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Impact of Pre-incubators on Entrepreneurial Activities in Turkey: Problems, Successes, and Policy Recommendations

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**Impact of Pre-incubators on Entrepreneurial Activities in Turkey:
Problems, Successes, and Policy Recommendations**

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Abstract

Innovation is a key driver of economic growth the world over. One key initiative in innovative societies is entrepreneurship. Entrepreneurship can be considered a driving force for economic growth, employment creation, and competitiveness in societies. However, a crucial issue is the ability to produce knowledge and train a skilled workforce that has a proper entrepreneurial mindset. In this regard, there are three main actors: public governance, universities, and the private sector.

Universities need to become more innovative and entrepreneurial—in contrast to their traditional approach in teaching and research. They need to play an important role as both producers and disseminators of knowledge in entrepreneurial activities. The concept of pre-incubation centers, which is the central focus of this paper, is one outcome of such activities.

By providing targeted resources and services, incubation is a business-support process that accelerates the successful development of start-ups and companies. Incubation ideas focus on already established firms—either start-up or senior firms; however, pre-incubation centers focus on the early-stage ideas of students and entrepreneurs.

This study addresses the impact of services offered in pre-incubation centers—namely infrastructure, coaching, and business networks—on the graduation rates of incubator participants in Turkey. Based on interview data with 23 of 40 pre-incubation managers, we found that it is necessary to develop synergy among universities and achieve local economic alignment. The educational system should produce individuals with requisite skills: at that point, they can become active in furthering government policies to promote entrepreneurship. In this context, entrepreneurial universities play an important role as both producers and disseminators of knowledge. University-based incubation centers will become key actors for promoting entrepreneurial culture in societies.

I-Introduction

During the last decade, the evolving digital economy has been the preeminent driver of structural change and economic growth at both national and local levels in developed, industrialized economies. However, there are substantial differences among countries and local regions with regard to their role in the development of information and communication technology (ICT) and their propensity to adopt and apply ICT applications in various sectors and activities. Hence, countries and local regions differ markedly in how far they have pursued the road to the digital economy. The concept of innovation through the creation, diffusion, and use of knowledge has become a central driver of economic growth.

Innovations mainly result from increasingly complex interactions among individuals, enterprises, and different kinds of knowledge institutions—i.e., clusters. Interestingly, innovation activities are localized, and they tend to aggregate in regions that offer favorable conditions for innovation. Thus, emerging regional innovation networks create new forms of learning and knowledge production. One important aspect of these localized clusters of knowledge production is that such knowledge flows could be exploited by third-party economic agents, i.e., entrepreneurs. We believe that for developing or less developed local regions, adequately establishing this relationship with entrepreneurs would be key to the development process. Thus, cluster initiatives that encourage regional entrepreneurial capacity are essential for success.

Entrepreneurship is crucial in the creation of innovative societies. Entrepreneurship can be considered a driving force for economic growth, employment creation, and social competitiveness. However, a vital link in that process is the ability to generate knowledge appropriately. In that regard, three main actors should adopt that role: public governance, universities, and the private sector. With respect to universities, pre-incubation and incubation centers are vitally important in the entrepreneurial ecosystem.

The concept of incubation and pre-incubation centers is the prime subject of the present study. Incubation is a form of business support that accelerates the successful development of start-ups and companies by providing targeted resources and services. Although incubation focuses on already-established firms, including start-up and senior firms, pre-incubation centers concentrate on the ideas of students. In broad terms, a pre-incubation initiative offers infrastructural opportunities, such as office space, equipment, and such administrative facilities as fax machines, telephones, and Internet access. A pre-incubation initiative also offers training and educational workshops or seminars. However, the most important contribution is business

networking. Here, this networking signifies the access available to tenants of the incubator to managers, administrative, management, financial, legal, and insurance consultants, scientists, academics, and prospective customers (Peters et al., 2004).

Entrepreneurship in Turkey has clearly made tremendous progress. Most universities have initiated programs and areas to promote entrepreneurship, such as technology development zones, technology transfer offices, and incubation and pre-incubation centers. The first pre-incubation center in Turkey was established in 2004; now, there are almost 40 such centers. Most of them have been in existence for less than 5 years. The impact of these centers will become more apparent within the next few years. The biggest problem these centers face is the lack of an entrepreneurial mindset among incubatees. In addition, success is a critical target for all of them. The present study examines the impact of the services offered at pre-incubation centers, namely infrastructure, coaching, and networks, and on the graduation rates of the incubators' tenants in Turkey. To improve the quality of the services provided at those centers, it is necessary for governmental bodies to implement effective policies. As a major source of skills and knowledge, universities also play a crucial role.

This study comprises five parts. In the next section, the concept of pre-incubation centers is discussed along with the idea of entrepreneurial universities. The third part introduces the methodology; the fourth part presents an analysis of the data; the final part outlines the results of field research and implications (policy ideas).

II. Literature Review

II.1-From traditional to entrepreneurial or third-generation university

The role of entrepreneurship is not only to increase outcomes and annual income; it is also to set the foundations for structural changes in economic and social activities. The importance of entrepreneurship in development can be emphasized “as an engine of economic development” (Amiri et al., 2009). There are various actors in the entrepreneurship ecosystem and, as noted above, universities play a very important role in that. It is indisputable that universities need to create an encouraging environment for fostering entrepreneurship, thereby contributing to real economic and social development at the regional and national level (Kirby, 2006).

Etzkowitz et al. (2000) observed that traditional universities undertake academic education and conduct basic research without directly focusing on developing entrepreneurship. Thus, traditional universities do not concentrate on pure entrepreneurial culture and systems to elevate entrepreneurship. Owing to global competition, universities need to review their functions and respond to internal and external forces so as to change their role to one of

entrepreneurial institutions (Amiri et al., 2009). Clearly, converting traditional universities to entrepreneurial institutions is no easy task: it requires support from different sections of society, such as universities (university management, faculty, students, and staff), government, and industry (Etzkowitz et al., 2000; Etzkowitz and Leydesdorff, 2000; Pahurkar, 2015). It is also necessary to undertake various strategic actions and policy decisions that support entrepreneurial culture at universities.

Traditional universities tend to produce graduates with no entrepreneurial background; such institutions measure their output only in terms of student enrollment and graduation. However, universities also need to consider and evaluate their social and economic contribution. In this regard, universities should emphasize activities that lead to economic and social development, and it is necessary to coordinate relations among universities, industry, and government. A university that succeeds in this manner may be termed an “entrepreneurial university” (Etzkowitz and Leydesdorff, 2000). Entrepreneurial universities can undertake various entrepreneurial activities, as follows (Pahurkar, 2015):

- Establishing technology parks
- Assisting with new venture start-ups
- Protecting intellectual property rights through patents
- Contracting research
- Setting up executive education or industry training courses
- Providing assignment consultation
- Providing research funding and grants
- Undertaking publication and documentation of research activities
- Arranging participation in international research exhibitions and conferences

The above possible entrepreneurial activities have different levels of proximity to entrepreneurship and academia. Activities closely related to entrepreneurship are termed “hard activities” (e.g., patenting, licensing, and spin-off venture formation); those closely related to academia are termed “soft activities” (e.g., academic publishing, research grants, contract research, publication, conferences) (Klofsten and Jones-Evans, 2000).

As large organizations with an academic purpose, universities do not possess the core function of entrepreneurship. Accordingly, some of their inherent characteristics operate as barriers in this regard (Kirby, 2006):

- Strict, complex organizational structure with many levels of approval
- Monolithic relationships
- Restrictive controls, rules and regulations, protocols, and following standard procedures
- Burden of bureaucracy, red tape, corruption, and extensive formalities
- Lack of corporate culture and talent
- Inappropriate compensation plans.

In addition to these general barriers of universities, other factors impede the entrepreneurial activities of students. Some of these are as follows (Pahurkar, 2015):

- Negative examples of others conducting business and fear of failure
- Difficulty in coping with problems arising from business that involves risk
- Lack of financial security, as found in salaried employment
- Financial problems in starting a business
- Family resistance to starting a business
- Lack of experience in coping with the psychological burdens of business
- Limited knowledge of business operations
- Previous negative experience with business.
- Benefits of a good salaried job, such as high social status
- Bureaucracy, red tape, corruption, long-established procedures, and tax issues

The barriers for universities may be eliminated with new regulations and policies. However, the barriers for students cannot be controlled in this way, and it is necessary to understand such barriers toward cultivating entrepreneurial culture. Universities are generally regarded as academic organizations with intellectual integrity; they are devoted to critical inquiry and committed to learning and understanding. When universities become entrepreneurial, that may divert their attention from core academic matters. Most academics consider their primary duties to be research and teaching, not acting as entrepreneurs. Thus, there is a fear of conflict of interest with respect to academia and entrepreneurship: there could be a negative impact on an institution's research performance if its leading academics devote their efforts to entrepreneurial activities (Kirby, 2006). However, many institutions, such as the universities of

Surrey, Stanford, California, and Columbia and the Massachusetts Institute of Technology, have become more entrepreneurial as well as having a strong research output. They have therefore proved the above fear to be unfounded.

Above, we examined barriers and fears on the part of entrepreneurial universities. However, it is important to note that there is both a positive and a negative side to this issue. Some motivational factors and positive outcomes with respect to entrepreneurial universities include (Pahurkar, 2015; D’Este and Perkmann, 2011):

- International exposure and funding
- Revenue from patents and licensing
- Commercialization of research output and starting spin-off ventures
- Intellectual property rights, licensing, publications, and collaborations with industry
- Global exposure and reorganization
- Research grants from industry and government
- Encouraging feedback from industry about research work and real-life applications
- Learning opportunity
- Expertise and advance information about specific industries
- Access to industrial equipment and materials
- Becoming part of a global research network

As the benefits of becoming entrepreneurial are very significant, universities need to develop business and entrepreneurship as strategic goals. Universities that grasp this situation review and reorganize their structure and policies to become third-generation universities. Their role is indisputable in the entrepreneurial ecosystem. Universities that understand their role in entrepreneurship have started to establish resources, such as technology transfer offices (TTOs), pre-incubation and incubation centers, and even technoparks, to meet the demands of students, academics, and industry. Specifically, as the first and second stages of entrepreneurship, pre-incubators and incubators have gained importance among third-generation universities. In the following section, we will examine pre-incubation and incubation centers in detail.

II.2-Pre-incubation and Incubation Centers

Before considering pre-incubation centers at universities, it will be helpful to define “pre-incubation” and “incubation.” Pre-incubation plays a key role in providing different forms of

assistance to nascent entrepreneurs—especially in the initial development stages of their ideas. Knowledge produced in universities is studied extensively, and it has an impact on industry. The pre-incubation level supports entrepreneurial ideas so that they can attain the start-up level of business incubation.

Kirby (2004) describes a pre-incubator as a facility for a very early stage of a start-up that has yet to formulate its business plans, develop a prototype, or establish an entrepreneurial team; the pre-incubator leads the embryonic business to an investment or market-ready stage. Accordingly, it can be stated as follows: pre-incubation relates to the overall activities needed to support the potential entrepreneur in developing his business idea, business model, and business plan, to boost the chances to arrive at an effective start-up creation.

The definitions of a business incubator may vary in detail but agree in some basic characteristics. The National Business Incubation Association refers to business incubation as follows: “Business incubation is a business support process that accelerates the successful development of start-up and fledgling companies by providing entrepreneurs with an array of targeted resources and services. These services are usually developed or orchestrated by incubator management and offered both in the business incubator and through its network of contacts. A business incubator’s main goal is to produce successful firms that will leave the program financially viable and freestanding” (Bathula et al., 2011, p. 2). Another authority gives the following definition: “Business incubators are facilities that provide rental space, shared basic business services and equipment, business assistance, coaching and financial support to start-ups and young firms in order to accelerate their successful development” (Anonymous, 2012).

The main difference between business incubators and pre-incubators is usually defined by the development stage of the incubatee’s business. A business incubator provides its services to already founded start-up companies at the early stage of their development; a business pre-incubator supports businesses at the planning stage before they have actually become established (Kirby 2004). Nevertheless, there are certain similarities between the two types in terms of provided services, and the pre-incubation and incubation stages can have areas of overlap, as shown in Figure 1.

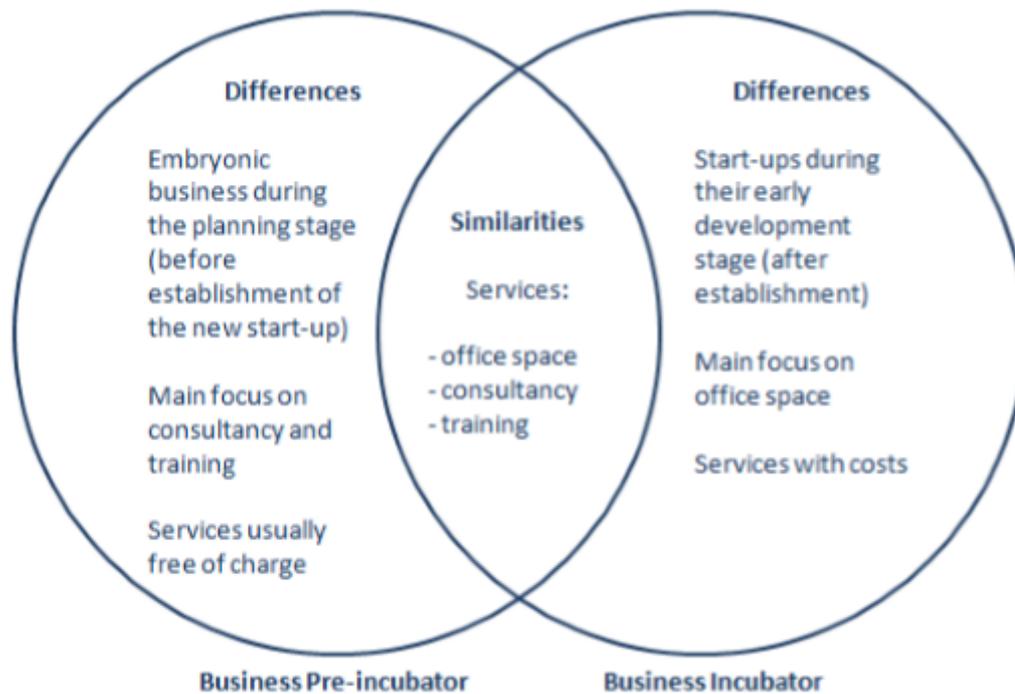


Figure 1. Similarities and differences between business incubators and pre-incubators

Source: Deutschmann (2007)

II.3-Role of University-Based Pre-incubators

The pre-incubation concept was developed to promote enterprise and spin-out ventures of universities. The first defined pre-incubator in Europe was established in 1997 at the University of Bielefeld in Germany (USINE, 2002). As the name indicates, university-based pre-incubators are a special type of pre-incubator located in universities. They are sponsored by universities and are popular in both developed and emerging countries. University-based pre-incubators link higher education and private sector initiatives for wealth creation: they generate new products and reduce the associated risk (Bathula et al., 2011).

To understand the popularity of university-based pre-incubators, it is necessary to consider the current business environment in which universities operate. As noted above, the main purpose of universities is research and teaching in various fields and building an academic foundation. However, universities are also under pressure from government and industry to contribute to the social and economic development of the nation. Grimaldi and Grandi (2005) state that government authorities expect universities to lend resources, faculty time, and talent to economic development efforts. Universities have additional significant roles, such as establishing links with industry. By doing so, universities can provide their faculty with a

platform for conducting research; they can also give their students an opportunity to find jobs and support them in starting their own ventures (Bathula et al., 2011).

A university-based pre-incubator provides a good training environment for potential entrepreneurs or entrepreneurial teams by putting them in active positions. Academics assume an active role in the commercialization of their R&D results by starting their own profit center. In addition, university-based pre-incubators offer special support, such as entrepreneurial courses, personal mentoring, access to relevant networks, and applying for patents. University-based pre-incubators can provide the following to academics and students (Anonymous, 2012):

- A pre-incubator offers the chance to test business ideas and gain business experience without actually forming a company.
- Unlike a business incubator, a pre-incubator supports only entrepreneurial projects and enterprises not already registered
- The pre-incubator management and both academic and students conclude a contract; this enables the profit centers to conduct normal business transactions, such as the sale of pilot products, on behalf of the pre-incubator.
- Since the chief executive manager controls all business transactions, financial risks are minimized for academics or the entrepreneurial team.
- After a successful period of pre-incubation, academics or their entrepreneurial team will have gained sufficient knowledge, skills, and experience to run a company on their own. Registration of an enterprise usually takes place after those individuals have completed their terms at the pre-incubation center.
- The fear of failure is significantly reduced as a result of improved self-confidence and experience gained during the pre-incubation.
- Pre-incubation involves the development of a “risk mitigation strategy,” which helps ensure success among the participants in their enterprises.
- In the course of pre-incubation, participants are able to test the markets for their products and services; this allows emerging entrepreneurs to gauge the feasibility of their business ideas before undertaking the risk of establishing their own company.
- Pre-incubation reduces risk by selecting business ideas that have the greatest chance of success.
- The pre-incubation time is limited: it may vary from a couple of months to several years, depending on the concept of pre-incubation. This limited time is often referred to as the “probationary period.”

In the light of above clarification, the primary aims of the university-based pre-incubator can be stated as follows: (1) to qualify academic entrepreneurs to found and manage a company of their own; (2) to increase the number of academic spin-offs; (3) to create sustainable spin-offs; and (4) to create a culture of entrepreneurship within the university.

In the university environment, pre-incubators are regarded as a necessary facility that fills the gap between a university and science-based business incubators (Figure 2). In pre-incubation, participants receive support for their business ideas and plans, in testing the markets, and building up resources (Dickson, 2004).

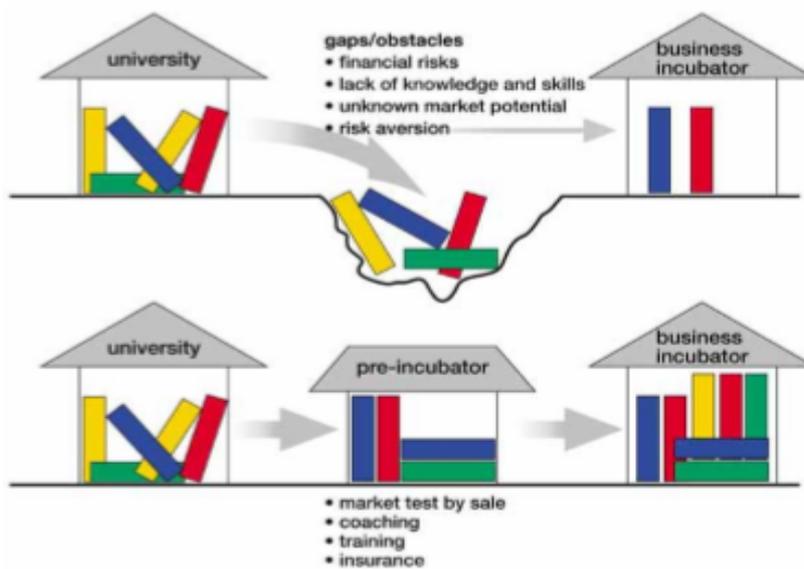


Figure 2. Pre-incubator: filling the gap between universities and the business incubator

Source: USINE (2002)

As noted above, pre-incubation usually involves an initial assessment of an idea, training, and personal assistance so that the incubatee is able to write a complete business plan. Pre-incubators offer training, mentoring, and facilities (at minimum, a workstation) to support potential entrepreneurs in developing their business ideas and elaboration of their business plans. Once participants have completed their business plans, the next stage is to direct them to incubation centers to establish their start-ups (Figure 3).

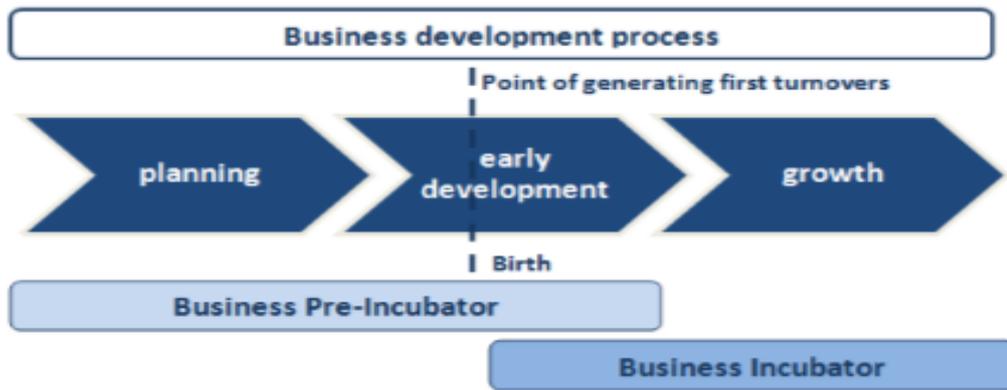


Figure 3. Entrepreneurial process-oriented classification of business incubators and pre-incubators

Source: Deutschmann (2007)

The resource-based view is an organizational theory that is often used to explain entrepreneurial performance, and it may be applied to examine the business pre-incubation process. The key principle of this theory is that it addresses competitive advantages through strategic positioning; the aim is identification and intelligent application of a unique set of valuable resources (Anonymous, 2012). The resources necessary for creating start-ups can be classified into various categories, such as technological, financial, physical, human, social, and organizational.

Some of those resources are intangible, such as human, social, and organizational; they are generally more difficult to acquire. Dierickx and Cool (1989) found that there are two types of resources: physical tangible and knowledge-based intangible resources. In business pre-incubation centers, physical resources may be infrastructure and financial resources; knowledge-based intangible resources are the training, mentoring, administrative support, technology expertise, professional services, and consulting.

II.4-Characteristics of University-Based Pre-incubators

As indicated above, the presence of pre-incubation services at universities can encourage entrepreneurial awareness and stimulate entrepreneurial activity. Pre-incubation facilities have been initiated by many universities. These facilities have as much diversity as standard incubators, though Dickson (2004) identified four groups of common characteristics (Voisey et al., 2013).

1. **Targeted processes:** The pre-incubation process provides the entrepreneur participant with the appropriate support to develop their business ideas and plans, build up the necessary resources for the creation of a viable business, and then test the market. The standard pre-incubator services provided to participants are office facilities, business plan assistance, practical guidance, mentoring, training, financial counseling, and business networking. All this is at a nominal cost to the would-be entrepreneur.

Not all services can be provided directly by the pre-incubator. The existence of local business support networks—in both the public and private sectors—allows for the development of enterprise education.

2. **Selection policies:** Pre-incubation processes offer a risk mitigation strategy. The would-be entrepreneur has access to an environment in which knowledge-based support is provided at low cost. During pre-incubation, the viability of an idea can be developed and tested before taking on the significant risks associated with business start-ups. The selection of candidates is also seen as a risk-reducing strategy within the incubation chain: funding targets are often associated with recorded successes, not the number of business ideas tested.

3. **Period of incubation:** The time a business idea spends in the pre-incubation stage before proceeding to the business incubator is limited. The time spent in the pre-incubator is often termed the probationary period. This time may vary from a couple of months to several years, depending on the culture and operation of the pre-incubator.

4. **Linked:** Pre-incubation service centers are usually linked to universities. As a result, the centers promote and support graduate entrepreneurial intent, thereby acting as feeders for other incubators. Even though no two incubators are exactly alike, they have several traits in common, such as co-location of businesses, shared services, management assistance, and networking. One distinctive feature of pre-incubation facilities is that they have a common purpose.

It is evident that university-based pre-incubation centers play a very important role in the entrepreneurial ecosystem in emerging economies such as Turkey. The first university-based pre-incubation center was established at University of Bielefeld in Germany in 1997. Since then, the number of university-based pre-incubation centers has increased around the world.

The first pre-incubation center was established in Turkey in 2004, and there are about 40 university-based pre-incubation centers in the country. This rapid growth has underlined the necessity to conduct the present study, which aims to provide a general overview of university-based pre-incubation centers in Turkey.

III-Methodology

The main goal of the present investigation is to examine the structure, organization, activities, and problems related to pre-incubation centers in Turkey. This study adopts both qualitative and quantitative research methods. First, we conducted a literature survey and established the scope of our field research. After setting the theoretical basis for the study, we designed a survey instrument. We divided the survey instrument into three parts. The first part consisted of 29 questions related to general information about pre-incubation centers. The second part comprised 18 questions about beneficiaries. The third part included 35 questions related to problems and successes of pre-incubation centers. We pretested the survey instrument with two academics to confirm that the survey questions were clear and lacked confusion regarding wording, descriptions, and measurement scales. Based on feedback from those pretests, we improved and refined the instrument. We also implemented a pilot study before administering the survey instrument to managers of pre-incubation centers.

III.1-Sample

There is unfortunately no official database about the number of pre-incubation centers in Turkey. For that reason, we used the database of the Association of Technology Development Zones in Turkey to create a list of such centers. We then asked the managers of identified centers to provide their own list of pre-incubation centers in Turkey. We thus used the snowball sampling method to establish our sample. This method is also referred to as the chain sampling method. It is mainly used in complex and problematic field studies (Neuman, 2006). Initially, we conducted interviews with a small number of managers of pre-incubation centers, and we utilized their networks to identify other actors. Currently, there are 40 pre-incubation centers in Turkey. We made interview requests to the managers of all centers but succeeded in interviewing only 23 (58%). We asked the managers both open- and close-ended questions. We conducted both face-to-face interviews and interviews via Skype. After analyzing the resultant data, we prepared policy recommendations.

IV-Analysis and Findings

Many universities in Turkey have taken decisive steps to stimulate entrepreneurial quality. They have also started to take on a role in the entrepreneurship ecosystem. Universities have established several centers within their local regions, such as technology parks, technology transfer offices, and acceleration, incubation, and pre-incubation centers. In addition, governmental institutions have become involved: they have launched many supportive mechanisms. However, the history of entrepreneurial support in Turkey is fairly short. The first step was taken by KOSGEB, which is a governmental institution that supports small and medium-sized enterprises in Turkey. The first technology development center (TDC) was founded. At the beginning of the 2000s, the first technology development zone (TDZ) was established. Today, there are 42 TDCs and 63¹ TDZs in the country.

Since the new millennium, supporting entrepreneurial activities before the establishment of start-ups has increasingly appeared on the agenda in Turkey. Both TDZs and universities have started instituting incubation and pre-incubation centers. The first TDC began operations in 2004.

In the following section, we discuss the results of our field study, which aimed to analyze the structure, organization, and problems related to pre-incubation centers in Turkey.

IV.1-Pre-Incubation Centers in Turkey

Pre-incubation centers of Turkey are quite young institutions. As of 2016, the oldest is just 12 years old; however, the youngest is just half as old. It is interesting that 73% of them were established in the last 3 years. This highlights the strength of the entrepreneurial spirit in Turkey.

Geographically, most pre-incubation centers are located in Turkey's three largest cities: 77% are in Ankara and Istanbul, 10% in Izmir.² Those three cities have thus taken the leadership in this area. They have made a great contribution to the entrepreneurial ecosystem in terms of operations and human resources. The remaining centers (18%) are located in several other cities. This geographic distribution should be beneficial in supporting entrepreneurs living around the country.

¹ Of the 63 TDZs, 13 are inactive. They were officially founded but are not in operation.

² The distribution of the pre-incubation centers is as follows: 17 in Istanbul (43%), 10 in Ankara (25%), four in Izmir (10%). The remaining centers are located in several cities in Anatolia: Bursa, Eskişehir, Samsun, Gaziantep, Kahramanmaraş, Kayseri, Elazığ, and Sakarya ve Konya.

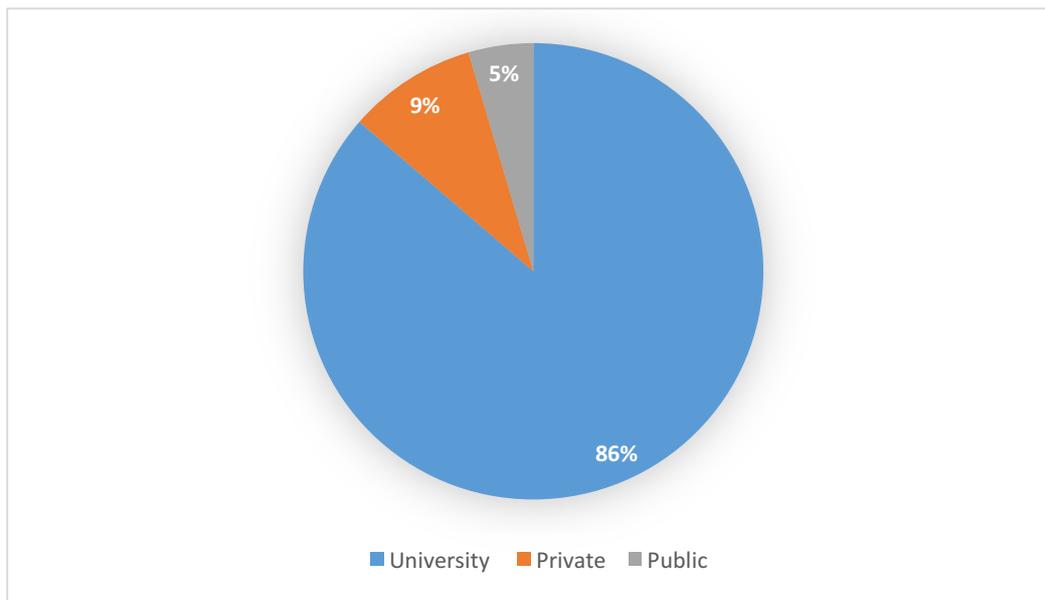


Figure 4. Type of pre-incubation centers

Nineteen pre-incubation centers were founded by public or private universities. The entrepreneurial activities of those centers are managed through TDZs and TTOs. Activities related to the incubation are operated under the umbrella of those two bodies. Two private pre-incubation centers are located in each of Ankara and Istanbul. One pre-incubation center was established by a municipality located in Istanbul. Those numbers indicate that universities are the key stakeholders in Turkey's entrepreneurial ecosystem. These institutions have undergone the transformation from a traditional role (education) to a contemporary one (entrepreneurial support). Universities are thus the main source of knowledge and skilled labor force for the private sector.

Pre-incubation centers operate with a small number of staff. The greatest number of people working in one managerial team is eight. At some centers, only one person is employed. Only four centers (18%) are profit-making operations; 82% are non-profit organizations. All the services provided by the centers are free for entrepreneurs. Pre-incubation centers derive their profits from partnerships. When a start-up is founded, the center receives 5% or 10% of company shares for its services. The center retains its shares if the start-up is sold.

With regard to the purpose of pre-incubation, the centers are very supportive of entrepreneurial ideas at a very early stage of development. The incubatees are young and face considerable problems, among which is finance. The non-profit or free services offered by such centers are the main draw for potential entrepreneurs.

We found that 81% of pre-incubation centers had a strategic aim along with a defined vision and mission. They aimed at contributing to both the regional and national development of Turkey. We observed no sectoral differentiation among 45% of the centers: they supported innovative ideas from all sectors, especially ICT (Figure 5). Five pre-incubation centers decided to support one special sector: two supported ideas in the health sector; one supported the digital games sector; one supported projects that aimed to contribute to civil society; and one supported smart cities. Specialized pre-incubation centers are crucial for entrepreneurial activities. It would likely be more effective if they concentrated on one particular sector. Specialization also offers particular services and support mechanisms for incubatees. If pre-incubation centers focused on one sector that would be more profitable for both the local region and nation.

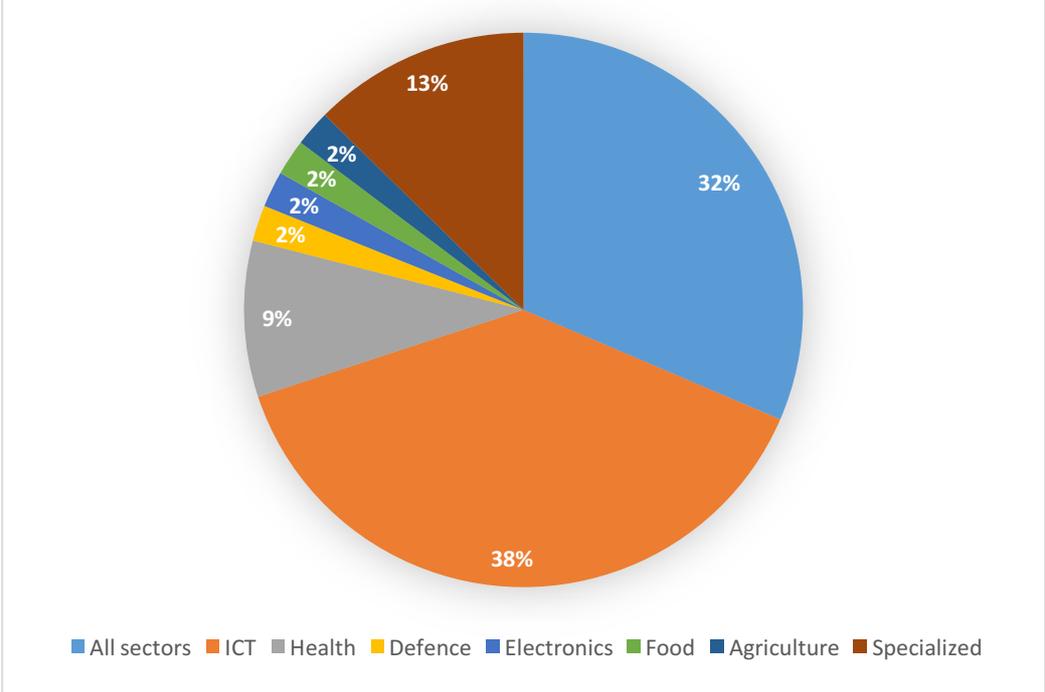


Figure 5. Sectoral priorities among the pre-incubation centers

IV.2-Criteria for incubatees

Deciding which individuals to support is a critical issue for pre-incubation centers. We found that two criteria were vital for all the centers: having an innovative R&D project and the characteristics of the group. The project should involve a new idea, aim at solving an existing problem, and be marketable. More important, the characteristics of the group members should be in keeping with the idea. If disparities exist in this regard, the rate of failure increases enormously. Thus, the attitudes of the members should be appropriate for the project. The experience of group members is also an important criterion for selection of incubatees.

As to why characteristics of the group members are so important, the first reason is that pre-incubation centers obviously want to be successful. That is to say, with limited resources, they wish to achieve good results. Accordingly, pre-incubation centers consider potential incubatees very carefully before deciding. The centers are looking for skilled, experienced entrepreneurs. The second reason is that discrepancy between the theme of the project and the characteristics of the group members promotes the rate of failure. Failure also signifies loss of time and resources, which are invaluable assets for the centers. It is not easy for young entrepreneurs to maintain their sustainability. Most projects fail to see the light of day. In addition, the candidates need to show their commitment to their ideas or projects. If owners of an idea do not believe in themselves, nobody else will do it for them. Another crucial criterion is whether the end product has market or investment potential. We found that 50% of the centers did not accept new candidates, and they also did not accept start-ups at a very early stage. The other 50% never accepted any kind of enterprise.

IV.3-Services

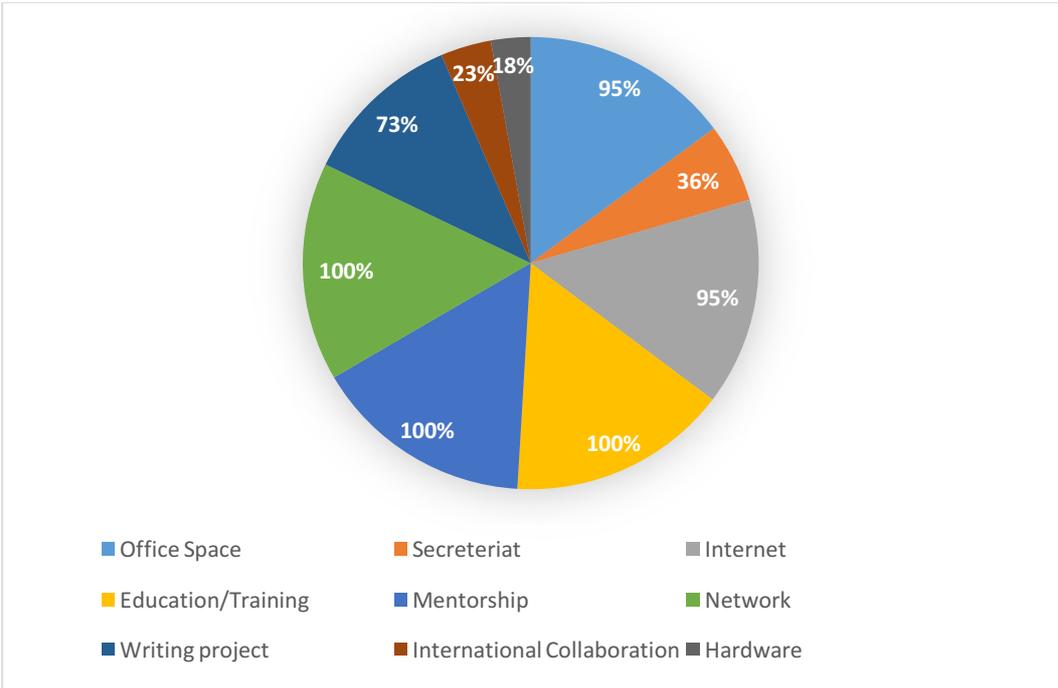


Figure 6. Services provided for incubatees

Pre-incubation centers provide many different types of services for incubatees; however, almost all the centers offered the same services. All except one center provided open office spaces; that center focused on network, mentorship, and training without using office space. As noted above, the pre-incubation centers operate under the umbrella of TDZ or TTOs. Incubatees have

the opportunity of receiving support following graduation. The differences among the center mainly start at that point. For example, some TDZs offer accelerator programs and international collaborations for their entrepreneurs. The public institution KOSGEB has launched a support program for TDZ, which aims to open accelerator centers overseas. It is obvious that such services increase the rate of success.

We found that 86% of pre-incubation centers did not use financial support: they depended on their own equity. We observed collaborations with private firms and sponsors among 14%. It might be expected that pre-incubation centers would engage in projects in conjunction with their sponsors. However, we found that managers of the centers showed considerable interest in state incentive programs. The Scientific and Technological Research Council of Turkey (TÜBİTAK), KOSGEB, and development agencies provide very good support mechanisms for entrepreneurs and incubation centers. We found that 13 pre-incubation centers (59%) benefitted from such programs. TÜBİTAK 1512-BİGG³ was the most preferred support program, being used by eight centers. We observed that development agencies were another source of support: three centers in Istanbul were supported by Istanbul Development Agency⁴. One center was supported by European Union programs.

Partnership is vital for pre-incubation centers in terms of service provision. We found that 90% of centers had had at least one operational partnership with another center; 16 centers had regular training and mentorship programs in collaboration with another center; eight centers (35%) had international collaborations. The centers organized activities on experience sharing, increasing networks, and joint workshops. We observed that 50% of the centers collaborated with the private sector in terms of mentorship and networking.

As noted above, the universities of their location are crucial stakeholders for pre-incubation centers. Universities have started to become increasingly engaged in entrepreneurial activities. They are sources of knowledge, technical support, and a skilled workforce for startups. Universities can also help transform students into young, talented entrepreneurs. The role of third-generation universities is a subject of much debate.

³ Tübitak 1512-BiGG is the support program for entrepreneurs at an early stage. Although the program is provided by TÜBİTAK, it is executed by university TDZs or TTOs. The advisory board of TÜBİTAK decides on the institutions to execute the program.

⁴ Those are state-operated agencies. They aim to be centers that provide support for production and implementation of projects as well as original development strategies; they do so by adapting innovative, sustainable development models created around the world to their own regions. There are 26 such agencies in Turkey.

IV.4-Problems with Pre-incubation Centers

Pre-incubation centers face a number of problems related to organization, field of interest, and the services they provide. Many of them share the same problems. We found that 41% of managers stressed that group members were very resistant to change and that they could not easily change their way of thinking. Young entrepreneurs tend to be very conservative about their projects. If they are unwilling to make changes to their project or business model, their chances of failure are high. Pre-incubation centers offer mentorship for the sake of the project. It is important that young entrepreneurs understand the value of such services. In this regard, 26% of centers reported that for most incubatee groups, the commercialization process takes too long. Most incubatees spend too much time developing prototypes and forget about marketing the product.

Another problem is the slow decision making of higher boards (28%). At some pre-incubation centers, the bureaucracy is too restrictive. This lowers their effectiveness. In this respect, private centers display better organization: decisions can be easily made in short, straightforward meetings. In addition, 23% of centers complained about a lack of adequate physical and financial resources. Most centers are located on university campuses and use existing buildings. All of them have open office spaces, but they need more and bigger spaces. However, greater resources demand higher budgets and more time.

We found that 23% of pre-incubation centers reported that lack of resources prevented staff from providing appropriate services for incubatees. If an entrepreneurial idea has the potential for special interest value, that will definitely heighten its attractiveness; however, if a center is serving too many incubatees, it cannot easily provide individualized services to every group of entrepreneurs. For example, centers may be unable to find a mentor from the same academic discipline as the incubatees. By contrast, centers that specialize in a particular sector do not face that kind of problem. They can provide focused services. It is believed that a new approach to resource management and organization with stakeholders will solve such problems.

We found that 77% of managers desired greater state incentives—especially private pre-incubation centers—to solve the above problems. However, sustainability becomes a key issue in this regard. Instead, centers themselves need to explore potential resources. Centers also need to develop more, broader network opportunities.

IV.5-Needs of Incubatees

Incubatees need support in several areas during the incubation process (Figure 7).

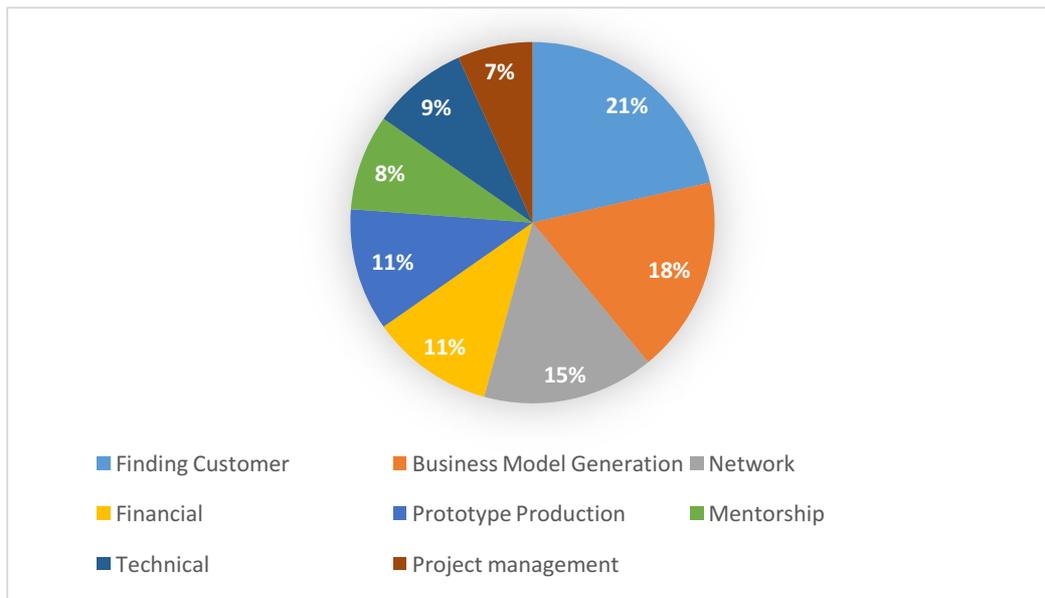


Figure 7. Support needs among incubatees

Incubatees need more support in finding potential customers (45%). As mentioned earlier, the biggest mistake among incubatees is an inability to focus on market dynamics while working on their projects. In this regard, they are unable to develop a proper business model (37%). Although training is available about generating a business model, groups still have a problem with this issue. Resistance to change may also be a cause of such problems. A business model lends the entrepreneur the ability to give value to their enterprise and gain sustainability (<http://www.businessmodelgeneration.com/>). Entrepreneurial groups clearly need to have adequate resources to identify that value and present it to customers or investors. This creates another crucial problem—scaling the project. If the entrepreneur cannot produce an appropriate business model, they cannot anticipate future actions; failure becomes inevitable. To overcome this problem, special mentorship and more networking opportunities should be provided for incubatees. Network channels will offer the chance for incubatees to find real customers. The main problem is matching the product with the right customer. Training in effective market research and network relations should help deal with that problem.

IV.6-Education and Training

Education is the most important input source for the entrepreneurship sector. We found that all the centers organized education programs for incubatees. Training programs were held in various fields from the initial acceptance period to the center until graduation. Three to four education programs were organized at each center on a monthly basis. The educational content

was almost the same, such as business plans, business models, marketing, sales, and effective presentation techniques. Some centers also organized education programs to meet the needs of entrepreneurs. Education programs also covered such areas of technical training as lean manufacturing, product verification, crisis management, and coding. It is evident that the pre-incubation centers succeeded in this area.

In addition to the education programs, all the centers provided mentoring services. We found that 82% of the centers had their own mentor pools. The remaining centers did not possess such a pool; however, upon requests from teams, a mentor could be assigned and interviews conducted. Moreover, 59% of the centers stated that they would set up mentor interviews upon request. We found that 41% of centers held interviews on a periodic basis.

IV.7-Beneficiaries

Approximately 700 beneficiaries were supported by 22 centers. Among those beneficiaries, 80% were university students. The centers did not welcome entrepreneurs only from their own universities, but also those from different cities and universities. However, the low number of women entrepreneurs should be noted. At 13 centers, women constituted less than 10% of entrepreneurs. At only three centers, the proportion of women entrepreneurs was 20%. The lack of female employees, managers, and skilled personnel is evident everywhere in Turkey, and this also applies to entrepreneurship.

It is not expected that every candidate who leaves the pre-incubation center should start their own company. To graduate successfully (by starting a company or finding investment) after acceptance to the center; the “survival rate” for entrepreneurs varied among the centers (Figure 8).

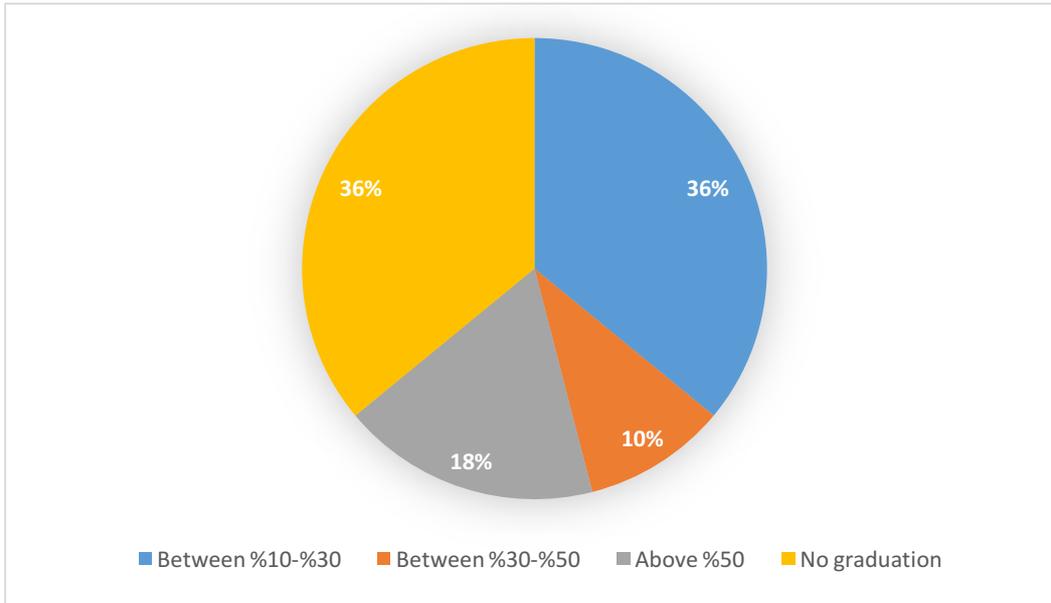


Figure 8. Survival rates

The survival rates of eight centers among the nine that were established in 2015 have not been calculated since they have not yet produced graduates. The proportions in Figure 8 naturally lead to a discussion of the reasons for failure. We found that the teams failed for very different reasons. However, some reasons for failure applied to the entrepreneurs at every center (Figure 9).

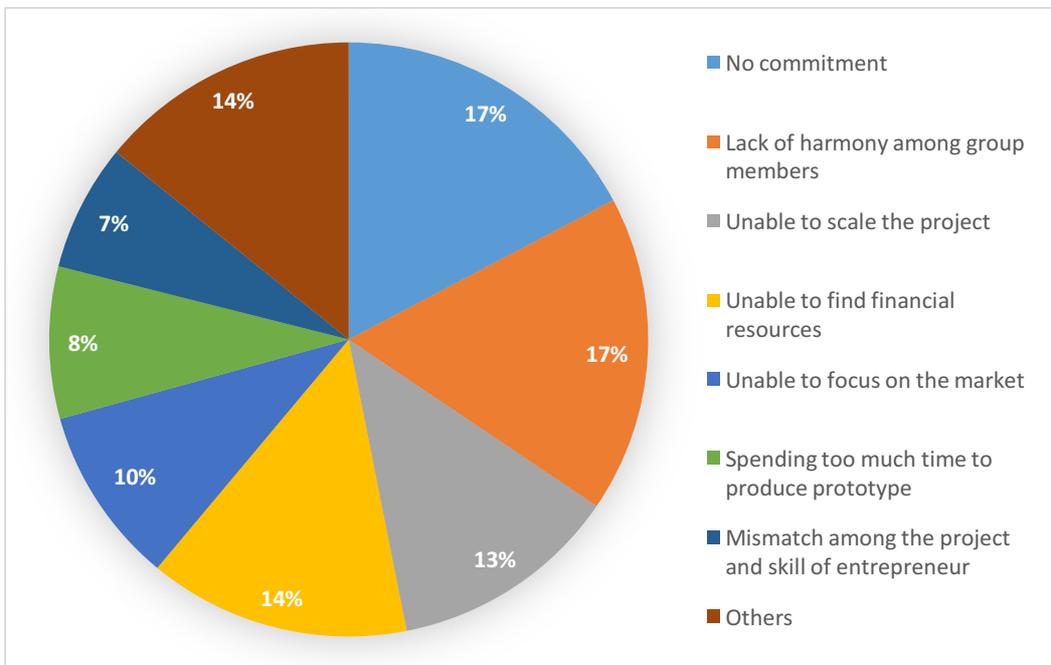


Figure 9. Reasons for failure

Not being sufficiently committed and lack of harmony in the group were considered the major reasons for failure. Some center managers cited cultural behavior issues related to commitment. Individuals who lack the entrepreneurial mindset can easily give up if they are forced to explore new ideas. In this context, universities need to help create a culture of entrepreneurship in their approach to education. Subjects and workshops directed at entrepreneurship should be added to the educational process.

With respect to lack of harmony, problems occur regarding team and project management among team members throughout the project process. These problems may persist despite training devoted to this area at the centers. Working more closely with team members at the center and increasing social sharing to help improve internal communications among members will be beneficial in this area.

IV.9-Success

According to the organization and field of interest, the meaning of success differed from center to center (Figure 10). For some centers—especially young ones—the number of established firms was the main criterion. The older pre-incubation centers focused more on the sustainability of their groups after establishing their enterprises; they were thus interested in quality, not quantity.

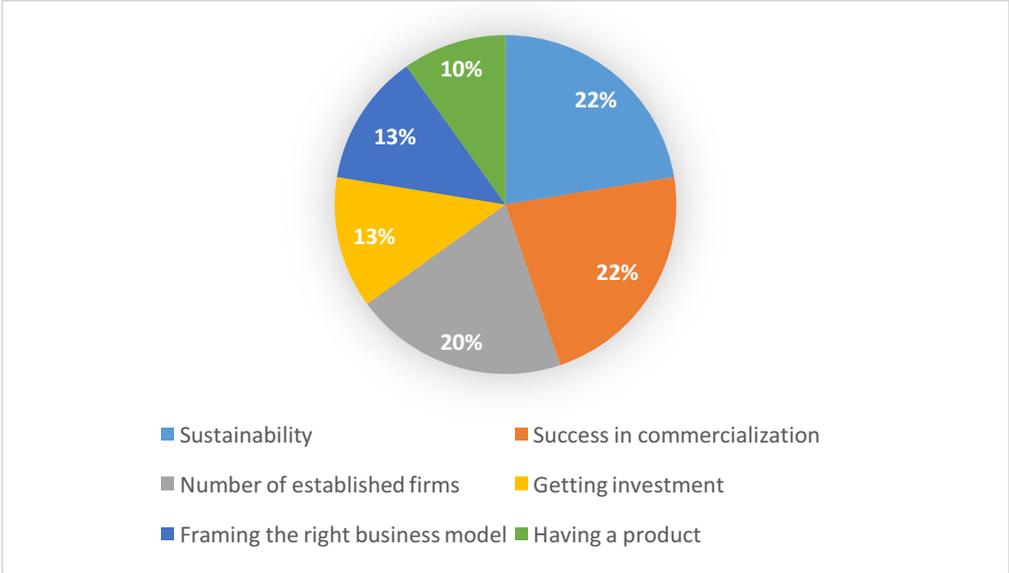


Figure 10. Criteria for success among pre-incubation centers

Among specialized pre-incubator centers, increased consciousness of the incubatees in terms of their aims and targets was a criterion of success. In addition, groups were expected to produce a minimum viable product.

The main target of pre-incubation centers is to train groups and increase their experience. Thus, newly established start-ups are appropriate for TDZs. TDZs are the first step toward nurturing an entrepreneurial ecosystem in a local region. For that reason, sustainability is a crucial aspect. All incubatees in pre-incubation centers are necessarily expected to start their own firms. However, the meaning of success is very much related to quality. For that reason, it is necessary to develop long-term plans.

V- Policy Recommendations

It is evident that universities have evolved from playing a tangential role in local, regional, and national business ecosystems to becoming key partners. Entrepreneurial universities focus on knowledge spillovers and commercialization of research. Successful regions have vibrant university–business partnerships.

V.1-Entrepreneurial Mindset

An important function of an entrepreneurial university is therefore creating awareness of the importance of developing a range of entrepreneurial abilities among students and faculty. A university should initiate awareness-raising steps across the whole institute. For example, universities can restructure their curriculum and include courses and workshops related to entrepreneurship. In addition, the links between business pre-incubation and higher education institutions and research centers should be stronger. This would help facilitate the commercialization of research findings, promote innovation transfer to entrepreneurship, and aid the creation of spin-offs. Students should be encouraged to attend pre-incubation centers in order to gain experience and entrepreneurial skills.

Universities should develop strategic targets that encompass an entrepreneurial vision for the future. Strategies should focus on generating entrepreneurial thinking and competence, commercializing research results through technology transfers and business start-ups, and strengthening cooperation between the institution and local firms.

V.2-More Resources

Pre-incubation centers need more resources in terms of a skilled workforce and finance. Government involvement is necessary: it has an impact on incubator models, organization, and

funding structure. The government should support those centers in establishing their own financial fund. This fund can be used in the prototyping process. It is also vital that the university invest in its entrepreneurial activities through a sustainable financial strategy.

An effective managerial staff will establish closer contact with incubatees. This will provide the ability to create more extensive, special services for the groups. It is better to appoint incubator managers with high-quality professional business expertise.

Public institutions clearly need to play a more active role in terms of generating incentive programs—especially incentive programs to reduce the structural problems of pre-incubation centers. This does not mean that public institutions should provide only financial resources. Special support mechanisms need to be prepared, such as commercialization and special fund for pre-incubation centers.

V.3-Greater Collaboration

A university should be involved in a range of partnerships, including, for example, regional and local organizations, small and medium-sized enterprises, social enterprises, schools, alumni, and entrepreneurs. Matching student and graduate entrepreneurs with experienced entrepreneurs will increase a business's chances of success and boost other support services. Universities should make mentoring services available to both student and graduate entrepreneurs. Mentors could be educators with entrepreneurship experience or dedicated business coaches. Entrepreneurial universities should also make use of their alumni as mentors.

Internationalization may offer a chance to integrate international, national, and local dimensions. Universities should develop internationalization strategies, including entrepreneurial activities as well as incubation and pre-incubation centers. Universities should establish stronger links with international networks and university innovation clusters in addition to setting up bilateral partnerships with other institutions. Universities should use their networks, partnerships, and international alumni to provide feedback for teaching, learning, and research agendas.

A particularly important mechanism for knowledge exchange is staff and student mobility. Such mobility can also be implemented for young entrepreneurs, and it includes internships or programs for exchange. Universities should establish the necessary mechanisms to support the mobility of staff and students into the external environment.

V.4-Impact Assessment

To ensure that entrepreneurship activities reach their full potential, they should be regularly monitored and evaluated. However, in Turkey, the evaluation of services in this area is not conducted properly. For example, monitoring and evaluation should assess changes in the participants' motivation and level of competence in skills gained through the activities related to the entrepreneurship education. Universities should measure the impact of entrepreneurship education at different phases of the associated activities (beginning, end, subsequent time points). In this way, strategic forecasts could become more precise.

The goals of entrepreneurship programs should be made explicit, based on a thorough analysis of local economic circumstances and of the problems that the incubator is intended to address. Setting clear goals in advance will also ensure proper monitoring and evaluation of a scheme.

Identifying appropriate areas and products that are relevant to the socioeconomic context is a critical area that needs to be considered when making a decision about university-based business incubators. Future research should focus on identifying high potential areas and undertaking a comparative analysis of university-based business incubation processes in different countries.

V.5-Pre-incubation Centers

These centers need to become autonomous managerial bodies. The time for decision-making processes should be reduced. The centers clearly need more skilled specialists and managers. People from academia could perhaps be employed in the management teams of these centers. In addition, the working spaces need to be designed to foster synergy among incubatees.

VI- Conclusion

An entrepreneurial society refers to one where knowledge-based entrepreneurship has emerged as a driving force for economic growth, employment creation, and competitiveness. In this context, entrepreneurial universities play an important role as both knowledge producers and disseminating institutions. University-based incubation centers will be the key actors for promoting entrepreneurial culture in societies. By supplementing government activities, they will play a significant role in job creation and economic development.

The government should take the initiative to develop more business incubators in general and university-based business incubators in particular. These efforts could be directed to establish public-private partnerships and financial hubs to sustain them in their early stages.

REFERENCES

- Amiri, S.R.S., Kavousy, E., Husseini, A.S. (2009) "Strategies for Creating Entrepreneur University," **European Journal of Social Sciences**, 11 (3), 496-506.
- Bathula, H., Karia, M., Abbott, M. (2011) "The Role of University-Based Incubators in Emerging Economies," Working paper No: 22, December
- D'Este, P., Perkmann, M. (2011) "Why Do Academics Engage with Industry? The Entrepreneurial University and Individual Motivations," **The Journal of Technology Transfer**, 36 (3), 316-339
- Deutschmann, M. (2007) "What Difference a 'Pre' Makes: University Business Preincubators in Germany. A National Survey." Working Paper, Report No:5, Leuphana University Luneburg.
- Dickson, A. (2004). "Pre-incubation and the New Zealand Business Incubation Industry.", **New Zealand Centre for SME Research**, Massey University: Wellington.
- Dierickx I., Cool K. (1989) "Asset Stock Accumulation and Sustainability of Competitive Advantage." **Management Science**,35(12): 1504-1511.
- Etzkowitz, H., Webster, A., Gebhardt, C., Terra, B.R.C. (2000) "The Future of the University and the University of the Future: Evolution of Ivory Tower to Entrepreneurial Paradigm," **Research Policy**, 29, 313-330.
- Etzkowitz, H., Leydesdorff, L. (2000) "The Dynamics of Innovation: from National System and 'Mode 2' to a Triple Helix of University-Industry-Government Relations," **Research Policy**, 29, 109-123.
- Grimaldi, R., Grandi, A. (2005) "Business Incubators and New Venture Creation: an Assessment of Incubating Models, **Technovation**, 25 (2), 111-121.
- Kirby, A.D. (2006) "Creating Entrepreneurial Universities in the UK: Applying Entrepreneurship Theory to Practice," **Journal of Technology Transfer**, 31, 599-603.
- Kirby, D.A. (2004) "Entrepreneurship Education and Incubators: Pre-incubators, Incubators and Science Parks as Enterprise Laboratories." 14th Annual IntEnt Conference Proceeding, IntEnt University of Napoli Federico II (Italy), 4-7 July, 1-10.
- Klofsten, M., Jones-Evans D. (2000) "Comparing Academic Entrepreneurship in Europe: the Case of Sweden and Ireland," **Small Business Economics**, 14, 299-309.
- Neuman, W. L. (2006) **Social Research Methods: Qualitative and Quantitative Approaches**. 6th Edition. Boston: Pearson/Allyn and Bacon.
- Pahurkar, R.N. (2015) "Creating Entrepreneurs through Entrepreneurial Universities," **Management**, 5 (2), 48-54.

Peters, L., Rice, M., Sundararajan, M. (2004) "The Role of Incubators in the Entrepreneurial Process," **Journal of Technology Transfer**, 29 (1), 83-91.

USINE, University Start-up of International Entrepreneurs (2002), available from: [http://www.usine.unibonn.de/ Downloads/bilder/preincubation.pdf](http://www.usine.unibonn.de/Downloads/bilder/preincubation.pdf), last accessed 20 September 2012.

Voisey, P., Jones, P., Thomas, B. (2013) "The Pre-incubator: a Longitudinal Study of 10 Years of University Pre-incubation in Wales," **Industry & Higher Education**, 27 (5), 349-363.