 2008), and create the focal point of the nascent cluster, i.e., become a significant source of local imitation and reputation (Fornahl, 2003; Menzel & Fornahl, 2009). For example, Buenstorf and Fornahl (2009) presented evidence how Intershop, a leading Jena-based e-commerce company, become the main source of regional development in Jena ICT Cluster. They show how both previous Intershop founder and employees created new start-up companies, and how Intership’s temporary success created a new technological trajectory in the Jena ICT cluster. In the Israeli case, Ellis and others illustrated the significant impact that a few homegrown ICT companies had on the development of the regional ICT cluster. They found that three Israeli homegrown ICT firms—RAD Data Communication, Fibronics, and Comverse—spawned more companies than any other ICT firm in Israel (including large local MNCs’ R&D centers, such as Intel or IBM). These three firms were founded as start-ups in the late 1970s and early 1980s. They exhibited an entrepreneurial spirit, intensively invested in knowledge creation, and contended in competitive markets from the very beginning. These companies are probably part of a small group of homegrown role models that emerged in Israel during the preemergence stage (1985–92) of the new ICT cluster in Israel (Avnimelech & Teubal, 2004). These and other companies that were created in the early 1980s had a significant impact on the development of the Israeli ICT cluster during the 1990s (Avnimelech & Teubal, 2006). Similarly, many other studies presented anecdotal evidence how local successful homegrown companies became a significant source of regional cluster emergence, for example, Fairchild Semiconductors in Silicon Valley (Moore & Davis, 2004), or SP Radio in Denmark (Dahl, Dalum, & Pedersen, 2003). Buenstorf and Klepper (2009) argued that in many cases, the main explanation of cluster emergence is spin-off from very successful early local homegrown firms in a...
new emerging industry. In addition, in Table 1, we presented evidence that corporations that originated from the region have a higher propensity to become a significant source of local spin-offs.

Table 2 presents new empirical evidence on the role of homegrown companies in enhancing cluster development. We counted the number of founders spawned from the largest 100 private sector employers in 20 large innovative U.S. clusters. In each region, we ranked these 100 companies based on the number of founders spawned, i.e., from the company with the highest number of spin-offs to the company with the lowest number of spin-offs. Finally, we counted the number of homegrown companies among the top sources of spin-offs in the region (Table 1 presents this information for three groups: Top10, Top20, and Top50). These partial results suggest that there is a very high correlation (0.73, 0.79, and 0.90, respectively) between the share of homegrown companies in the leading local spin-off sources and the level of the cluster development. For example, while in Silicon Valley, the most entrepreneurial cluster in our sample, 80% of the Top10 sources of spin-offs are homegrown companies, in Nashville, the least entrepreneurial cluster in our sample, only 20% of the Top10 sources of spin-offs are homegrown companies. It is important to mention here that we do not have any evidence in this data to the causality direction of this strong correlation, and it is not clear whether successful homegrown companies lead to strong cluster or vice versa.

However, as mentioned, the cluster development literature may suggest that the emergence of early successful homegrown companies often appears prior to the rapid start-up formation in the cluster and may help to explain variation in start-up formation levels in different regions. Moreover, we do not suggest that attracting R&D centers of large corporations is not helpful in cluster development, but that this action cannot be the exclusive element of the regional development strategy.
6. Summary

This paper presents empirical findings on the attributes of corporate spawning. Accordingly, local establishment characteristics, such as the number of employees and the level of innovativeness, have a positive significant impact on the number of spinoffs from the local corporate establishment. We also found that a higher level of local spawning is associated with companies originating and headquartered in the region. Moreover, beyond these establishment characteristics, location factors that reflect the entrepreneurial environment of the establishment are the most important attribute for the local spawning process. In addition, we found that corporate headquarters’ entrepreneurial environment has a significant impact on the propensity of the corporation and its local establishments to spawn founders. Finally, we found that homegrown companies spawn more than other companies.

In Section 5, we presented new empirical data on the main sources of spin-offs in 20 leading U.S. innovative clusters. These data suggest that homegrown companies have a strong interaction with cluster development. The data also suggest that, often, in leading innovative clusters, homegrown companies play a significant role in the process of local spawning, e.g., homegrown companies spawn more local founders than other local establishments. While there is no evidence on the direction of the relationship between cluster development and the dominance of homegrown companies, the cluster development literature supports the view that the emergence of some early successful homegrown companies may be an important precondition for enhancing rapid cluster development.

6.1 Discussion

Knowledge-based regional cluster development policies have become widely used by policy makers all over the world. Their main goal is to transform local economies to successful innovative clusters. Often, sustainable innovative clusters contain a strong element of entrepreneurship and start-up formation. More specifically, rapid start-up formation is a major component of cluster emergence and is a precondition for cluster sustainability. The naïve perspective of many policy makers is that attracting R&D centers of large innovative corporations into a region could be the primary step in creating the conditions for the upcoming rapid local start-up formation. According to this perspective, the next stage in cluster development strategy (after a decade or more) will be promoting of venture capital investment and improving the entrepreneurial supporting system in the region. The hidden assumption is that after these R&D centers will operate in the region for a while, they will continuously spawn local founders.

However, this paper presented empirical evidence that challenges this naïve view. While the attraction of R&D centers to an emerging innovative cluster might have a significant impact on regional development, its entrepreneurial impact might be limited without a corresponding local cultural change. Moreover, we suggest that without the appearance of some successful homegrown companies, the anticipated cultural change is less likely to appear (or at least will be less dramatic), and thus the impact of this regional development strategy will be limited. More specifically, a cultural change toward entrepreneurial culture is one of the preconditions for
rapid start-up formation and cluster emergence and sustainability. Thus, we argue that attracting large innovative corporations into a region may not be enough in order to foster entrepreneurship; you also have to create appropriate pre-conditions of entrepreneurship.

The cluster life cycle literature (Avnimelech & Teubal, 2006; Feldman, 2001; Feldman et al., 2005; Martin & Sunley, 2003; Menzel & Fornahl, 2009) support this view and suggests that the process of start-up formation has very strong local characteristics and co-evolves with the development of the cluster’s entrepreneurial infrastructures. This literature also suggests that an intermediate stage of cluster development (between the attraction of R&D centers and the rapid formation of local start-ups) will include events such as the formation of successful homegrown companies, the appearance of dominant local role models and the emergence local leadership (Avnimelech & Teubal; Buenstorf & Fornahl, 2009), and processes such as creation of focal points in terms of technological focus and business models (Menzel & Fornahl). Through time, the accumulation of such events will potentially lead to cultural change toward an entrepreneurial supportive culture (Avnimelech & Teubal) and viewing entrepreneurs as cultural heroes (Malach-Pines et al., 2005).

Undoubtedly, there is still more to learn about the conditions for local cultural change and the emergence of successful homegrown companies. Klepper (2007b) argues that such homegrown companies could appear by chance, while other researchers are less deterministic and give a greater role to the preconditions. However, most researchers do agree that specific processes and events may have a significant role in creating the conditions for a cultural change and homegrown companies’ emergence. For example, Venkataraman (2004) argues that prior to the formation of a rapid entrepreneurial economy, a region should first develop tangible elements, such as sound legal systems, capital markets, and other structural features, and also develop the intangible features of entrepreneurship, such as access to novel ideas, role models, region-specific opportunities, and executive leadership. This is related to the notion that rapid entrepreneurship will develop only in areas where the entrepreneurial support systems are well developed, and the local culture is supportive to entrepreneurship (Acs, 2006; Van de Ven, 1993).

6.2 Policy Implications

A critical question from a policy perspective is how a cluster emerges in a region that was not characterized as innovative previously. Certainly, there is a role for government to play in facilitating entrepreneurship, cluster formation, and regional economic growth. Government has a role in providing infrastructure and other goods that markets fail to provide (Feldman & Francis, 2004). The potentially long horizons of development policy, as opposed to the short horizons of the stock market, can provide an environment conducive to entrepreneurship. Effective state policy might focus on creating conditions that would allow firms to grow and prosper. One key component of the new regional development strategies is the recognition of the importance of entrepreneurship and the potential in homegrown industries and companies. Instead of relying on attracting successful firms from other regions
through financial incentives, the new strategies focus on providing a hospitable environment for entrepreneurs to create new firms.

One potential policy framework for such new regional development strategies is the evolutionary targeting (Avnimelech & Teubal, 2008) approach. The evolutionary targeting framework aims at creating new capabilities, markets, institutions, and fields of research within a number of existing or emerging industrial sectors. It requires clear definitions of the short-term objectives while being aware of the long-term objectives. Evolutionary targeting should consist of both vertical and horizontal policy portfolios, and other institutional and regulatory policy elements. Evolutionary targeting requires a critical mass of resources and activities in order to effectively trigger an emergence process. The overall goal of evolutionary targeting policy is to trigger and support the development of a significant and sustainable new sectoral innovation system.

The extended industry life cycle perspective suggests that there are few distinctive phases in industrial cluster development. It contains five distinctive phases of development starting with the creation of the background conditions phase, followed by pre-emergence phase, an emergence phase, a maturity phase, and decline or renewal phase.

The background phase begins with the appearance of the knowledge-intensive sectors and activities in the relevant sector in the broad sense; it is a period of experimentation, including various agents, in which capabilities and other relevant recourses are gradually accumulated. The preemergence phase is a distinctive part of the background condition creation, which begins with the appearance of new agents within the relevant sector and is followed by extensive variation within this category. This process of new agents and new activities-experience accumulation enables selection of the suitable features of the new activities and agents and identification of specific system failures that are related to the new emerging sectoral system of innovation. This phase involves extensive structural and cultural changes within the economy, leading to the emergence of new institutions and new agents. This process creates the preconditions for the cumulative emergence process in the next phase. In the emergence phase, after an initial critical mass of demand and supply agents is created, the new sector will grow rapidly. Emergence should be followed by a successful cluster development and expansion processes in order to create a high impact and sustainable new sectoral system of innovation. Finally, the ability of the sector to retain a significant level of diversity in terms of knowledge, types of agents, networks, and sources of new technologies will determine its chance to undertake a renewal process.

Evolutionary targeting policy seeks to identify common potential systems and market failures during these phases, and to create a suitable multi-phase policy framework to handle these system and market failures. Phase 1 of evolutionary targeting will focus on creating the background condition for new sector development. Thus, phase 1 will often be based on horizontal policies with or without some level of vertical focus. Often, a primary policy focus of this phase is the attraction of R&D centers of large corporations into the region and the accumulation of innovation and management capabilities within the region. Initiating the evolutionary targeting process requires a clear definition of the short-term objectives (of phase 1) while being aware of (but not deterministic about) the long-term objectives (e.g.,
North Carolina policy toward biotechnology during the 1980s is a clear example of such a policy perspective. Phase 2 of evolutionary targeting will focus on dealing with system failures blocking market development and triggering emergence processes. Thus, phase 2 will often add significant vertical focus to the policy; it may also include some policies specific for dealing with missing or insufficient institutions or context-specific system failures. These may also include triggering policies for those missing elements in the sectoral system of innovation or attempts to enhance a cultural change process. Phase 3 of evolutionary targeting will focus on enhancing market growth and leveraging the economic impact of the new sector. Thus, phase 3 will often include significant expansion of government support during early emergence processes, and will be followed by regional cluster development policies to leverage the initial success to a broader economic impact. These policies will often include also programs geared toward enhancing venture capital activity and strengthening the entrepreneurial support system.

Notes

1 We would like to thank the Kauffman Foundation for support.
2 Based on interview conducted with entrepreneurs in the Research Triangle during June–August 2009.
3 The HQ entrepreneurial environment index is a count of all founders in the 50 miles from the corporate headquarters location, and the local entrepreneurial environment index is a count of all founders in the 50 miles from the local establishment.
4 The working definition of spin-offs in our empirical work is founders spawned out of a specific company.

About the Authors

Gil Avnimelech is a lecturer and researcher at the Faculty of Business Administration, Ono Academic College, Israel. He held a postdoctoral research associate position at the University of North Carolina at Chapel Hill. His research and teaching interests focus on the areas of innovation, entrepreneurship, venture capital, and regional development.

Maryann Feldman is the S.K. Heninger Distinguished Chair in Public Policy at the University of North Carolina, Chapel Hill. Her research and teaching interests focus on the areas of innovation, the commercialization of academic research, and the factors that promote technological change and economic growth.

References


