Imprinting, inheritance, and entrepreneurial inclinations:

A genealogical approach to the study of founding new firms

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Abstract

We examine the impact of the initial environmental conditions on the imprinted entrepreneurial inclinations of technologically oriented organizational genealogies. We further explore how these imprinted entrepreneurial inclinations are transmitted, along genealogical lines through parent-progeny heredity mechanisms, and affect the growth of the population of organizations. Our analysis of 769 Israeli communication and information technology firms provides evidence to support our claim that the founding parent firms developed different entrepreneurial inclinations depending on their initial founding conditions. We show that these entrepreneurial inclinations of the founding parent firms impact the entrepreneurial inclinations of the second generation and those of the entire genealogy, as well as mediating the effect of the initial conditions on the entrepreneurial inclinations of future generations of the genealogy.

Key Words: genealogy, imprinting, inheritance, spinouts, evolution, high-tech

Introduction

Understanding the process of founding new firms is an ongoing agenda in organizational evolutionary research. In particular, theories have stressed the importance of organizational processes and events that profoundly influence the birth mechanism and the evolutionary trajectory of start-up firms (Aldrich and Ruef, 2006; Klepper, 2009; Stinchcombe, 1965). Research pays special attention to the founding, and evolution of spin-out, firms founded by employees of incumbent firms, and the sources of their position and prevalence in their respective industries (Agarwal, Raj, Franco, and Sarkar., 2004; Chatterji, 2009; Gompers, Lerner, and Scharfstein, 2005; Klepper and Sleeper, 2005; Klepper and Thompson, 2006; Klepper, 2009). Given the importance of the founding of new firms, it is beneficial to understand the factors that influence their founding and how such factors affect the evolution of the spin-out.

Stinchcombe's (1965) imprinting hypothesis has emerged as the primary explanation. Stinchcombe argued that the environment and its characteristics, such as social relations, institutions, or legal systems "are historically contingent and imprint an organization with the characteristics of the era when it was founded" (Stinchcombe, 1965: 142). This highlights the idea that the initial conditions at the time of founding exert an enduring effect on certain organizational characteristics that persist and selectively reproduce along time (e.g., Johnson, 2007; Marquis and Tilcsik, 2013).

However, scant research has been devoted to exploring the influence of imprinting on the evolutionary trajectory of a population of organizations that originated in similar founding conditions, focusing instead on the consequences of parent-progeny founding (Phillips, 2002; Jaffee and McKendrick, 2006). In this paper we grapple with the effect of imprinting beyond parent-progeny relations, and across generations (e.g., Marquis and Tilcsik, 2013). We examine the effect of imprinting in terms of the persistence of organizational entrepreneurial inclinations.

By entrepreneurial inclinations we mean the relevant repertoire of norms, capabilities, practices, managerial blueprints and behaviors that under certain circumstances provide an impetus for further entrepreneurial activities. The effect of the imprinted entrepreneurial inclinations is maintained, along the generations through parent-progeny heredity mechanisms, and consequently influences the growth of the population of organizations from a similar origin. We develop a framework for the genealogical evolution of an industrial sector, tracing the pattern of growth of new firms along generational lines. We refer to a *genealogy* as a record of descent or lineage of a group from its ancestors to the recent generations (Fox, 1984). Being part of a genealogy reflects the degree of association and proximity of a distinct network of firms which serve as a repository of potential founders who transfer entrepreneurial knowledge to their progenies.

By focusing on genealogical evolution, we can empirically examine the impact of certain characteristics of the environment at the period of founding on the organization's entrepreneurial inclinations (Stinchcombe, 1965), and then we can trace the persistence of these inclinations across generations in spite of continuous environmental changes. Thus, organizations founded in subsequent generations far removed from their ancestors, may still be influenced by the characteristics of the founders that are reproduced and inherited across genealogical time (Hannan, Burton, and Baron, 1996; Stinchcombe, 1965; Marquis and Tilcsik, 2013)

Specifically, we argue that the initial conditions at distinct points in time shape the entrepreneurial inclinations of the founding parent’s firm of a genealogy and consequently determine its fate in terms of its ability to reproduce. The entrepreneurial characteristics of the different genealogies are transmitted along genealogical lines, via inheritance, thus affecting the evolutionary trajectory of future generations. This multi-generation analysis addresses a gap in

the literature, which focuses mainly on the relations between parents and progeny in the first generation as the driving mechanism of transmission of knowledge and organizational norms that may lead to the spawning of new firms (Phillips, 2000, 2005; Klepper, 2001, 2009).

In this study we explore the following questions: (1) how different environmental conditions (competitive vs. institutional-cooperative) imprint different entrepreneurial inclinations on the founding parents of the respective genealogies, and (2) how the entrepreneurial inclinations of the respective founding parents of the genealogies persist over generations. We examine these questions in the context of the evolution of the Israeli information technology and communication (ITC) industry since its inception in the 1950s. We identified founding parents' firms that led to the establishment of nine genealogies. This setting provides an empirically rich illustration of our theoretical model. Since the Israeli state's early days, the founders of its ITC industry have been renowned for their entrepreneurial resilience and creativity (de Fontenay and Carmel, 2001; Breznitz, 2007; Senor and Singer, 2009).

We proceed by presenting our theoretical framework and hypotheses, including the basic principles of the genealogical approach. We then review the data, method, and results. We conclude by discussing the implications for multilayer imprinting studies and more broadly propose insights for understanding the evolution of industrial sectors.

Theory and Hypotheses Development

The nature and taxonomy of organizational genealogies

Fox (1984) refers to "genealogy" as a group's record of descent or lineage (from its ancestors up to the recent generation. Genealogy reflects the degree of association and proximity within a network of relationships along time, characterized by path-dependent relationships among firms along a lineage system. Examining the evolutionary process of the industry through the lenses of a genealogy would thus imply that the so-to-speak genetic characteristics of parenting founders will be inherited by the offspring of the genealogy and may determine the evolutionary trajectory of the entire genealogy. In organizational terms, we postulate that certain genealogical characteristics can predict what types of new organizations will be founded as well as their organizational characteristics, such as organizational models, technology, knowledge, markets, alliances, and access to human, social and financial capital. Rose and Ito (2005) have also shown that Japanese parent companies tend to behave somewhat "altruistically" by distributing core competencies to offspring and risking being outperformed by them for the sake of the survival of the whole family (Ito, 1995). Studying new venture creation in Boulder County, Colorado, Neck, Meyer, Cohen, and Corbett (2004) presented the genealogy of the local high-tech firms that spun off from the "trunks" of seven primary incubator organizations that serve as the genesis bedrock for new organizations which follow a well-defined path (Neck, et al., 2004: 206). Furthermore, studying the genealogical evolution of the health care system of Twin Cities in Minnesota, Van de Ven and Grazman (1994) suggested a nested evolutionary model, in which processes and organizations are entrenched. Eventually, different genealogical characteristics stem from the *genetic variations* existing within and between offspring, families, or branches of lineages, which are transmitted directly from parents to progeny.

Genealogies may vary in different ways depending on the composition and characteristics of those included in the genealogy. For example, the number of incumbents (one or more founders or acquirers), the incumbents' origin (the founders may be ex-employees of companies in the same genealogy or external genealogies), the founders' occupational or industrial background (having working experience in the same industry as the genealogy or in a different industry). Genealogies can also vary according to particular types of relations among members. Unlike a familial (human) genealogy, which is normally linear in terms of generational path, organizational genealogies vary in terms of their affinity and linearity. Moreover, familial genealogies are usually constrained by cultural and social norms and rules that define who are entitled to perform the reproductive and social roles, and by the degree of affinity. Regardless of the differences, a genealogy is founded by ancestors (real or mythological) and grows by their children, their grandchildren and so on (Fox, 1984). Further, a genealogy is affected by the origin of its ancestors, and the composition of the spin-outs in the successive generations.

Finally, it should be noted that the evolution of an organizational genealogy may transcend familial societal norms of affiliation. For example, cross-affinity relations may develop, which can also be described as incestuous or serial entrepreneurship. Cross-affinity relations exist when a spin-out is founded by a parent teaming up with a grandchild or great-grandchildren along the generational line. Furthermore, serial entrepreneurship can be detected in multigenerational genealogies in which potent members found new ventures in a number of successive generations**.**

Initial conditions, imprinting and entrepreneurial inclinations

Stinchcombe's (1965) seminal work on the emergence of organizations provides a conceptual insight that situates the evolution of new industries within the framework of founding

mechanisms. In it he claims that the initial social and structural conditions at the time of founding, which include technological, social, political, economic and cultural characteristics, exert enduring effects on future organizational evolution. As Dobrev and Gotsopoulos (2010) note: “Initial conditions exert a permanent, direct effect on subsequent developments regardless of the intermediary steps that have taken place since the start of the evolutionary process” (p. 2).Studies that draw on Stinchome’s insights have put forward the idea of imprinting at different levels – individuals, organizations, organizational building blocks or organizational collectives, to examine the nature of those organizational characteristics that are imprinted by the condition that prevailed at the time of founding. For example, studies show how imprinting affects the population's mortality rate (Swaminathan, 1996), pace of change (Tucker, Singh, and Meinhardt, 1990), or the formation of a locally focused network of transportation (Marquis, 2003). On the organizational level, Dobrev and Gotsopoulos (2010) studied the legitimacy vacuum which imprints on the structure and practices of new type of organizations. Looking at a single organization, Johnson (2007) studied the Paris Opera and documented the tenacity of cultural policies. On the individual level, Hannan, Burton and Baron, (1996) explored the formation of management blueprints and employment models which become distinct imprints of certain type of organizations (Baron, Burton and Hannan, 1999). Phillips (2005) studied gender imprints, and stated that gender equality in newly founded law firms is affected by the gender norms that prevail at the founder’s former workplace. Thus, the policy environment, societal values and political systems contribute to the formation of the organizational structures, routines, practices and knowledge of the newly founded organization. Other characteristics may directly relate to the organization's attitude toward processes, structures, and values that may enhance or

constraint innovation, creativity or learning, including skills and knowledge associated with entrepreneurship.

In accordance with the imprinting hypothesis, entrepreneurial inclinations are influenced by the interrelationship between the internal organizational dynamics and the external environment and provide the impetus for further entrepreneurial activities. For example, employees of companies that operate in environmental conditions that encourage entrepreneurship (such as competition (Kirzner, 1973)) are better equipped to identify entrepreneurial opportunities that call for founding a new firm (Klepper, 2001, 2009). In other words, entrepreneurial inclinations entail a repertoire of characteristics, norms and behaviors which allow social actors to exploit opportunities and create new venture that may follow a certain path influenced by pre-existing social-environmental conditions (Sydow, Windeler, Schubert, and Möllering, 2012). Thus, the entrepreneurial inclinations of a genealogy are influenced by the scope of the genealogy's embededness in its institutional environment, that is, the set of conditions, norms, regulations or interdependencies between various sources such as state bureaucracies, the legal system or the private sector's structure and corporate governance (Stinchcombe, 1965). The composition and structure of the institutional environment present constraints or opportunities for founding new firms.

Kirzner (1973) emphasized the importance of competitiveness in shaping entrepreneurial inclinations, insofar as they reflect alertness to newly worthwhile goals and newly available resources. In other words, the ability of individuals to learn from market participation and to respond to the changing environmental conditions in various innovative ways can be exercised most effectively in competitive environments. This alertness shapes the dynamic nature of the market and generates change in individual plans. Competitive environments are therefore the

best arena to develop entrepreneurial inclinations. The entrepreneurs are those who notice opportunities such as price discrepancies or potential technological innovations before others. Furthermore, in order to survive in competitive environments, firms must engage in more explorative activities, including risk taking and proactive behaviors (Auh and Menguc, 2005), and reduce uncertainties (Anand, Mesquita, and Vassolo, 2009). As Zahra (1993: 324) states: "When rivalry is fierce, companies must innovate in both products and processes, explore new markets, find novel ways to compete, and examine how they will differentiate themselves from competitors." In contrast, when competition is less intense, firms can operate with their existing systems to fully capitalize on the transparent predictability of their own behavior. That is, low competitive pressures may enable firms to primarily exploit previously established cost and differentiation advantages and to engage in lower levels of exploration efforts than in highly competitive environments.

Entrepreneurs thrive in a competitive environment which is characterized by aggressive seeking of opportunities to keep up with technology and market. In contrast, a cooperative environment which calls for fewer dynamic organizational strategic changes effectively cements structures and practices that favor inertia and may depress the need for change (Carroll and Hannan, 2000). Inertia discourages disruptive spin-off activities which may cause a loss in talent, know-how or social capital (Phillips, 2002). Organizations which were founded in such an environment tend to create routines and practices aligned with effective structure and values that seek to benefit from stability and preservation of extant capabilities (Stinchcombe, 1965; Hannan and Freeman, 1984).

In light of Stinchcombe's imprinting hypothesis, we suggest that founding parents of genealogies that were established in competitive environments will develop stronger entrepreneurial inclinations than genealogies that were established in cooperative environments.

H1: Founding parents' firms that met a competitive environment will have stronger entrepreneurial inclinations than founding parents' firms that met a cooperative environment.

Transmission of the initial conditions and the founding parent's entrepreneurial inclinations

Parents influence their progeny through the "genes" of experiences, skills, practices and knowledge that offspring carry with them and apply to the newly created organization. By doing so, they shape the new firm's behavior (Beckman, 2006; Boeker, 1997; Kraatz and Moore, 2002). Transmitting organizational parents' "genes" may have practical advantages for the progenies. The offspring may introduce innovations and practices related in some way to the activities of their parent company (Bankman and Glison, 1999), because they inherited the knowledge and strategy of how to exploit similar products and services from their parent company (Franco and Filson, 2006; Agarwal et al., 2004). Thus, transmitting ideas or skills exerts influence on both the nature of the spin-out activities and the prospects of their survival and success (Burton, Sorensen, and Beckman, 2002; Eckhardt and Shane, 2003; Klepper, 2001, Romanelli and Schoonhoven, 2001; Shane, 2000, 2001).

Furthermore, the "inheritance" bestowed on progenies represents the tenacity of the imprinting effect and consequently the persistence of parental blueprints, including the culture, practices and knowledge at their founding. Burton and Beckman (2007) contend that the imprinting process plays a critical role in preserving the position's initial formulation and shapes its evolution.

Researchers studying the inheritance processes in spin-outs, claim that what is being inherited (e.g., technological or marketing know-how or culture) is contingent upon the nature of the founding which, in turn, shapes key organizational characteristics such as norms, routines, practices and professional schemas (Agarwal et al., 2004; Chatterji, 2009; Delmar and Shane, 2006; Dencker, Gruber, and Shah, 2009; Gompers et al., 2005; Franco, 2005; Franco and Filson, 2006; Helfat and Lieberman, 2002; Jaffee and McKendrick, 2006; Klepper, 2001; Klepper and Sleeper, 2005; Phillips, 2005). This approach emphasizes the inheritance aspect of the spin-outs, that is, the harnessing of the incumbent's potential contributions to the new venture. According to this view, experience gained during employment provides entrepreneurial knowledge as well as instrumental help to the prospective entrepreneurs of new ventures.

Interestingly, beyond a few studies that dealt with transmission of knowledge between two generations (cf., Baron and Hannan, 2005; Burton, et al., 2002; Phillips, 2000, 2005), the literature is mute on the process of knowledge transmission along generational lines. We propose that not only the progenies (the first generation) that inherit the traits from the founding parent will be impacted by the imprinting of the initial environmental conditions. We argue that the entire genealogy is impacted by these initial conditions. In other words, our genealogical approach demonstrates that the influence of the imprinting does not vanish, and entrepreneurial values remain consistent along generational line (e.g., Johnson, 2007; for a review see Marquis and Tilscik, 2013).Hence, our hypotheses are:

H2a: The entrepreneurial inclinations of the founding parent's firm have a positive effect on the entrepreneurial inclinations of the second generation of a genealogy: The greater the entrepreneurial inclinations of the founding parent's firm the greater the entrepreneurial inclinations of the second generation of a genealogy.

H2b: The entrepreneurial inclinations of the founding parent's firm have a positive effect on the entrepreneurial inclinations of a genealogy: The greater the entrepreneurial inclinations of the founding parent's firm the greater the entrepreneurial inclinations of a genealogy.

Examining the impact of the initial conditions on the entrepreneurial inclinations of the founding parents' generation, the second generation and the entire genealogy is only the first step in demonstrating multigenerational imprinting (Johnson, 2007; Marquis and Tilscik, 2013). The environmental changes that follow the period of founding can bring about the creation of certain organizational characteristics that might differ from those that were shaped during the period of founding. Nevertheless, we argue that some of the original characteristics are persistent and transmitted along generations. In other words, the entire genealogy is influenced by those organizational characteristics that were formed during the founding of these organizations. Thus, genealogies of founding parents that imprint their progenies with effective skills, practices, knowledge or blueprints associated with entrepreneurship tend to be as entrepreneurially inclined as their founding parents. In light of this assertion, the last step in demonstrating the inheritance claim is to show that the initial conditions affect the entrepreneurial inclinations of the second generation and the entire genealogy. In other words, the entrepreneurial inclinations of the founding parents' firms mediate the imprinting effect of the initial conditions on the second generation (the first generation after the founding parents) and, accordingly, on the entire genealogy.

Hence, the entire continuum of genealogical growth can be described as following three organizing principles. First, the initial conditions impact the entrepreneurial inclinations of the founding parent. Second, the entrepreneurial inclination of the founding parent is then

transmitted to the second generation and from generation to generation throughout the genealogy. Third, the transmission of entrepreneurial inclinations in the generational chain from one generation to another depends on the entrepreneurial inclinations of former generations. Thus, we propose that the transmission of the entrepreneurial inclination throughout the genealogy mediates the transmission of the initial conditions.

H3a: The entrepreneurial inclinations of the founding parent's firm mediate the effect of the initial conditions on the entrepreneurial inclinations of the second generation of a genealogy.

H3b: The entrepreneurial inclinations of the founding parent's firm mediate the effect of the initial conditions on the entrepreneurial inclinations of a genealogy.

Method

Compiling data

The data for constructing the genealogies of the founding parents' firms of the Israeli ITC industry were collected from the following information sources: (1) The Israel Venture Capital (IVC) Research Center's historical and current archives; CBS (Israel's Central Bureau of Statistics) databases; IAEI (Israel Association of Electronics & Information Industries) databases; (2) LinkedIn.com; (3) firms' URL websites; (4) newspaper archives; and (5) interviews with 65 CEOs and founders of high-tech and venture capital firms. Constructing the ITC genealogies involved the following steps:

We used the IVC (www.ivc-online.com), historical and current records to identify all the companies listed under communication-related categories. IVC's database is divided according to industrial sectors and communication companies that are aggregated under separate domains. The IVC-Online database includes over 6,500 Israeli high-tech companies and ventures capital

funds. It is considered a reliable and major source for the Israeli high-tech and venture capital industries and is widely used in academic research (cf. Avnimelech and Tubal, 2004; Fiegenbaum, 2007) as well as by government and private sector industry analysts. For further information about the founding firms of the entire communication industry and their progenies, we viewed each of the company websites and searched the Israeli daily newspaper archives (Haaretz, Globes, Yediot Aharonot). We then triangulated the information collected from the various data sets with selected interviews with the industry champions. We identified these industry leaders, through a "snow-ball" or chain referral technique (Biernacki and Waldorf, 1981). Such procedures are very effective in the Israeli context since firms in the ITC industry are geographically concentrated and the founders of start-ups are closely related through the VC industry (cf. Avnimelech and Tubal, 2008; Breznitz, 2007).

Identifying and constructing the genealogies

We developed the genealogies by tracing the origin of each company in our sample. We searched and analyzed founding data, the name/s of founder/s; their employment history, the owner and affiliated firms, which were founded prior to 1985 (the early 1980s is considered as the start of the modern communication industry in Israel, see Breznitz, 2007).We found 18 firms that had been founded before1985: BA Microwaves, Comverse, ECI Telecom, Elisra, Fibronics, Gal-Op, Galtronics, Leadcom, Microkim, Micronet, Motorola Israel, Orbit Technologies, RAD Data Communications, Source of Sound, Telco, Teldor, Telrad Networks, and Tadiran. For each of these, we identified its spawned, merged, or acquired firms. We used the interviews to verify whether all founding parents of the ITC industry were included in this group of firms, which could be titled "founding parent of ITC in Israel." Five firms were selected by most of our interviewees: Telrad Networks (Telrad), Tadiran, ECI Telecom (ECI), Comverse, and RAD Data

Communications (RAD). However, our genealogical analyses revealed three additional relatively important genealogies, Elisra, Orbit Technologies (Orbit), and Motorola Israel (MIL), that evolved during the 1950s and 1960s and one important and unique genealogy, Fibronics, that evolved during the late 1970s. Interestingly, although Fibronics was not mentioned by many interviewees, it had a tremendous effect on the evolution of the Israeli ITC industry. The other nine firms (four that were established in the institutional-cooperative period and five that were founded in the competitive period) did not have the minimal record of spin-outs and were not included in our study

Constructing the genealogies

We searched for founders who had been employed by one of the nine parent firms before founding their own. This allowed us to add the de-novo firms – spawned start-ups founded by independent entrepreneurs who left their incumbent firms – to the basic configuration of the genealogy. Then we searched for firms that were spawned from, acquired by, or merged into each of the nine founding firms. We coded these firms as the second generation of the genealogies. We repeated the procedure moving along the genealogy from generation to generation up and including the year 2005. In this way, we were able to build a succession line of firms and to identify their founding characteristics. In cases in which there was more than one founder, we traced their employment histories and marked the genealogical affiliation as endogenous (or exogenous) if they were employed by a firm that was (or was not) part of the genealogy.

We traced firms not only through top-down procedures (as described previously) but also from the bottom up. We selected the firms of the last generation and identified their founding teams and employment histories. The most recent employers were identified as the parent

companies of these teams. In this way, we continued to trace each genealogy's origin until we reached the founding parents of the entire genealogy. This procedure was carried out to ensure that we did not miss any firm or founder in the top-down method.

Drawing the genealogy maps

We drew network maps of each genealogy using the Pajek software (see Figures 1 through 9). These maps illustrate the interrelationships among the members of each genealogy and between genealogies, enabling us to understand the nature of each genealogy's intergenerational relations.

[Insert Figures 1-9 about here]

The nine genealogies consist of 769 firms. Because some firms may be affiliated with more than one genealogy, the total number of firms in our nine genealogies was 998. The firms included in each genealogy were divided into two major groups: endogenous and exogenous .A firm is defined as an exogenous member of a particular genealogy if it originated in another genealogy and it is related to the particular genealogy by "marriage"; thus, the new joiner is a co-founder, co-acquirer, or co-merger. All of the firms of exogenous origin are affiliated with at least two genealogies. A firm is endogenously affiliated with a particular genealogy if it is related to it by "birth," or by mergers and acquisitions (M&As). Accordingly we identified seven types of affiliated membership in genealogies of firms. These types are (1) founding parents of the entire genealogy; (2) de-novo firms founded by employees who left their organizations to pursue their entrepreneurial ambitions; (3) de-novo firms founded by existing members of a genealogy; (4) mergers and acquisitions (M&As) – those that were either merged into or were acquired by a member of a genealogy; (5) mergers – firms that were established following a merger of two or more firms within the genealogy; (6) spin-offs – firms that used to be a division

of an incumbent firm or of one of its offspring and became new independent entities; and (7) exogenous firms – a co-founder, co-acquirer, or co-merger originating in another genealogy.

Research Variables

Entrepreneurial inclinations. The best proxy for measuring entrepreneurial inclinations is the number of spawned start-ups founded by independent entrepreneurs who left their incumbent organizations (de-novos) and by the number of start-ups that were established by existing members of the genealogy. Our data allow us to count the number of de-novos and firms founded by de-novo members in each genealogy from the date of founding until December 31st, 2005. To test our hypotheses we computed three proxies of entrepreneurial inclinations. (1) The number of new ventures that the founding parents' firms established and the number of de-novos spawned from the founding parents' firms each year. These numbers reflect the entrepreneurial inclinations of the first generation (founding parents). (2) The number of new ventures that were established by de-novo firms of the second generation and the number of de-novos spawned from the second generation firms each year. These numbers reflect the entrepreneurial inclinations of the second generation. (3) The number of new ventures (de-novos or founded by de-novos or founding parents) across the entire genealogy each year. This reflects the entrepreneurial inclinations of the entire genealogy.

Initial conditions. To test the imprinting argument, i.e., the effect of initial conditions on entrepreneurial inclinations, we identified two periods that might have shaped the entrepreneurial inclinations, the capabilities of the founding parents' organizations, and, later, the evolution of different groups of genealogies. The first period, before 1977, the formative years of the Israeli state, was marked by an ideology that elevated the collective above individual interests and harnessed the resources of both for the goal of nation building. This period was associated with

high involvement of the government and other national institutions (such as the national labor union) in economic and industrial activities. We refer to this period as the institutional-cooperative period. The second period was marked by political upheaval, a shift toward a neoliberal economy, and substantial growth of the private sector. We refer to this the competitive period.

[Insert Table 1 about here]

Our analysis of nine founding parent organizations revealed that firms founded during these respective periods, have developed different strategies in terms of knowledge creation versus knowledge acquisition, as well as different choices of target markets – local and institutional versus competitive and international. As can be seen from Table 1, RAD, Fibronics, and Comverse, which were founded during the competitive period, based their strategy on knowledge creation and an entrepreneurial orientation, whereas Tadiran, Telrad, Orbit, MIL, and Elisra, which were founded during the institutional-cooperative period, initially focused on knowledge acquisition. Founding parents of genealogies in the competitive group began as young start-ups led by founders who were oriented toward both business and R&D in order to survive and prosper in the competitive environment. As Zohar Zisapel, one of the two founders of RAD, explains: "From my early days I realized that our (RAD) R&D should be focused in accordance with the need of the market. In practice, we developed our technology with the guidance of our customers" (interview with the authors, 2007). In contrast, the founding parents of the institutional-cooperative group, integrated as they were into the effort of nation building, operated in a centralized, institutionalized communication sector. Firms in the institutional-cooperative group were practically free from external competition and did not have to invest in R&D beyond the needs of their institutional clients. One genealogy, ECI, which was founded

during the institutional-cooperative period (1965) but went through a major leadership and organizational change in 1977, exhibited characteristics typical of the two periods and was considered a hybrid. Thus we coded ECI as an institutional-cooperative genealogy till 1977 and thereafter as a competitive genealogy.

Statistical analysis

All the dependent variables in our models were count variables. The data were structured as unbalanced panel data across time and the count of new ventures that were established year by year. For the first analysis of the entrepreneurial inclinations of the first generation for each of the genealogies we started the data analysis at the year of founding. For the other two analyses we used the year after the first generation was created for the starting point. As the data were a cross-sectional panel, we ran a Poisson panel time varying data analysis. To prevent violation of regression assumptions (covariance of errors), in all the regression analyses we excluded all the de-novos that were affiliated with more than a single genealogy.

Estimating the effect of initial conditions on the founding parents' firms'' entrepreneurial inclinations

To test the first hypothesis, namely that the initial conditions differentially shape the entrepreneurial inclinations of the founding parents' firms, we included in our regression model six variables: the independent variable, namely, the two sets of initial conditions, and four control variables. For the independent variable, we used formation during the institutional-cooperative period, and formation during the competitive period. Because the two variables could not be included together in the regression, formation during the institutional-cooperative period was omitted. In accord with H1, we expected that formation during the environmental conditions of competition would have a greater positive impact on the entrepreneurial

inclinations than formation during the environmental conditions of institutional-cooperative. To control for potential imprinting factors that occurred after the foundation of the genealogy, we used four variables. The first variable was "founding firm is traded". Once the founding parent's firm had gone through the initial public offering process and was being traded, the founding parents might have had greater motivation to grow in size and scope and less inclination to found new ventures. This variable was coded as a dummy variable: a value of 1 was ascribed to genealogies in the years after their founding parents' firms went through the initial public offering. The value remained 1 as long as the founding parent's firm was traded in the stock exchange. An alternative argument can be made for this variable: once the founding firm becomes a publicly traded firm, more financial resources will be available to foster additional firms in the genealogy and induce growth. Second, to control for the uncontrolled environmental effects that occurred during the period of analysis, we used dummy variables for each year of this period. Third, we controlled for the number of the generations of the genealogy. Finally, we controlled for the prior cumulative entrepreneurial activity of the founding parent's firm and the employees who left the founding firm. The variable was coded as the cumulative number of ventures founded prior to the year of observation.

Estimating the effects of the founding parent's entrepreneurial inclinations on those of the second generation and of the genealogy

To estimate the effects hypothesized in H2a, H2b, H3a,H3b, we used the two dependent variables, entrepreneurial inclinations of the second generation (for H2a and H3a), and the entrepreneurial inclinations of the genealogy (for H2b and H3b).

To address these hypotheses we ran four regression models for both dependent variables. The first model tested the effect of the baseline model – the control variables. The second model

included the initial conditions independent variable. The third model included the entrepreneurial inclinations of the founding parents and the baseline. The fourth model included the baseline model, the initial conditions independent variable and the entrepreneurial inclinations of the founding parents, the mediator variable. As noted above, we coded the entrepreneurial inclinations of the founding parents as the number of de-novos spawned from the founding parent's firm.

Estimating the mediation effect of founding parents' entrepreneurial inclinations on the effect of the initial conditions on the entrepreneurial inclinations of a genealogy

In order to test whether the entrepreneurial inclinations of the founding firm mediate the effect of the type of environment on the entrepreneurial inclinations of a genealogy, we followed Baron and Kenny's (1986) four-stage analysis. More specifically, we tested whether (1) the independent variable (the initial conditions) significantly predicts the dependent variables (entrepreneurial inclinations of the second generation of a genealogy) and (entrepreneurial inclinations of a genealogy); (2) the independent variable (the initial conditions) significantly predicts the mediator (entrepreneurial inclinations of the founding parent's firm – H1); (3) the mediator (entrepreneurial inclinations of the founding parent's firm) significantly predicts the dependent variables (entrepreneurial inclinations of the first generation of a genealogy – H2a and (entrepreneurial inclinations of a genealogy – H2b); (4) when both the independent variable (the initial conditions) and the mediator (entrepreneurial inclinations of the founding parent's firm) are included in the regression model, the contribution of the independent variable (the initial conditions) drops substantially for partial mediation and becomes significantly lower or insignificant for full mediation when entered into the model together with the mediator, entrepreneurial inclinations (H3a and H3b).

Additional control variables

Similarly to the first analysis, to control for potential imprinting and inheritance factors that occurred after the foundation of a genealogy, we used four variables. (1) Founding firm is traded. (2) Number of generations already in existence in the genealogy. (3) The cumulative number of entrepreneurial spawning activities prior to each of the years of observation[1]. (4) A yearly dummy variable.

Findings

Effect of initial conditions on entrepreneurial inclinations

To test the first hypothesis, we analyzed how the initial conditions affected the entrepreneurial inclinations of the founding firms. In what follows we provide two kinds of data that support the initial conditions effect: qualitative and quantitative.

Descriptive data: Table 1 summarizes how the two genealogical groups were differentially shaped by the environmental context. As can be seen, the founding parents used different strategies with regard to resources – knowledge creation versus acquisition – and with regard to target markets – local and institutional versus competitive and international. Tadiran and Telrad differ from Elisra, Orbit and Motorola, as well as from ECI, RAD, Fibronics and Comverse. They represent organizations that operated in the centralized and protected Israeli market until the 1980s. Through their holding company, Koor, which was horizontally integrated and politically well connected, the two firms were practically free from external competition that would have threatened their survival. Thus, they did not have to invest in R&D beyond the direct

[1] The greater the cumulative number of entrepreneurial spawning activities prior to each of the years of observation, the greater the probability that employees will leave any of these firms and start a new venture contributing to the entrepreneurial inclinations of the genealogy.

needs of their institutional clients. It was only the liberalization and privatization of the Israeli economy in 1980s that forced Tadiran and Telrad, which were heavily involved in government projects for either the Ministry of Defense or the Ministry of Communication, to turn around and invest resources in innovation and knowledge creation, in order to cope with the uncertainties of competitive markets. Finally, the managerial culture and vision of both organizations were characterized by a collectivist approach with a preference for nation building and the social benefit of employees, rather than profit and providing added value for shareholders. As noted earlier, these values were intertwined with their business considerations and had a great impact upon their evolution (Drori, Ellis and Shapira, 2013).

All of the other founding companies were private enterprises. Four of them, Elisra, Orbit, ECI, and MIL, were established either by Israeli entrepreneurs or by foreign investors during the institutional-cooperative economy period, though ECI has the dual influence of both periods. Although ECI was founded in 1965, it experienced a major transformation in the 1970s that allows it to be considered after 1977 as an entity founded in the competitive period. The common denominator of Elisra and Orbit is their orientation toward defense products. From their employees' perspective, being a part of an industry that contributed to Israel's defense meant very much to them. As one of Elisra's senior employees stated, "You will not abandon an organization where you feel that you are an integral part of the tremendous effort to defend your country" (interview with the authors, June 2010). Furthermore, Elisra's projects created for the military were, generally speaking, bigger and much more technologically challenging than those created for the civilian market. Such factors contributed to the motivation of the organizations' members and increased their organizational identification.

The remaining three firms, RAD, Fibronics and Comverse, were founded during the competitive period. In contrast to the other firms, they were start-ups and from the very beginning based their strategy on knowledge creation for a globalized competitive environment. Furthermore, their founding teams had been nurtured in the most creative and innovative scientific units of the IDF. Benny, the founder of one of the first spin-outs that originated from RAD explained: "I dared to start my own start-up only because I worked closely with Zohar (RAD co-founder), and learned from him all I know about how to do it. Being technology savvy is important, but having your own business is more than that" (interview with the authors, 2008).

RAD was founded by two brothers, Zohar and Yehuda Zisapel, both of whom were involved in the technology and business development of the 26 firms that the company spawned, each of which adopted a similar business model, albeit engaging in different technologies. This model was based on RAD's founders' serving as mentors and coaches of the CEOs of the initiated companies. In this sense, RAD served as a repository for the companies' entrepreneurial blueprints as well as for their practices and resources. In contrast, Comverse's model involved channeling its efforts toward the development and business control of a particular interrelated technological niche – voicemail and surveillance. To this end, it invested in R&D and also acquired a large number of firms to gain competitive knowledge and reduce competition. RAD avoided going public because its founders preferred to retain absolute control over their first founded firm. In contrast, Fibronics and Comverse went public on the NASDAQ a few years after founding. They differed from RAD in their growth strategies. Unlike RAD and Comverse, Fibronics, a world leader in fiber optics technology, neither initiated nor acquired even a single firm during its 17 years of existence. The event that triggered the rapid growth of this genealogy was an internal conflict that led to the exit of the firm's creative and influential CEO, who left in

1984 to found Adacom, which later became Fibronics' main competitor. We have been able to trace 23 companies founded by ex-employees of Fibronics (almost 10 percent of the highest number of Fibronics' employees at its peak) between 1984 and the end of 2005. The initial conditions and the genesis events at RAD, Fibronics, and Comverse had greater potential for triggering stronger entrepreneurial inclinations than those at Tadiran and Telrad.

ECI, although formally founded in the institutional-cooperative period, formally belonged to the RAD, Fibronics, and Comverse group after 1977 in terms of the potential impact that its initial environmental conditions might have had on its entrepreneurial inclinations. ECI was not founded as a start-up but as a merger between two small companies. Taking its first steps as a unified company, it focused mainly on the defense market. However, ten years later, in the late 1970s, following a change in its leadership, it modified its strategy and made extensive investments in innovative R&D, carving its way into international competitive markets.

The above descriptive analysis shows that the founding parents have differential entrepreneurial inclinations and that these inclinations are impacted by the initial environmental conditions. Specifically, we find qualitative support for hypothesis H1, which argues that the founding parents of genealogies that were created during the period of competitive environmental conditions are more entrepreneurially inclined than the founding parents of genealogies that were created during the period of institutional-cooperative environmental conditions.

Quantitative data: As mentioned above we ran a Poisson, time varying, panel regression model, estimating the effect of the initial conditions on entrepreneurial inclinations. The descriptive statistics and correlations matrix for the entrepreneurial inclinations of the founding parent are displayed in Table 2. The results of the regression equation are provided in Table 3.

Model 1 includes only the control variables. We added the environmental condition variable in the second model. The log likelihood ratio test indicates a significant improvement to the model.

The findings in Table 3 for Model 2 suggest that founding parents' firms that were established during the period of competitive environmental conditions were more entrepreneurially inclined than the founding parents of genealogies that were formed during the period of institutional-cooperative environmental conditions. The positive and significant coefficients support hypothesis H1.

[Insert Tables 2 and 3about here]

The effects of the founding parent's entrepreneurial inclinations on those of the second generation and of the genealogy

The means, standard deviations, and correlations matrix for the entrepreneurial inclinations of the first generation are presented in Table 4. The means, standard deviations, and correlations matrix for the entrepreneurial inclinations of a genealogy are presented in Table 6. The results of the regression equations for the entrepreneurial inclinations of the first generation are provided in Table 5 and for the entrepreneurial inclinations of a genealogy in Table 7. In both Tables 5 and 7, Model 1 includes only the control variables, in Model 2 we added the initial conditions variable, in Model 3 we included the entrepreneurial inclinations of the founding parents' firms and the control variables and in Model 4 all the variables. In both tables, the log likelihood ratio test indicated a significant improvement of Model 4 over the fit of Model 1, Model 2 and Model 3.

[Insert Tables 4 to 7 about here]

The coefficients for the estimation of the effect of entrepreneurial inclinations of the founding parents' firms on the entrepreneurial inclinations of the second (next) generation and on the entrepreneurial inclinations of a genealogy (as a whole) are provided in Model 3 in Tables

5 and 7, respectively. The positive and significant value of the coefficient suggests that the entrepreneurial inclinations of the founding parents' firms have a positive impact on the entrepreneurial inclinations of the second generation as well as on the entrepreneurial inclinations of the whole genealogy, supporting H2a and H2b. In other words, more individuals belonging to genealogies in which the founding parents exhibited high entrepreneurial inclinations left their companies and founded new ventures.

Testing the mediation hypotheses

As noted above, for testing the two mediation hypotheses, we need to demonstrate, first of all, that (1) the independent variable (the initial conditions) significantly predicts the dependent variables (the entrepreneurial inclinations of the second generation of a genealogy and the entrepreneurial inclinations of a genealogy); (2) the independent variable (the initial conditions) significantly predicts the mediator (the entrepreneurial inclinations of the founding parent's firm); (3) the mediator (the entrepreneurial inclinations of the founding parent's firm) significantly predicts the dependent variables (the entrepreneurial inclinations of the first generation of a genealogy and the entrepreneurial inclinations of a genealogy). The effects of the independent variable on the mediator and the effects of the mediator on the dependent variables have already been demonstrated above. Thus, before moving to the fourth step of testing the mediation effect we will test the effects of the independent variable (the initial conditions) on the two dependent variables (the entrepreneurial inclinations of the second generation and of the entire genealogy).

The findings in Model 3, Table 5, suggest that, as expected, the second generation of genealogies that were formed under competitive environmental conditions were more entrepreneurially inclined than the second generation of genealogies that were formed during the

period of institutional-cooperative environmental conditions. Model 4, Table 7, presents similar results for the initial conditions. The entrepreneurial inclinations of a genealogy that was formed under competitive environmental conditions were greater than those of a genealogy that was formed during the period of institutional-cooperative environmental conditions.

Interestingly, the findings in Model 4, Table 7, also show that founding firms that went public had a negative impact on the entrepreneurial inclinations, that is, a relatively smaller number of employees left these firms in order to start new ventures. This result indicates that the bigger and more established parent firms become, the less entrepreneurially inclined their employees become.

The fourth step in the mediation analysis is presented in Model 4, Table 5, and in Model 4, Table 7. In Model 4, Table 5, we find that the effect of the initial conditions on the entrepreneurial inclinations of the second generation is significantly reduced when controlling for the entrepreneurial inclinations of the founding parent's firm, and its regression coefficient is now not significant. Furthermore, the effect of the mediator (the entrepreneurial inclinations of the founding parent's firm) on the dependent variable (the entrepreneurial inclinations of the first generation of the genealogy) remains highly significant. These findings demonstrate that the founding parent's entrepreneurial inclination fully mediate the effect of the initial conditions on the entrepreneurial inclinations of the second generation, supporting H3a.

In Model 4, Table 7, we find that the effect of the initial conditions on the entrepreneurial inclinations of a genealogy is significantly reduced when controlling for the entrepreneurial inclinations of the founding parent's firm. Furthermore, the effect of the mediator (the entrepreneurial inclinations of the founding parent's firm) on the dependent variable (the entrepreneurial inclinations of a genealogy) remains highly significant. These findings

demonstrate that the founding parent's entrepreneurial inclination fully mediate the effect of the initial conditions on the entrepreneurial inclinations of the entire genealogy, supporting H3b.

Discussion

We developed a genealogical approach by analyzing data that trace the founding affiliation of the Israeli information technology and communication (ITC) industry, which we divided into nine genealogies. We argued that the interaction between environment and internal organizational founding processes, based on parent-progeny relations, is the building block of genealogical evolution. For the Israeli ITC industry, genealogical growth involved (1) environmental factors during the time of founding, such as policy, culture, market, and technology, all of which have a substantial impact on the formation of the entrepreneurial inclinations of the founding parents' firms, and (2) the inheritance of these entrepreneurial inclinations (entrepreneurial capabilities, values and blueprints) throughout the genealogy.

In accordance with our expectations, the analysis revealed that founding parents' firms developed different entrepreneurial inclinations depending on the social-economic environment in which they began their entrepreneurial activity. Founding parents' firms of genealogies that were founded during the competitive period were oriented toward both business and R&D in order to survive and prosper. In contrast, founding parents' firms of genealogies that were founded during the institutional-cooperative period were practically free from external competition and did not have to invest in R&D beyond the needs of their institutional clients. More specifically, the findings showed a significant difference in entrepreneurial inclinations

between these two groups of founders, highlighting that founders of the competitive period were likely to found more new ventures than their counterparts.

Our findings demonstrate that the initial environmental conditions are imprinted on the founding parents' firms and shape their entrepreneurial inclinations. These inclinations are then transmitted from generation to generation along the genealogical trajectory. As expected by our second set of hypotheses, we found that the entrepreneurial inclinations of the founding parents' firms impact the entrepreneurial inclinations of the second generation as well as those of the entire genealogy. In operational terms, the number of de-novos established by progenies of the founding parents had a positive influence on the number of de-novos that were founded in the next generation of a genealogy. De-novos of genealogies that were established in a competitive environment spawned more de-novos across generations than de-novos of genealogies that were established in an institutional-cooperative environment. Furthermore, since we used time-sensitive panel regressions for analyzing our data, we can safely argue that this effect prevails in spite of various environmental changes that might have occurred along the years and generations.

These results provide evidence of parent-progeny inheritance dynamics – the transfer of entrepreneurial inclinations in direct and non-mediated ways through learning and socialization. As spin-outs evolve from the founding parents, their "genetic content" is made available to succeeding generations. Our study expands on Klepper's (2001) and Phillips' (2005) notions of inheritance relations and elaborates on the ideas of transmission of traits, values, and blueprints (see also Burton, 2001; Burton et al., 2002; Burton and Beckman, 2007; Dencker et al., 2009). A genealogy that transmits norms and values conducive to entrepreneurial initiatives tends to retain its tenacity along generational lines (cf. Jaffee and McKendrick, 2006).

Finally, our findings emphasize a mediation effect of the founding parents' entrepreneurial inclinations on the effect of the initial condition on the entrepreneurial inclinations of the second generation and the entire genealogy. This suggests that the effect of the initial conditions on the genealogical entrepreneurial inclinations would have been much weaker without the mediation of the founding parents' firms. In other words, the initial conditions shape the characteristics of the founding parents' firms and they transmit these characteristics to their progenies along the genealogy,

Our data also highlight other factors that inhibit the development and transmission of entrepreneurial inclinations. We found that the inclinations of founding parents to develop a "bigger" firm and take it public have inherent implications for the growth trajectory of the genealogy. Specifically, when the founding parents took the firm public the genealogy demonstrated weaker entrepreneurial inclinations and thus had less new ventures than other genealogies. The results indicate that the long-term orientations of the founding parents disseminate through the genealogy and negatively influence the entrepreneurial inclinations, given the tradeoff between more but "smaller" new ventures and "bigger" but fewer ones. RAD, the largest of the genealogies that were formed during the competitive period, had a specific policy that the founding firm would not go public and this company is used as leverage to finance and support new ventures (interview with Zohar Zisapel, RAD founder, December 2009).

In sum, in this study we examined some of the fundamental questions related to the entrepreneurial founding of new ventures, and, consequently, the emergence and evolution of industrial sectors. Based on Stincchcombe's (1965) imprinting hypothesis, we asserted that the

initial conditions influence the evolution of an industrial sector. They do so through the multilevel processes of inheritance and the intergenerational transmission of entrepreneurial inclinations. More specifically, new organizations are shaped not only by the characteristics of their current competitive business environment, but also by inheritance of entrepreneurial knowledge and traits which foster persistent entrepreneurial inclinations. Our genealogical approach demonstrates that the influence of the imprinting does not vanish, and entrepreneurial values, routines and blueprints remain consistent along generational lines. Thus, our work extends the scope of the genealogical framework by demonstrating how the entrepreneurial inclinations of the founders, distinct characteristics developed during the period in which the genealogy was formed, persist along generations. Our study reveals the impact of the distinct genealogical kinship in carrying entrepreneurial inclinations along the generations on the process leading to the spawning of new firms and their structure.

Future research

By analyzing the genealogical evolution of the Israeli ITC industry, we proposed an alternative view of how a new industry emerges through the sequence of affinity and heredity, affected by historical contexts. Although previous studies have explored the nature of founding (e.g., Klepper, 2009; Phillips, 2000), and the tenacity of imprinting of historical conditions which can be traced to the present (Stinchcombe, 1965), many issues still call for further exploration. An important issue that could further enhance our understanding of the role of history and heredity in growing a new industry is the dynamics of genealogical conversion.

We observed many cases in which entrepreneurs from a firm in one genealogy teamed up with entrepreneurs from another to establish a new venture. Furthermore, many of these ventures

were established by entrepreneurs from two genealogies founded during the two different economic periods. Such firms facilitate the transfer of entrepreneurial inclinations from one genealogy to another, thus blurring the boundaries between genealogies. Furthermore, companies that are affiliated with the less entrepreneurially inclined genealogies are able to tap into the capabilities and resources of those who have experience in initiating a new business. An entrepreneur who worked at Tadiran until the late 1980s reflects on his experience there:

> "…I was doing a challenging work in Tadiran, and then came the crisis, and many people were laid off. Luckily, I knew Gadi [his partner] from my working relations with RAD, and when he came up with the offer for a start-up, I agreed immediately. I'm a very good technological person, but he knows how to make business happen. This is what the Zisapel brothers [RAD founders] are teaching them out there" (interview with the authors, July 2004).

We also found that a few branches of genealogies from the institutional-cooperative era, such as Telrad and Elisra, started as joint ventures that were created by two or more entrepreneurs affiliated with genealogies of the competitive period, such as RAD and Fibronics. These branches were more potent and spawned more generations consisting of more companies than all of the other branches.

Thus, one factors that contributed to the creation of joint ventures and, ultimately, to the surge of potency in the ITC industry was the permeability of the genealogies' boundaries – that is, the ease of moving from one to another – mainly after 2000. Zohar Zisapel, one of the founding fathers of RAD, says: "…I know what to do; I have the ideas. What I need are good managers who will turn these ideas into a successful start-up. . . . I know how to find them. . . . Usually I need only one step to locate them in the high-tech sector" (interview, 2009).

Any venture co-founded by Zohar or Yehuda Zisapel and an individual from another genealogy served as a bridge between the entrepreneurial networks of their genealogies.

Consequently, the entrepreneurial tendencies expanded beyond the boundaries of RAD, Fibronics, and Comverse.

Thus, the culture of entrepreneurship inherent in the genealogies founded in the competitive period has enabled founders to share their entrepreneurial capabilities through cross-genealogy ventures. This could explain why we witness meaningful founding activity within the high-tech industry's entire genealogical configuration. The process of convergence manifested in the founding of new ventures by mixed-genealogy teams has provided the necessary resources and conditions for growth via knowledge and information transfer (Shane, 2000; Burton et al., 2002); better networking (Shane and Cable, 2002; Wiewel and Hunter, 1985); technological know-how and first-hand experience in the development of technology at the start-up stage; and the realization of entrepreneurial opportunities (Shane, 2001).

Future research may explore the implications of blurring boundaries between genealogies. It may examine how and why inter-genealogical affinities are created and whether they are influenced by generational evolution. An intriguing question to study is the dynamics of convergence between genealogies, how it tends to blur their boundaries along the generations, and why and how certain genealogies tend to converge. Studying the convergence of genealogies could provide new understanding of the evolutionary processes and environmental contexts that lead to the emergence and growth of new technology and science based industries.

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Table 1. Major genesis events and initial conditions of the founding firms of the nine genealogies

Institutional-cooperative period						ECI	Competitive economic period		
	Telrad	**Tadiran**	**Elisra**	**Orbit**	**MIL**	**ECI[a]**	**Fibronics**	**Comverse**	**RAD**
Year of founding	1951	1962	1967	1951	1964	1965	1977	1982	1983
Company type at birth	Joint venture of American company and holding corporation controlled by unions	Merger of two private companies owned by Ministry of Defense and holding corporation controlled by unions	Private company; acquired by holding corporation controlled by unions	Private company	Subsidiary of American corporation	Merger of two private companies; acquired by holding corporation in 1977	Joint venture of two private companies	Start-up: private company	Start-up: private company
Founders	Assigned managers from owners, Koor and CNEC	Professional manager (Director General of Ministry of Defense)	Engineer, owner of American company	Five engineers	Engineer (manager of electronics and engineering factory)	Engineer (former U.S. colonel, new immigrant)	Engineer (serial entrepreneur) and owner of American company	Two engineers and finance expert	Two engineers (former chief scientist of military intelligence unit and owner of electronic equipment agency
First IPO			1951	1991	1965	1990	1983	1992	
First market	Institutional-	Institutional-	Institutional	Institutional	Competitive	Institutional	Competitive	Competitive	Competitive
	First stages: knowledge acquisition—2 knowledge-sharing contracts; later stages: knowledge creation—investment in R&D	First stages: knowledge acquisition4 knowledge-sharing contracts; later stages: knowledge creation—investment in R&D	First stages: knowledge acquisition 2 knowledge-sharing contracts; later stages: knowledge creation—investment in R&D	Knowledge creation-investment in R&D	Knowledge creation-investment in R&D	Knowledge creation-investment in R&D	Knowledge creation-investment in R&D	Knowledge creation-investment in R&D	Knowledge creation-investment in R&D

[a]ECI was founded as a private venture in 1965, targeting it efforts toward the institutional market. In 1977, its new leadership transformed the organization into a private entrepreneurial venture and changed its goals and culture

Table 2: Statistics and correlation matrix for assessing the effect of the initial conditions and the founding parent's entrepreneurial inclinations on a genealogy's entrepreneurial inclinations

	Variables	Mean	Std. Dev.	1	2	3	4	5	6
1	**DV - Enrepreneurial inclination of the foundig parent firm**	**0.25**	**0.62**	**1.00**					
3	**Initial conditions (genealogy formed under competitive environmental conditions)**	**0.30**	**0.46**	**0.26**	**1.00**				
	Control								
4	**Founding firm is traded**	0.54	0.50	0.05	0.32	1.00			
5	**Number of generations**	3.00	2.58	0.30	0.47	0.01	1.00		
6	**Year dummy variables**	1985	13.46	0.35	0.38	0.04	0.67	1.00	
7	**Prior cumulative number of de-novos**	2.10	3.81	0.38	0.32	0.08	0.58	0.60	1.00

Note: Number of observations 343

Table 3: Estimating the entrepreneurial inclinations of the founding parent firm

	Model 1		Model 2	
Initial conditions (genealogy formed under competitive environmental conditions)			**0.966**	*****
			(0.436)	
Control				
Founding firm is traded	0.169		-0.123	
	(0.383)		(0.352)	
Number of generations	-0.025		-0.112	*
	(0.060)		(0.051)	
Year dummy variables	0.092	***	0.117	
	(0.019)		(0.024)	
Prior cumulative number of de-novos	0.033		0.008	
	(0.029)		(0.029)	
N	343		343	
Loglikelihood	-181.04		-174.97	
Loglikelihood ratio test			12.14	

Note: * p< 0.05 ; ** p<0.01; *** p<0.001

Table 4: Statistics and correlation matrix for assessing the effect of the initial conditions and the founding parent's entrepreneurial inclinations on the first generation's entrepreneurial inclinations

	Variables	Mean	S.D.	1	2	3	4	5	6	7
1	DV - Enrepreneurial inclination of a genealogy	0.52	0.87	1.00						
2	Entrepreneurial inclination of founding parent firm	10.64	5.68	0.17	1.00					
3	Initial conditions (genealogy formed under competitive environmental conditions)	0.41	0.49	0.22	0.46	1.00				
	Control									
4	Founding firm is traded	0.54	0.50	-0.01	0.22	0.42	1.00			
5	Number of generations	4.66	2.84	0.38	-0.09	0.46	0.09	1.00		
6	Year dummy variables	1996	6.51	0.31	-0.22	0.16	0.09	0.55	1.00	
7	Prior cumulative number of de-novos	3.31	4.48	0.36	0.23	0.18	-0.04	0.67	0.56	1.00

Note: Number of observations 160

Table 5: Estimating the effect of the initial conditions and the founding parent's entrepreneurial inclinations on the first generation's entrepreneurial inclinations

	Model 1		Model 2		Model 3		Model 4	
Entrepreneurial inclination of founding parent firm					**0.130**	***	**0.237**	*
					(0.029)		**(0.096)**	
Initial conditions (genealogy formed under competitive environmental conditions)			**0.584**	*			**-1.191**	
			(0.264)				**(0.728)**	
Control								
Founding firm is traded	-0.153		-0.334		-0.656	*	-0.715	**
	(0.312)		(0.208)		(0.286)		(0.269)	
Number of generations	0.084	**	0.039	*	0.227	***	0.431	**
	(0.032)		(0.017)		(0.051)		(0.147)	
Year dummy variables	0.053		0.058		0.091	***	0.120	**
	(0.028)		(0.032)		(0.024)		(0.044)	
Prior cumulative number of de-novos	0.031		0.038		-0.075		-0.175	*
	(0.024)		(0.026)		(0.039)		(0.076)	
N	160		160		160		160	
Loglikelihood	-143.99		-141.87		-133.42		-130.09	
Loglikelihood ratio test			4.24		21.16		23.58	

Note: * p< 0.05 ; ** p<0.01; *** p<0.001

Table 6: Statistics and correlation matrix for assessing the effect of the initial conditions and the founding parent's entrepreneurial inclinations on a genealogy's entrepreneurial inclinations

Variables	Mean	S.D.	1	2	3	4	5	6	7
1 DV - Enrepreneurial inclination of a genealogy	**1.36**	**2.21**	**1.000**						
2 Entrepreneurial inclination of founding parent firm	**10.64**	**5.68**	**0.150**	**1.000**					
3 Initial conditions (genealogy formed under competitive environmental conditions)	**0.41**	**0.49**	**0.401**	**0.459**	**1.000**				
Control									
4 Founding firm is traded	0.54	0.50	0.048	0.219	0.421	1.000			
5 Number of generations	4.66	2.84	0.682	-0.094	0.458	0.093	1.000		
6 Year dummy variables	1996	6.51	0.461	-0.223	0.156	0.093	0.549	1.000	
7 Prior cumulative number of de-novos	6.30	10.03	0.723	0.119	0.339	0.033	0.812	0.553	1.000

Note: Number of observations 160

Table 7: Estimating the effect of the initional conditions and the founding parent's entrepreneurial inclinations on a genealogy's entrepreneurial inclinations

	Model 1	Model 2	Model 3	Model 4
Entrepreneurial inclination of founding parent firm			**0.179 *** (0.030)**	**0.181 *** (0.045)**
Initial conditions (genealogy formed under competitive environmental conditions)		**0.980 * (0.458)**		**-0.017 (0.281)**
Control				
Founding firm is traded	-0.133 (0.414)	-0.415 * (0.210)	-0.742 *** (0.203)	-0.741 *** (0.190)
Number of generations	0.098 (0.059)	0.058 (0.042)	0.430 *** (0.059)	0.433 *** (0.096)
Year dummy variables	0.083 *** (0.025)	0.099 ** (0.033)	0.115 *** (0.021)	0.115 *** (0.022)
Prior cumulative number of de-novos	0.025 (0.021)	0.019 (0.020)	-0.043 *** (0.009)	-0.043 *** (0.013)
N	160	160	160	160
Loglikelihood	-220.18	-205.76	-182.48	-182.48
Loglikelihood ratio test		28.82	75.38	75.39

Note: * p< 0.05 ; ** p<0.01; *** p<0.001

Figure 1: The genealogy map of Telrad

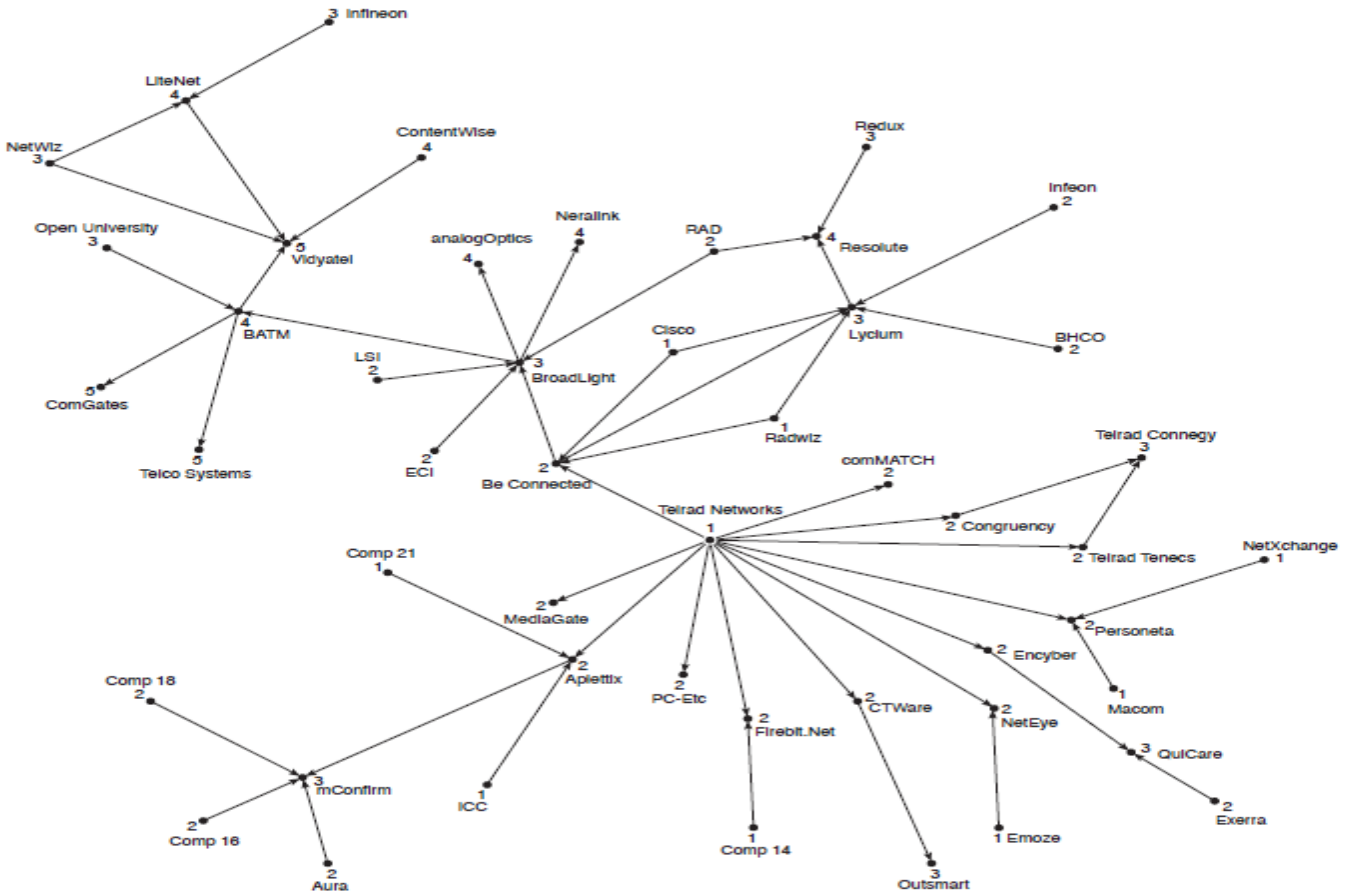

Figure 2: The genealogy map of Tadiran

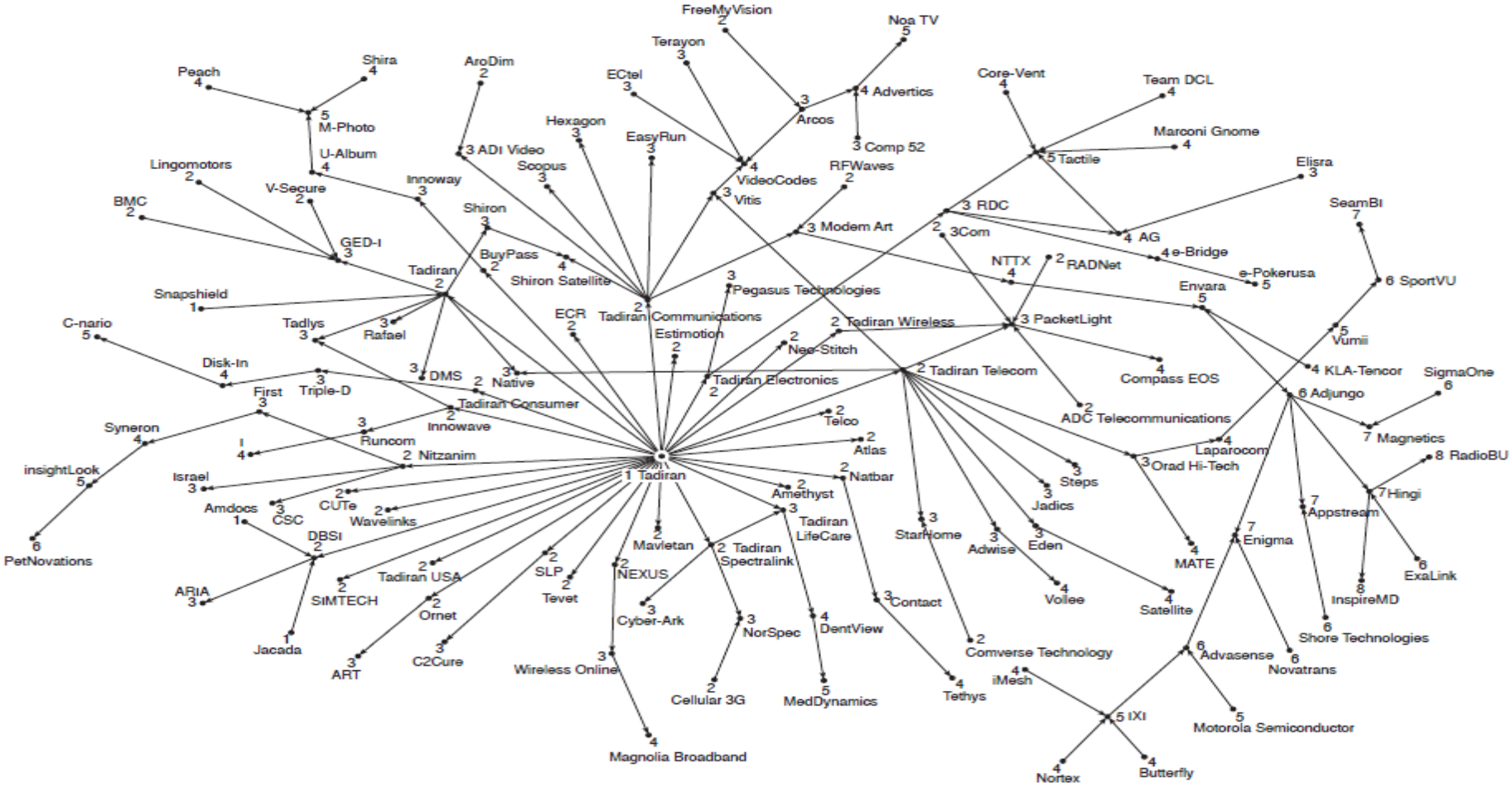

Figure 3: The genealogy map of Elisra

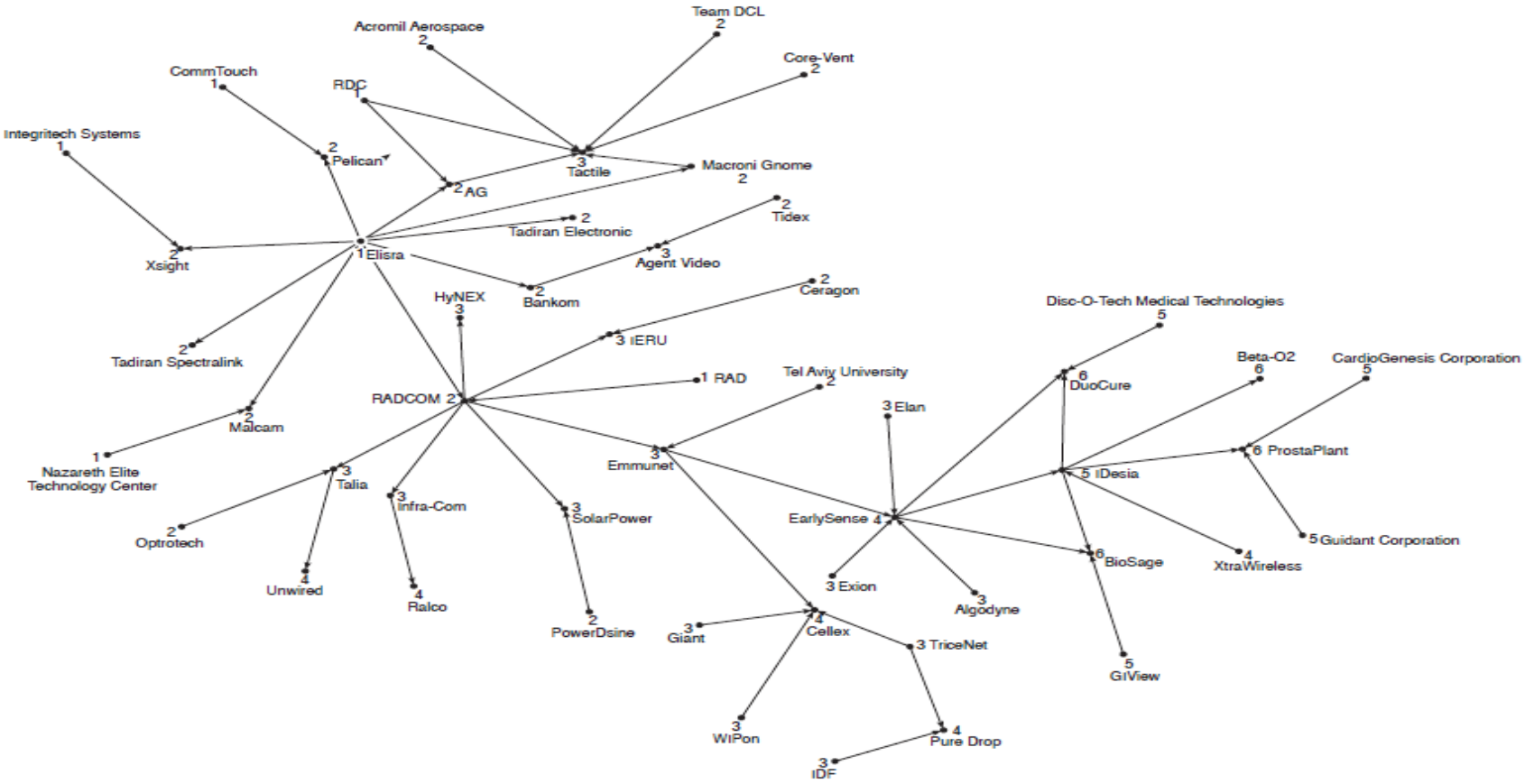

Figure 4: The genealogy map of Orbit

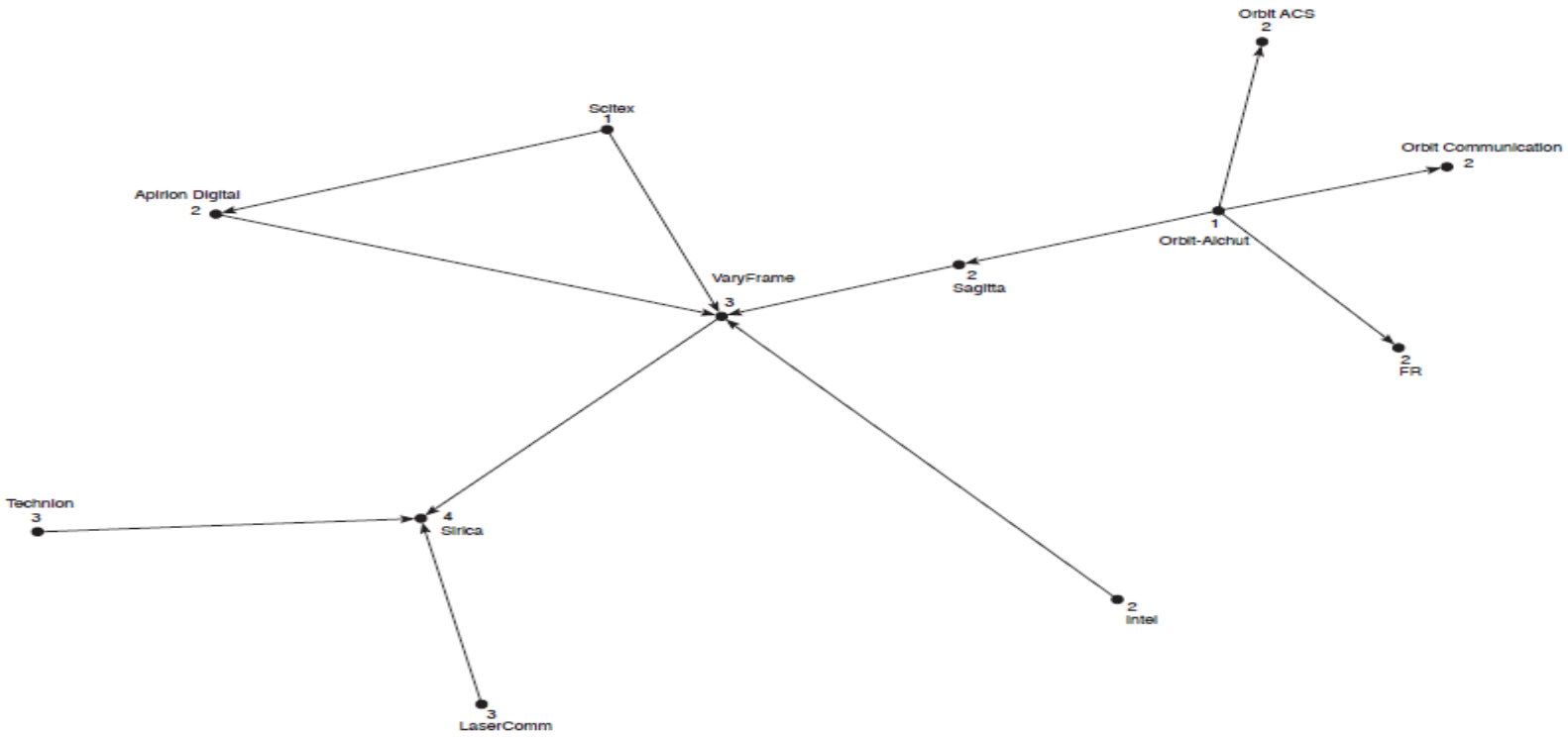

Figure 5: The genealogy map of Motorola

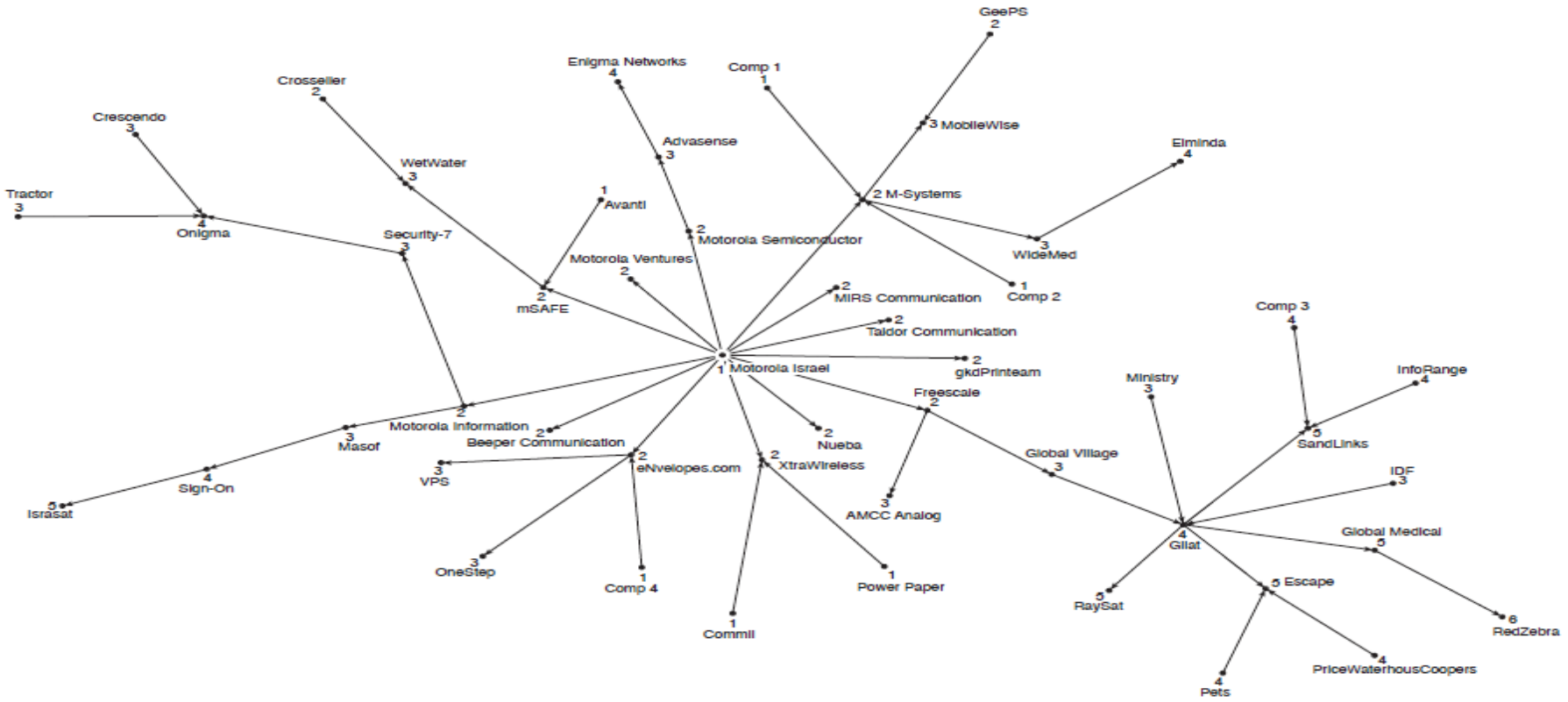

Figure 6: The genealogy map of ECI

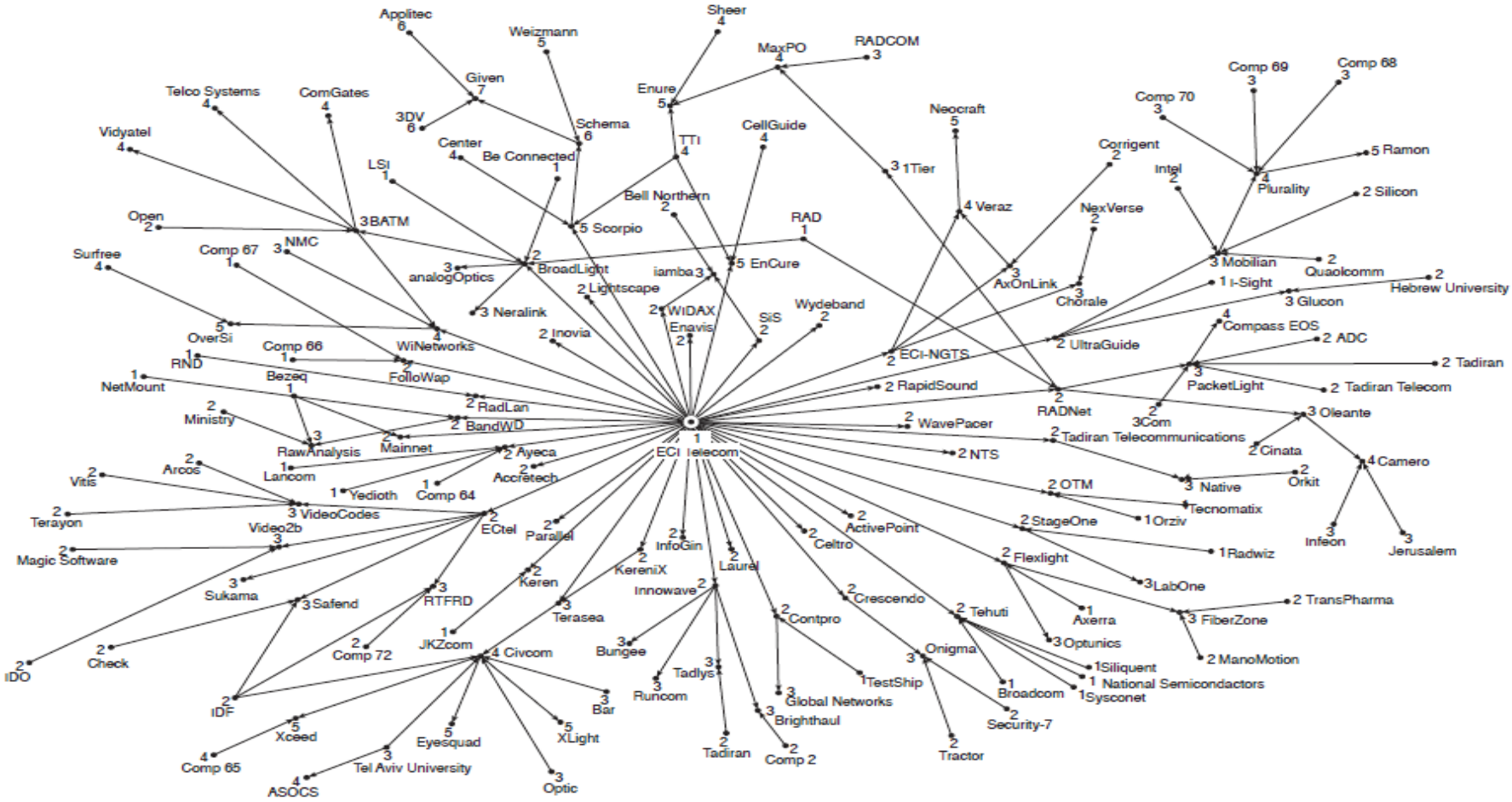

Figure 7: The genealogy map of Fibronics

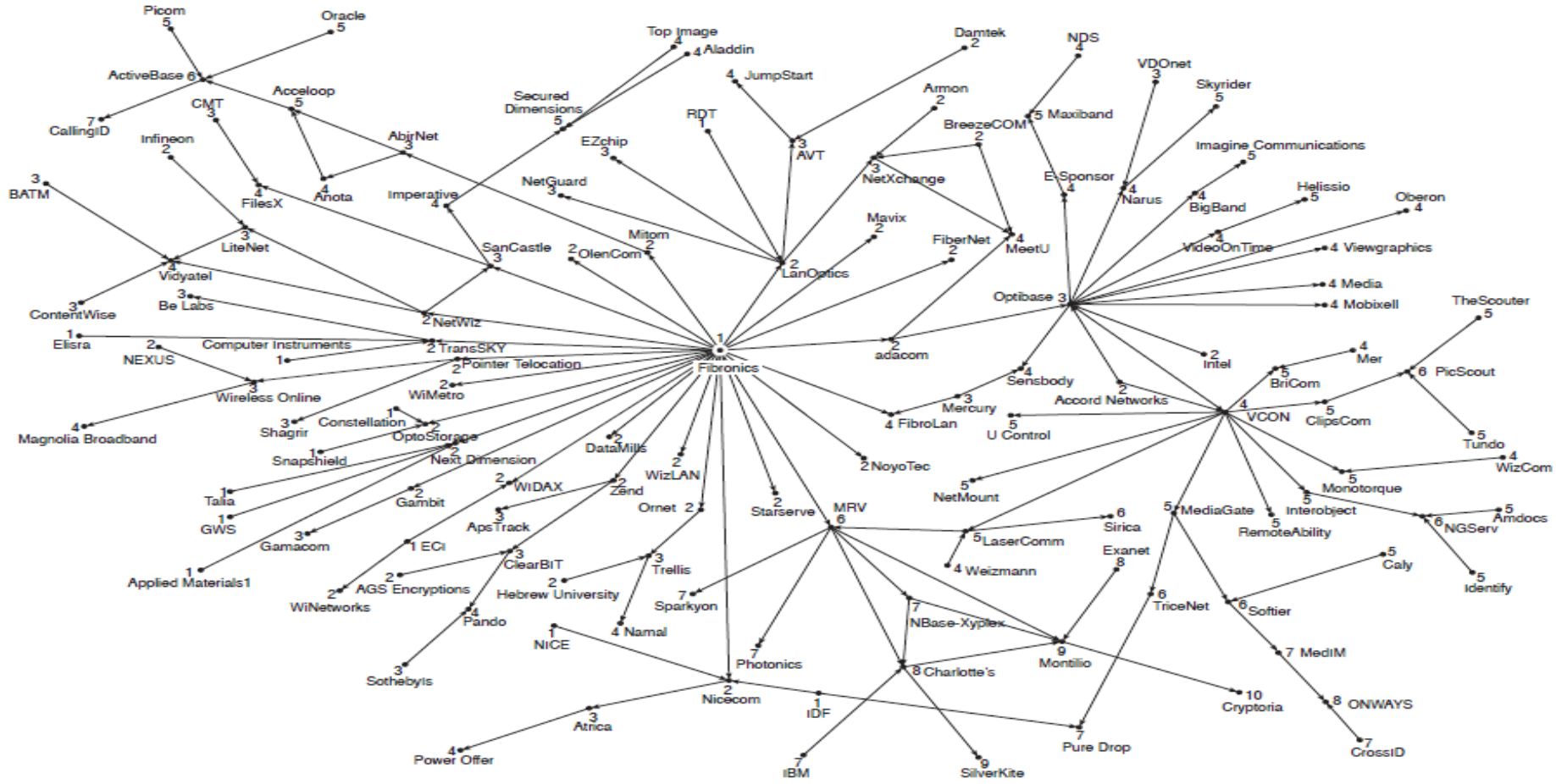

Figure 8: The genealogy map of Comeverse

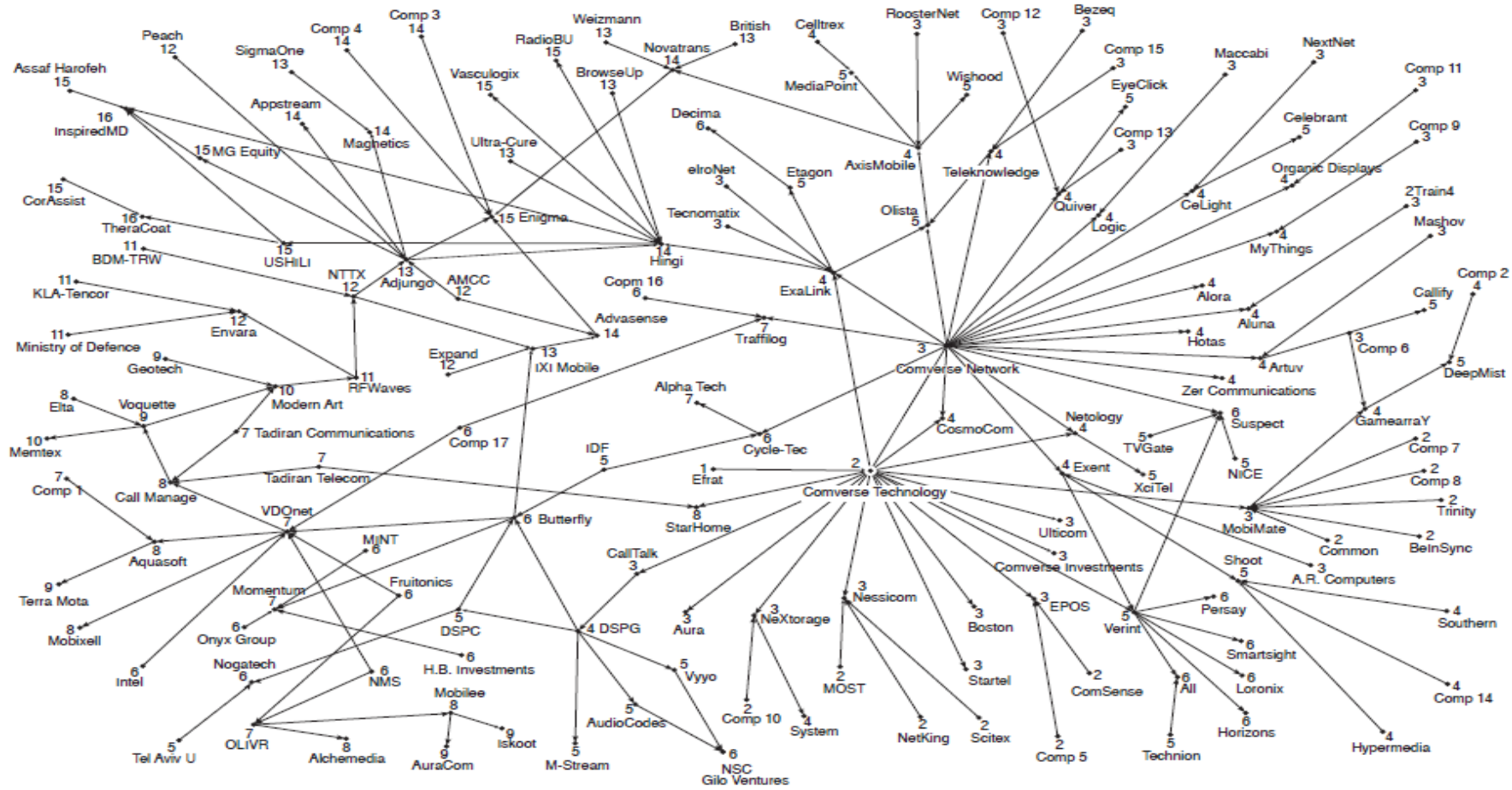

Figure 9: The genealogy map of RAD