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# Networking Activities and Growth of Newly Founded Firms under Incubation\*

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## ABSTRACT

The network approach to entrepreneurship has become a notable theoretical perspective within the literature. Networking activities enable gaining resources for new ventures in growth process while allowing growing firms to maintain their flexibilities. In this study, we investigate the effects of intra-incubator networking activities on new firm growth performance in business incubators. Based on a survey of newly founded firms located in three major incubation centers located in Adana, Tarsus and Samsun cities in Turkey, we empirical test the network success hypothesis. Differences between growing and non-growing firms have been analyzed by using essential network characteristics. Empirical research investigating the effect of networking on incubated new firm performance is rare. Among them, to our knowledge, we, first time, employ essential network characteristics approach in performance analysis among incubated firms. The results have shown that incubated firms have similar intra-incubator networking intensity whether it is a growing or non-growing over time.

**Keywords:** Network Theory, Firm Growth, Business Incubator, Newly Founded Firms

**JEL Codes:** C14, D02, D04, M13

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## **INTRODUCTION**

The network approach to entrepreneurship has become a notable theoretical perspective within the literature (Birley, 1985; Powell et al, 1996; Dyer and Singh, 1998; Powell et al, 2005; Owen-Smith et al, 2002; Gay and Dousset, 2005; McAdam et al, 2006). Networking enables firms to access resources, information and customers below-market prices, and strongly support firm innovations.

In particular, networking activities are beneficial for newly established firms in that it has a positive effect on firm performance in terms of both survival and growth (Granovetter, 1985; Larson and Starr, 1993; Gulati, 1999; Havnes and Senneseth, 2001; Andersson et al, 2002; Zaheer and Bell, 2005). Firms typically enter at inefficient small market size and lack in all types of resources such as experienced managerial teams, adequate capital, market awareness and technological competence. Thus, in early years after entry, they have to make timely transition with growth in capabilities and resources, and become structurally stronger for survival. Jarillo (1989), Brüderl and Preisendörfer (1998) and Zhao and Aram (1995) argue that networking activities enables gaining resources for new ventures in growth process while allowing growing firms to maintain their flexibilities. This perspective assumes that networking activities, network resources and network support are important elements of new firms' establishing process (Freel, 2003; Hansen et al, 2000; Johannisson, 1988; Rothschild and Darr, 2005).

In this study, we investigate the effects of intra-incubator networking activities on new firm growth performance in business incubators. Based on a survey of 182 newly founded firms residing in three major incubation centers located in Adana, Tarsus and Samsun cities in Turkey, we empirically test the network success hypothesis for intra-incubator networking case. Differences between growing and non-growing firms have been analyzed by using essential network characteristics density (Cantner and Graf, 2006). Empirical research investigating the effect of networking on incubated new firm performance is rare. Among them, to our knowledge, we, first time, employ essential network characteristics approach in performance analysis among incubated firms. The results have not confirmed that incubated firms that have higher degree of networking within the incubation center perform better in terms of employee growth.

## **NETWORK THEORY**

Especially in the last ten to fifteen years, the importance of networks and ties to a network has been increasingly become focus of various research. Network approach is related with theoretical concepts such as entrepreneurship, industrial districts and innovation (Havnes and Senneseth, 2001).

There is an increasing interest on the formation, structure, and performance of interfirm networks (Kajikawa et al, 2010). Nowadays, networking as an important source in the acquisition of competitive advantages, innovativeness and firm performance has emphasized in various studies (Powell, Koput and Smith-Doerr, 1996; Dyer and Singh, 1998; Powell et al, 2005; Owen-Smith et al, 2002; Gay and Dousset, 2005).

One of the earliest studies on business networks was published by Piore and Sabel (1984). Another important study in this field was done by Aldrich and Zimmer (1986). The "network approach to entrepreneurship", which was initiated by authors, has become one of

the most popular theoretical perspectives in entrepreneurship and small business formation research (Brüderl and Preisendörfer, 1998). As stated by Aldrich and Zimmer (1986), entrepreneurship is embedded in social context and “...channeled and facilitated or constrained and inhibited by people’s positions in social networks”. Followed by the studies of Piore and Sabel (1984) and Aldrich and Zimmer (1986), the interest on business networks was escalated and these studies were followed by several studies that are highlighted the importance of network concept in entrepreneurship research (Aldrich and Zimmer, 1986; Birley, 1985; Starr and MacMillan, 1990; Dubini and Aldrich, 1991).

According to Fombrun (1982), the term “network” refers to a set of nodes and the relationships that connect them. As a definition, the network consists of interconnected dyadic relationships where the nodes may be roles, individuals or organizations (Johannisson, 2002). Different network types may be defined which refers to different nodes and relationships. For example, the social network can be defined as a set of persons or organizations, namely nodes, linked by a set of social relationships (i.e. friendship, borrowing or lending, membership to a common group) of a specified type (Laumann et al., 1978). Similarly, as another network definition, a business network is defined as a set of relationships between two or more connected firms (Kajikawa et al., 2010). Lastly, an entrepreneurial network is relationships which firms establish with other firms, organizations or persons to improve their performance (Shahidi, 1998).

## **THE ROLE OF NETWORKING ACTIVITIES ON FIRM PERFORMANCE**

In the entrepreneurship literature, studies on the new venture creation, survival, growth and performance of firms and critical success factors take an important place. Many studies which has focused on new venture creation, generally has concentrated on the initial conditions of start-ups. Many new entrepreneurial firms are characterized by constrains such as “liability of newness” and “liability of smallness” (Lechner, Dowling and Welpé, 2006).

However, not only the internal resources, but also external opportunities and external networking are important for newly founded firms’ performance (Li and Chen, 2009: 35). Inter-firm networking is regarded as one of the most important sources to overcome the liabilities of small and new enterprises (Lechner, Dowling and Welpé, 2006). The importance of networking for entrepreneurial firms is that new ventures allow to access external resources and overcome the liabilities through networking activities. These networks also enable to reach the desired performance targets of entrepreneurs more quickly. As stated by Lechner and Dowling (2003), social networks act as “fast entrance ticket” to industry. Besides, networks are effective ways to survival and growth of newly established entrepreneurial firms.

The network structure and network position on the firm performance, market structure, growth and survival have been emphasized in many studies (Johannisson, 1998; Jarillo, 1989; Zhao and Aram, 1995). Several studies emphasize that the networking activities and embeddedness influence the newly founded firm’s capabilities and performance (Granovetter, 1985; Larson and Starr, 1993; Gulati, 1999; Andersson et al., 2002). According to Larson and Starr (1993), the network quality and the number of ties affect the start-up performance. Gilmore, Carson and Rocks (2006) also mention that the marketing network improves a more sophisticated decision-making. Besides, Lorenzoni and Lipparini (1999) suggest that firms’ capabilities to interact with other firms significantly affect the firms’ growth and innovativeness.

Zhao and Aram (1995) examined the effect of external networks on growth performance of new technology based firms. The authors concluded that the new ventures which have higher growth rates also have more external relationships and relationship frequency than firms which have lower growth rates. In the study, it was highlighted that networking affects the firm growth positively especially early stages of firm development. Similarly, Brüderl and Preisendörfer (1998) investigated the effect of entrepreneurs' personal networks on survival, employment growth and sales growth. In the study, four network types, namely support from strong ties, support from weak ties, active help from spouse, and emotional support from spouse, were examined. In the conclusion, the authors found that all four networking types have a positive impact both on survival and growth. Firms with higher network support have better performance than firms have lower network support. In the study performed by Hansen (1995), it was found that the entrepreneur's personal networks have a positive impact on employment growth in the following year. Ostgaard and Birley (1996) performed a study on 159 entrepreneurs and investigated the effects and effectiveness of entrepreneurs' personal networks on firm performance and growth. The authors found that there is a connection between entrepreneurs' networking behaviors and firm growth. Jarillo (1989) investigated whether growing firms use external sources more frequently and found that external source using and external networking effect firm growth positively. Donckels and Lambrecht (1997) examined the relation between firms' networking behavior and firm performance in manufacturing and service sector firms. In the study which was conducted on 900 firms, it is found that firms in both manufacturing and service sector use external counseling service extensively. The authors also found that a part of firms' growth performance is supported by networking activities. In a study conducted by Dean, Holmes and Smith (1997), authors found that networking has a positive effect on profitability, sustainable growth, knowledge sharing, product and service quality, and sales. Davidson and Klostner (2003) highlighted the importance of customer relations and other relations in addition to the business idea, the product, the market, the organization, core group expertise, core group drive/motivation on young new venture performance. Brown and Butler (1995) state that networking with competitor firms promotes firm growth.

In sum, the common finding of aforementioned studies, also stated by Havnes and Senneseth (2001), is that "...firms with large networks will exhibit better performance than firms with small networks, and consequently that firms with networks will perform better than firms without any network."

In contrast, there are also some empirical studies which find no or negative effect of networking on entrepreneurial performance and success. For example in the study which was conducted by Aldrich et al. (1987) on firm founders in North Carolina, the authors didn't find any significant effect of networking on firm profitability. Similarly, the study of Reese and Aldrich (1995) also showed that personal networks don't increase the firm performance. Also, Bates (1994) found that networking has a negative effect on profitability. The results of abovementioned studies show that there is no decisive solution on the relation between networking and firm growth.

## **LITERATURE REVIEW: THE RELATIONSHIP BETWEEN NETWORKING AND FIRM GROWTH IN BUSINESS INCUBATION**

In the business incubation literature, the survival and growth performance of incubated firms has been intensely studied (Adegbite, 2001; Cutbill, 2000; Nowak and Grantham, 2000. Campbell, 1989; Sherman, 1999; McAdam and Marlow, 2007; Zhang and Jiang, 2009; EC-

EDG, 2002; Allen and Rahman, 1985; Allen, 1985; Fry, 1987; Lumpkin and Ireland, 1988). However, the studies which focus on the effects of inter-firm networking activities of tenant firms on firm growth are limited. In the incubation literature, networking activities are regarded as one of business incubator services and its effect on firm growth and survival are examined with other incubator services such as physical, financial, shared, assistance and education/training services. Empirical research purely investigating the effect of networking on incubated new firm performance is rare.

Zhang and Jiang (2009) examined the networking activities in business incubators and its effects on firm performance. In the study, authors conducted a survey with both existing firm in business incubators and graduate firms. They used six performance indicators of (1) financial operational capabilities, (2) market competitiveness capability, (3) learning innovation capability, (4) organization and coordination capacity, (5) adaptable capabilities and (6) integration of collaborative capabilities. As a result of the study, authors found that there is an authentic relationship between business incubation networking operating mechanism and incubation performance. However, the authors didn't conduct any research in terms of the effect of networking on firm employment growth.

McAdam and Marlow (2008) investigated the effect of networking opportunities in university business incubators on firm sustainability and growth. The authors conducted a longitudinal study between 1999 and 2002 in United Kingdom. In the study, six firms were interviewed. The interviews were tape-recorded and transcribed and then analyzed. In conclusion, the authors found that university business incubators promote the development networks and these networks support new entrepreneurial firms during early growth. However, there is no any statistical methodology in this study.

In sum, to our knowledge, there is no study which using essential network characteristics such as density, closeness, betweenness for incubated firms. This paper tests the hypothesis that there is a significant relationship in intra-incubator networking activities and employment growth of tenant firms. We, first time, employ essential network characteristics approach in performance analysis among incubated firms.

## **THE DATA AND ANALYSIS**

### **Data**

Data has been gathered through survey from 127 newly founded active incubatee firms reside in three major incubation centers located in Adana, Tarsus and Samsun cities in Turkey. Firms that were already exit during the incubation eliminated from the analysis as we had not able to get information on almost all failing entrepreneurs. In this context, a questionnaire that developed to assess firms' growth performance has been applied to existing incubatees. The surveyed centers among the 12 incubation centers that are established between 1997-2007 by Small and Medium Sized Enterprises Development Organization (KOSGEB) and State Privatization Organization in collaboration with World Bank and European Union. They comprise more than 40% of the 12 incubators in size.

In the following section, we explain how we analyzed growth performance of firms by using networking activities. Weakness of our study, however, is that we only consider ties inside the incubation center as a network structure because lack of the information about outside relations. But, to our knowledge, there is not much empirical work in the literature

which examines networking activities, network position of firms, density of blocks and linking these factors to firms' growth performance.

## Analysis

Networking analysis has been now increasingly used to identify type and intensity level of interaction between firms. It shows formal and informal relationships and what facilitate and obstruct the knowledge flows between the firms through social maps and measures. The main objective of this study is to investigate if there are significant differences in intra-incubator networking activities of growing and non-growing young incubatee firms. In other words, given the literature, we hypothesize that the intra-incubator networking activities create significant stimulus for growth among young incubated firms.

Our main analysis rest on the fact that if the network positions really matter for the growth performance of a young firm one would state that its level of growth would have significantly higher level of intra-incubator networking activity in comparison to non-growth incubates. In this paper, any firm that incurs level of growth that is higher than zero in size during the incubation is defined as growing firm. Otherwise, it is defined as non-growing firm. Analyzing differences between the two, first, we produce network maps for growing and non-growing incubatees in each incubator and visually check the hypothesis. Later, we calculate sub-group block densities for the intra-incubator networking activities (Snijders and Borgatti, 1999). Separate analysis is made for each incubation center.

### *Network Maps for the Incubators*

Figure 1 depicts the networking map of the Adana Incubation center. Red nodes represent non-growing firms while the blue nodes represent growing firms. Their sizes are drawn according to their degree level<sup>5</sup>. The map of Adana incubation center shows that non-growing firms form the center of this network. Yet, when the map is visually checked, it is not clear if the growing or non-growing firms produce higher level of networking activity, as the sizes of the nodes and their position are not seem to be clearly differentiated from each other.

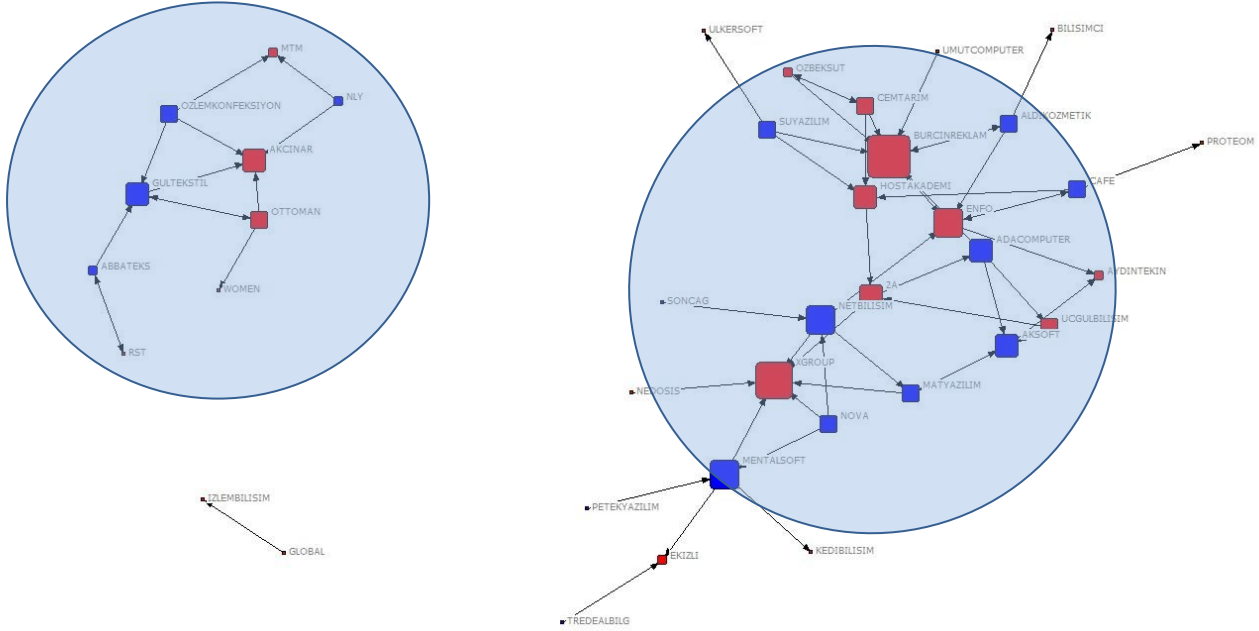
Moreover, the Figure indicates that Adana incubation center has two prominent cluster formations, as we ignore the last isolated two firms without any tie to the rest of the firms, located on the left bottom of the map. Two prominent clusters are highlighted by blue circle areas. On the left side of the network map, there is a cluster of firms which are completely isolated from other firms of the incubator center. This is natural because these firms mainly operates in textile and apparel industries (seven out of all nine firms in this group) as oppose to rest of the firms within the incubator that are located at the right hand side of the network structure. They comprise the major clustering of firms. In this cluster, almost all firms come from information and software industry. Consequently, the networking of firms in Adana incubator center is mainly occurs by sectoral cohesiveness of firms. In fact, Adana incubation center was originally established as a specialized center to host incubatees only from information and technology industry. Yet due to redundant capacity, few firms from other industries are also accepted to join the center over time. Also, on the upper right of side of the information technology cluster within the map, it can be seen that some firms have a central position in the network and these firms act as a "hub". In this part, the firm which holds

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<sup>5</sup> The degree centrality of an actor  $i$  is the number of its ties divided by the number of possible ties  
 $C_D(ni) = d(ni)/(g - 1)$ .

highest ties operates in advertisement business. Because of its business specialization, the other firms in the incubator center maintain a relation with the firm.

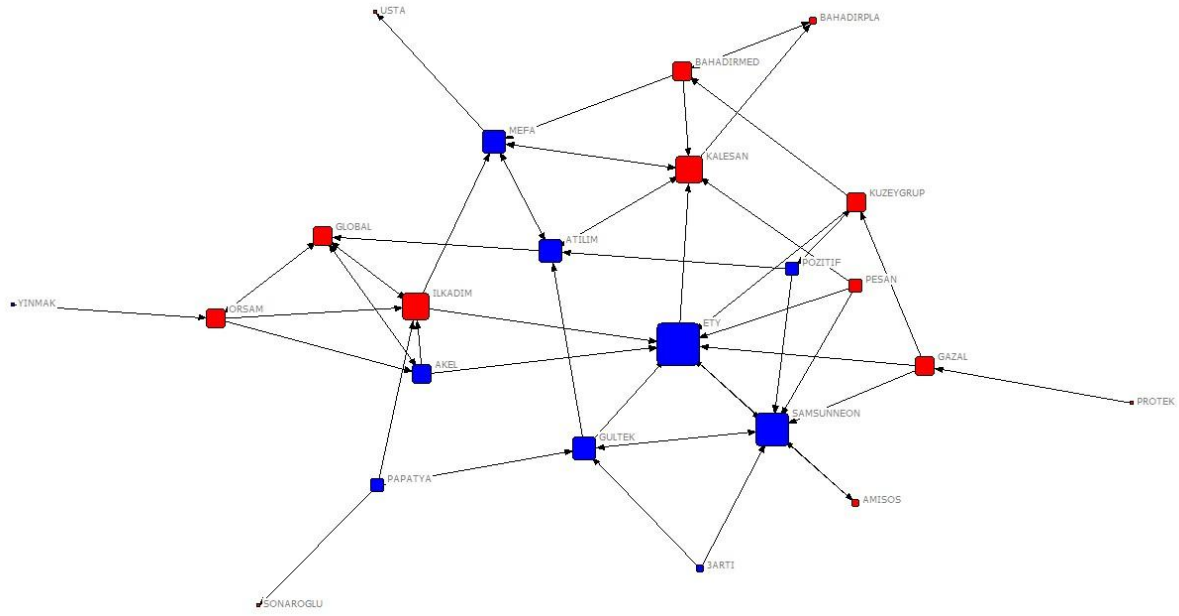
**Figure 1.** Network of Adana Incubation Center



Samsun intra-incubatee network has been presented in Figure 2. Samsun incubation center is much smaller than the Adana and Tarsus incubation centers. No split cluster formation exists at Samsun center. Visually checking, the network map indicates that growing firms are at the center of the network, and yet, it is not straightforward to say that the growing firms have significantly more ties with the other firms than non-growing firms. Although Samsun is a mixed incubator, the firms which are located at the core of network and their collaborators mostly operate within the same sector, as seen in Adana incubator. These firms are mainly from information, software and related industries. Besides, the firms which are located at periphery of the network map have usually one tie with other firms and have not got any sectoral cohesiveness with other firms located at the center of the network. These firms operate in industries such as machinery and plastic production and medical apparatus marketing.



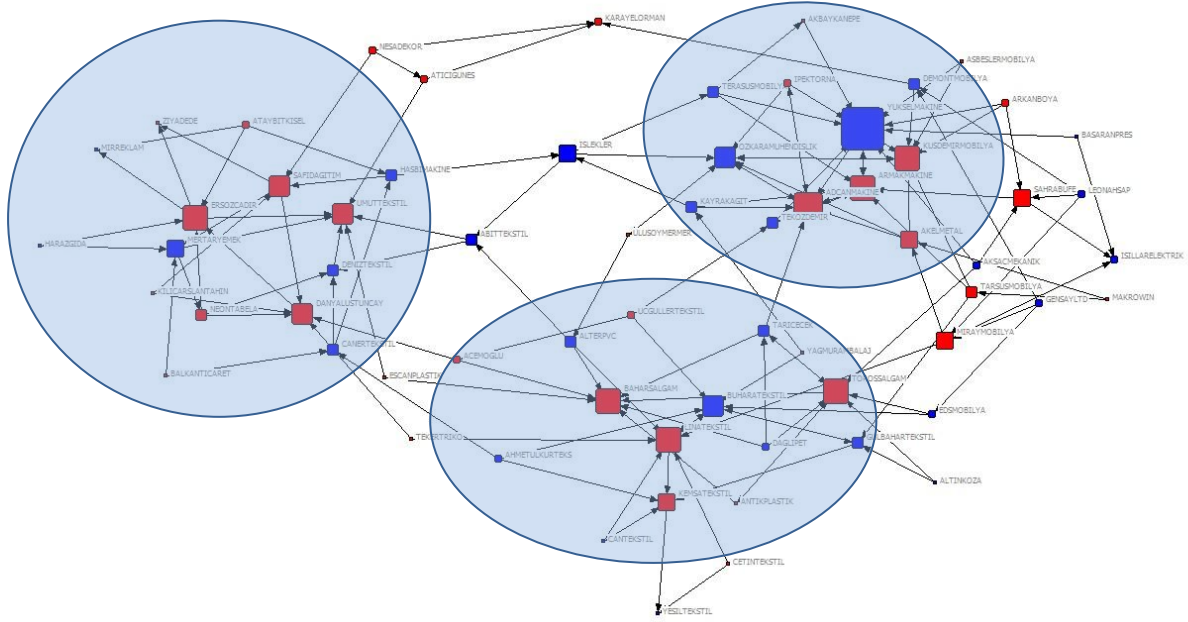
**Figure 2.** Network of Samsun Incubation Center



Finally, map of Tarsus incubation network is presented at Figure 3. It exhibits a structure that non-growing firms dominate the network and they are more at the center than growing firms. Yet, it cannot be clearly stated that there are clear differences between the networking activity of growing and non-growing firms.

In Tarsus incubation center, in terms of formation and main structure, the network map appears similar with Adana incubation center except that no secluded group of firms exists at Tarsus incubator. Yet, in Tarsus, there are three main networking clusters which include firms within the same sector. Firstly, the group that is located at left corner of the network map mostly includes firms from agriculture and food processing industry. Secondly, at the bottom of the map, there is the dominance of textile firms which consist of ten firms. Finally, the last group of firms comes together at the upper right hand side of the map. In this group, there are ten firms which are operating in related industries such as machinery, mechanic, electricity and engineering.

**Figure 3.** Network of Tarsus Incubation Center



### *Density Levels for the Incubators*

Preliminary visual analyses by network maps on the previous section on growing and non-growing firms do not give a clear preliminary view on testing our hypothesis that growing firms do higher level of intra-incubator networking activity than non-growing firms. At this moment we formally test the hypothesis by comparing the intra-incubator networking levels of the growing and non-growing firms. We use bootstrap method<sup>6</sup> that is based on re-sampling to construct standard errors. Classical formula of standard errors rests on the notion that all observations (i.e. all relations) are independent. However, since the ties are in fact generated by the same actors, this is not a reasonable assumption.

Moreover, For each incubator center in Samsun, Tarsus and Adana, we make the analysis i) for all sample and ii) for incubatees aged 42 months or younger. In a strict sense, entrepreneurship literature indicates that firms that are only three and a half years old or younger firms are accepted in the entrepreneurial process (Lundström and Stevenson, 2005). In the incubation center there are incubatees continue to reside within the incubation center although they exceed the anticipated residence period of three years. Thus we redo the same analysis in order to make sure the hypothesis holds under restricted conditions.

The resulting values and standard errors between the groups are given in Table 1. When making comparisons between groups, it is useful to have an indication of how precise a

<sup>6</sup> The basic idea of the bootstrap is that the observed data are treated as a population in itself, and that artificial samples of size  $N$  are drawn with replacement from the observed data. The procedure of generating an artificial network is repeated  $M$  times independently, where  $M$  is large. For each artificial network drawn in this way, the statistic is calculated. Denote these artificial statistics by  $Z^0$  to  $Z^a$ . This means that  $Z^a$  is calculated on the basis of artificially generated network  $Y^*$ . The artificial networks are regarded as networks that might have been observed instead of the actually observed one, so that  $Z^0$  to  $Z^a$  is regarded as a spurious sample from the distribution of  $Z$ . Accordingly, the bootstrap standard error is

$$S.E._b(Z) = \sqrt{\frac{1}{M-1} \sum_{m=1}^M (Z^0 - Z^x)^2} \text{ where } Z^x \text{ is the mean of } Z^0. \text{ (Snijders and Borgatti, 1999).}$$

given description is. But there are no widely applicable ways calculating standard errors for network statistics. If we are working with the distribution of relations among actors in a network, and our measure of tie-strength is binary, the mean or central tendency is also the proportion of all ties that are present, and is the “density”<sup>7</sup>.

**Table 1.** Density Levels of Groups

|  | Observations | Center        | Non-Growing        | Growing            | Difference         |
|--|--------------|---------------|--------------------|--------------------|--------------------|
| <b>All Sample</b>                                    | <b>39</b>    | <b>Adana</b>  | 0.0252<br>(0.0128) | 0.0609<br>(0.0266) | 0.0357<br>[1.2093] |
|  | <b>65</b>    | <b>Mersin</b> | 0.0321<br>(0.0075) | 0.0345<br>(0.0142) | 0.0024<br>[0.1494] |
|  | <b>23</b>    | <b>Samsun</b> | 0.0979<br>(0.0436) | 0.1227<br>(0.0595) | 0.0248<br>[0.3362] |
| <b>Incubatees that are aged 42 months or younger</b> | <b>16</b>    | <b>Adana</b>  | 0.08<br>(0.0342)   | 0.0889<br>(0.0769) | 0.0089<br>[0.1057] |
|  | <b>37</b>    | <b>Mersin</b> | 0.0205<br>(0.0117) | 0.0258<br>(0.0227) | 0.0053<br>[0.2075] |
|  | <b>16</b>    | <b>Samsun</b> | 0.075<br>(0.0716)  | 0.0917<br>(0.0528) | 0.0167<br>[0.1877] |

Bootstrap standard error in brackets. t-statistics in square brackets.

First, the Table shows that the density of block values of growing firms are higher in comparison to non-growing firms for all incubation centers. This is correct for both all and restricted data. Moreover, there is no monotonic increase or decrease in network density values when we switch to restricted sample. The density levels of non-growing and growing groups in Adana increases (0.0252 to 0.08 and 0.0609 to 0.0889) while it decreases (0.0321 to 0.0205 and 0.0345 to 0.0258) for both growing and non-growing firms in Mersin incubation center. Samsun also has a similar situation with Mersin Incubation center. For newly founded firms operating in this center, density levels decrease for both blocks (0.0979 to 0.075 and 0.1227 to 0.0917).

To test our central hypothesis we calculate t-statistics<sup>8</sup>. The results on the “difference” column of the Table indicate that the differences between the density values of growing and non-growing firms are not significant for all cases, considering the t-values within the brackets. Thus, in all grounds, we cannot verify our hypothesis that growing and non-growing firms differ in intra-incubator networking activities.

<sup>7</sup> If  $g$  is the size of the network and  $d(n_i)$  is the degree (the number of connections of actor  $i$ ), then the density  $D$  of the group is defined as the number of all linkages divided by the number of possible linkages within the network  $D = \sum_{i=1}^g d(n_i)/(g^2 - g)$ .

<sup>8</sup> To test the significance of observed differences between growth and nongrowth blocks, we construct a bootstrap t-test. Assuming a null hypothesis of no difference, the standard approach is to calculate  $t = \frac{Z_1 - Z_2}{\sqrt{SE_1^2 + SE_2^2}}$  where  $Z_1$  and  $Z_2$  are density levels of two blocks separately.  $SE_1$  and  $SE_2$  are bootstrap-derived standard errors.

## DISCUSSION AND CONCLUSION

Young firms play key role for new jobs, sales and innovation in most economies. But, they mostly face serious barriers to survive and expand during the initial period. Business incubation centers have emerged as a popular growth policy to respond to this general concern. Also, the cooperation can facilitate the achievement of economies of scale in small firms without producing the diseconomies caused by large size. Using networks can, therefore, potentially lower a firm's risk of failure and increase its chances of success.

We have examined Adana, Samsun and Mersin Incubation Centers which have benefited of this policy. Main contribution of this paper is that it adds to the new firm growth literature with pioneering analysis regarding the linkage between network position of companies and firm growth. Overall, growing firms in three incubation centers seem to be better integrated into the network although there are no significant density differences between growing and non-growing blocks.

Our study has some limitations that suggest directions for future research. Our results rest on findings from derived from a specific data. Additional evidence is necessary to confirm our findings. Moreover, our analysis covers communication flows across the ties within the incubation centers as a network, ignoring the networking ties established with outsiders. Future works that also include data about outside ties will produce additional and more comprehensive evidence on the subject.

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