

LEARNING TO INCUBATE:

EVIDENCE FROM GREECE (1995-2005)

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ABSTRACT

Aim of the present study is to analyze and explain the contribution of business incubators to the promotion of entrepreneurship. Drawing upon previous research findings and three distinct theoretical perspectives, namely the resource-based view, the resource dependence approach and the social capital theory, we propose a theoretical framework allowing for a pattern-benchmark model for successful business incubation. After gathering secondary data on the business incubation industry in Greece, and qualitative data through face-to-face interviews with Greek incubators' managers, the model is empirically validated in order to sketch the particular incubation landscape and identify best practices. The cases that are examined through a comparative analysis based on our research framework revealed that incubators were developed in two expansion waves, representing different ownership structures and objectives. The findings are further discussed for their theoretical, managerial and policy implications, while some recommendations for the further development of the industry are provided.

1. INTRODUCTION

The business incubation industry is a key feature of the modern knowledge economy, contributing to the development of dynamic regional clusters by supporting new start-ups. Given the importance of the incubation industry, a vast amount of research has addressed the different aspects of the business incubation. Researchers have investigated the incubation phenomenon through the application of economic, organizational and social theories (Bollingtoft & Ulhoi, 2005; Clarysse *et al.*, 2005; Gassmann & Becker, 2006; Hansen *et al.*, 2000; Peters *et al.*, 2004; Remedios & Cornelius, 2003; Rice, 2002; Studdard, 2006), while others have analyzed how business incubators are organized and managed in an attempt to identify best practices (Duff, 1994; Bagby *et al.*, 1989; Martin, 1997; Autio & Klofsten, 1998; CSES, 2002; NBIA, 2002; Murphy *et al.*, 1996). Another research stream analyzed how business incubators contribute to their tenants (Cooper, 1985; Lumpkin & Ireland, 1988; Merrifield, 1987; Sherman, 1999; Grimaldi & von Zedtwitz, 2006), or the contribution to regional entrepreneurship and economic development (Aernoudt, 2004; Allen & Rahman 1985; Honadle, 1990; Lalkaka, 1996). Although there is an abundance of research papers describing business incubators and their operations, only a few have unified theoretical knowledge to explain their success of incubators (Pena, 2004; Stevens, 2004). Furthermore, in spite of the diversity of actors involved in the process of business incubation, the incubators' interactions with external actors participating in the incubation process remains largely unexplored (Remedios & Cornelius, 2003; Ascigil, 2006).

This paper aims to establish a theoretical research model of business incubation that includes the contribution of business partners in the development of new ventures. The theoretical research model draws on three organizational theories: the resource based view, the resource dependency theory and the social capital theory. These organizational theories have been used to explain the incubation phenomenon separately (Starr & Macmillan, 1990), however, they have never been consecutively combined to analyze and explain the contribution of business incubators in the entrepreneurial process. Our objective is to explain how business incubators facilitate the development of new ventures and to provide a comprehensive conceptual model of how these organizations can effectively be managed and operated. Moreover, we seek to contribute to local incubation studies by empirically investigating the phenomenon in Greece. The application of the conceptual model; modulated in the local industry, is oriented to offer a valuable assisting tool for the further development of business incubators operating in Greece and kindred markets. To come in compliance with research objectives, the present study investigates three research questions.

- (1) *What are successful Business Incubator models?*
- (2) *How do Greek Business Incubators function?*
- (3) *How can Greek Business Incubators developed further?*

2. THEORETICAL VIEW ON BUSINESS INCUBATION

In examining the role of business incubation, we draw on three organizational theories that are often used to explain firm performance: the resource based view, the resource dependency theory, and the social capital theory.

Resource Based View

The main contribution of the **resource based view** is that it can explain how firms obtain and sustain competitive advantages and thus how firms achieve long term profitability (Barney, 2001). The primary principle of this theory is that strategic positioning lies in the identification and intelligent application of a unique bundle of valuable for the firm resources; resources that provide competitive advantages (Wernerfelt, 1984). The resources

that a new entrepreneur needs in the process of creating a new venture can be classified into various categories such as technology, financial, physical, human, social and organizational. The human, social, and organizational resources are more intangible resources and often more difficult to acquire (Clarysse *et al.*, 2005; Fernandez *et al.*, 2000). Similarly, Dierickx and Cool (1989) divide resources into two types: tangible and intangible resources. Tangible resources are, for example, machines, equipment and housing; intangible resources are carried within the members of the organisation, such as knowledge and skills, or are ascribed to the organisation, like reputation and image. Following the above, we distinguish two major types of resources, the tangible physical resources and the intangible knowledge-based resources. For business incubation, the physical resources can be infrastructure and financial resources, whereas intangible knowledge-based resources are the pre-incubation services, administrative support, technology expertise, professional services and consulting.

Resource Dependence Theory

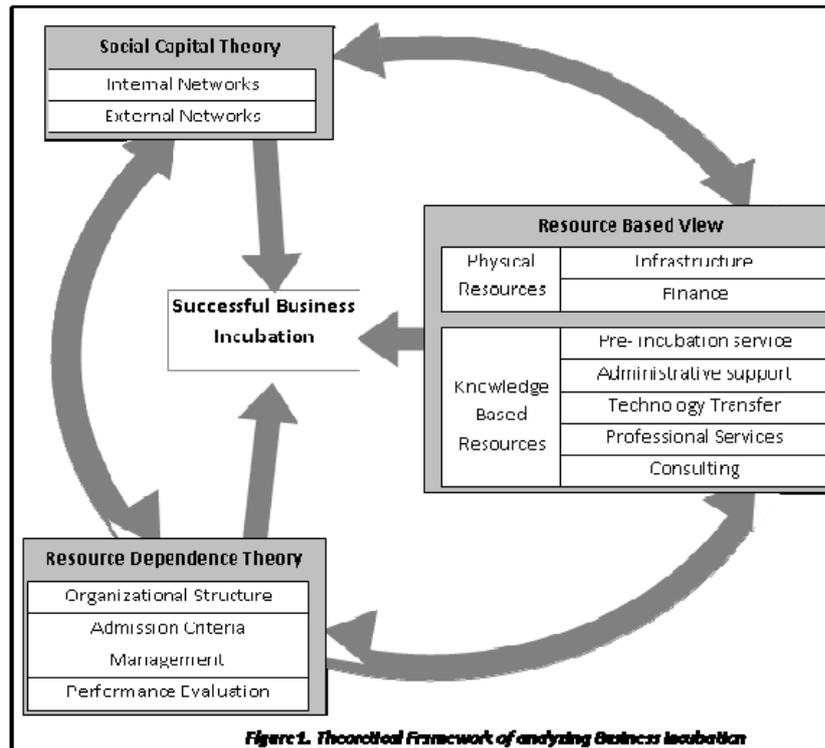
The resource dependence theory is an organizational theory that explains firm behavior as a result of their access and dependence on critical resources (Pfeffer & Salancik, 1978; Johnson, 1995). The fundamental argument of this theory is that organizations will respond to demands made by external resource providers and receivers and try to minimize their dependence when possible (Pfeffer, 1982; Johnson, 1995). Depending on the resource needs of an organization, the transaction partners and the exchange balance, the emergent relationship could be dependent, reciprocal or dominant (Silver, 1993). Scott (2003) and Johnson (1995) analyzed the strategies that organizations use to manage their dependency on resource providers or receivers. They argued that organizations can implement buffering strategies to increase the tolerance in case of resource shortage and, or use bridging strategies to strengthen the relations between organizations and suppliers. The resource dependence theory has significant implications within the incubation process. For example, the dependence that a spin-off has on the university or incubator, may affect its strategy. In this research we analyze four managerial issues concerning the resource dependency: organizational structure, admission criteria, management, and performance evaluation.

Social Capital Theory

The social capital theory claims that the social structure of relationships and networks facilitates certain actions of individuals. The resources available within social networks provide opportunity to leverage contacts' resources, and is the motivation and to enter social relationships (Adler and Kwon, 2002). In correspondence with the social capital theory, we suggest that business incubators may provide a link between vital resources and the incubated firm. We follow the distinction of internal and external networks (Nahapiet and Ghoshal, 1998). Internal networks refer to the exchange and transfer of knowledge and resources among members in an entrepreneurial team (Coleman, 1990) whereas external networks refer to the broader network of contacts. We conceptualize the internal networks as the connections within and between the start-ups that are accommodated in the incubator, and the external networks are the contacts outside the incubator.

Theoretical Framework

The theories utilized in this study are complementary to each other and can explain different aspects of the incubation process. To examine their influence on business incubation we developed a theoretical framework which is presented in Figure 1. The Resource Based View explains which resources are important and available for firms. The resource exchange that flows from resource needs result in relationships which can be explained by the social capital theory. The interactions among exchanging parties and their behavior can be analyzed using the Resource Dependence Theory.



3. ENTREPRENEURSHIP AND INCUBATION IN GREECE

The incubation phenomenon has been a topic of interest, not only in innovation and entrepreneurship research but also in the domains of strategic management, organization studies and regional science; all trying to provide a better understanding. Although, the first privately owned business incubation center was founded in 1959 in New York (Brown et al 2000), the research about incubation started at the early 80's. The common understanding is that business incubators can be described as supporters of new business development. The facilities that they offered to their tenant firms range from rental space up to business assistance services. In this paper we employ the general accepted definition of National Business Incubation Association, as mentioned on their website (www.nbia.org):

A business incubator is an economic development tool designed to accelerate the growth and success of entrepreneurial companies through an array of business support resources and services. A business incubator's main goal is to produce successful firms that will leave the program financially viable and freestanding.

Despite the effort to develop a general definition for Business Incubation, there are still a variety of types of business incubators. Scholars have tried to classify these organizations into different archetypes. The most common criterion to classify business incubators is based on funding (Allen, 1985). Allen (1985) identifies 1) publicly funded business incubators that contribute to regional development and job creation; 2) privately funded which goal is the return on the invested capital, and 3) the university funded incubator aimed at commercializing academic research. Recent studies introduced mixed-models such as private-public partnerships (Lalkaka, 2000) or distinguished between non-profit and for-profit incubators (Aernoudt, 2004).

Before we investigate the incubation practices in Greece, we first analyze the levels of entrepreneurship, entrepreneurial attitude and availability of a venture capital community in Greece. In 2006, Greece realized a significant increase in the early stages of entrepreneurship

comparing to previous years, according to the GEM report. About 7.9% of its population is concerned to be potential or nascent entrepreneurs. This percentage, ranked Greece in the 4th position in Europe among countries participating in GEM's (2006) report. Uncertainty and fear however, could prevent people to undertake entrepreneurial activities in a percentage of 60%, one of the highest among GEM countries; although 22% of population believes that entrepreneurial opportunities exist. The MRB HELLAS (1998) survey indicates that almost 96% of SME are funded by personal or family capital, while around 68% of SMEs' operations are financed by bank loans, a fact that is imputed to the lack of venture and seed capital (European Observatory 2003).

Regarding financing, as also stated before, data from the last 15 years indicate that more than 95% of funds for the development of new ventures reflect own savings and its close network (family and friends). The country is positioned in the bottom of EU's-15 list of venture capital investments, while the last years Greece is experiencing one of the highest growth rates in EU. Slightly better is the picture for seed capital investments, a fact that endorses the strong financing support of entrepreneurs from their close network. The lack of venture capital and in general of high-risk investments is one of the main obstacles of entrepreneurship in Greece according to the same research. As a consequence of those mentioned before, in Greece is reported an inequality regarding the financing opportunities for entrepreneurs as well as irrational utilization of capital for investors. Mentality of informal investors, lack of trust and lack of relevant education, could count as reasons for the current status of informal investments.

The birth and early stage development of supporting organizations (S&T parks, business incubators) in Greece, was started with the support of the government and the EU in the matrix of extensive policy initiatives for the development of the Greek economy. The expansion, took place in two "waves" of supporting initiatives. At first, in the beginning of the 90s, the Greek government started to provide funds to universities and public research institutions for the establishment of parks, through which the research institutions could exploit and commercialize their R&D results. Intention of the government was to attract to the parks, knowledge-intensive enterprises, in order to support them through the interactions with the research institutions and the information exchange. These governmental initiatives initially led to the development of four science and technology (S&T) parks across the country. At the late 90s, three more S&T parks were added to the project, resulting to the today's shape, with the existence of seven parks stretching the whole territory of Greece.¹

The second wave of policy initiatives for the development of supporting organizations started in 2001 and was on course till the end of 2006. Focus of this second initiative was the establishment of private business incubators, with the argument that active participation of the private sector in financing would lead to active involvement also in managing; a fact that could enhance the effectiveness of these organizations. The realization of the second wave of development was sponsored by the European Commission and took the form of an industrial 'Competitiveness' program that would improve the entrepreneurial environment, especially in sectors where the first initiative presented weaknesses, namely: venture capital, seed

I So far no comprehensive evaluation of performance has been undertaken. The only known study (Bakouros et al 2002) included the first three S&T parks and reported underperformance on the basis of only one successful graduation. The study included a relatively small sample of firms located in the parks till 2001 and identified as probable factors for the underperformance: the inadequate funding, the lack of managerial expertise (i.e. running the facilities and to the provision of specialized consulting services), the confusion between research and commercial needs and the ineffective infrastructure.

capital and unwieldy incorporation procedures. The program 'ELEFTHO'² provides incentives for the development of private business incubators and S&T parks, in order to foster the development of knowledge intensive, innovative ventures. Public funding; which takes the form of grants, cannot exceed the 50% of the total cost of investment, while emphasis is given -beyond infrastructure- to more value added factors such as consulting-services provision and access to risk capital.

The recipients of the public assistance are private enterprises, planning to establish and operate business support units in the Greek territory and to host knowledge based tenants. These enterprises are expected to serve as channels through which financial support will be transferred to tenants. Proposals for participation to the initiative are evaluated from national authorities and international experts. During the implementation period of ELEFTHO (2002-2006) ten business incubators' start-ups were supported, from which three do not exist today and one is still in the setting-up process. Those that operate today are counting for the majority of private funded incubators in Greece. From the available data, seven S&T Parks were identified in Greece and nine operating Business Incubators.

4. METHODOLOGY

This research focuses on business incubation in Greece. Greece was chosen for two reasons. First, in order to limit political, cultural and economic factors that may affect the results, we collected data from a single country. Second, incubators in Greece were created during two relatively short waves of expansion. This short time period allowed us to make better comparisons since incubators have approximately the same age and were developed under the same economic and political setting.

Method

The main research method is case study analyses of the business incubators in Greece. Two data collection methods are employed. Initially, secondary literature was addressed to investigate the case of business incubation in Greece. The incubators were identified through research papers, the General Secretary of Research and Technology (Ministry of Development/ ELEFTHO database), regional Chambers of Commerce and web search. The case studies were created using data from web-sites, promotional brochures and presentations on business incubation in Greece. Then, qualitative data were collected through face-to-face interviews with incubator managers. The qualitative data collection followed quite a structured procedure, built on two distinct parts, both of them grounded on the literature. The first part was based on the main components of our theoretical framework. The second part explored the interactions among the main components.

Structured interviews

The topics that were discussed during the structured interviews with the business incubation managers are based on the resource based view: physical and knowledge based resources; the resource dependence theory: managerial issues, and the social capital theory which included the networking.

Physical resources refer to the incubator's *infrastructure* that is offered and the availability of *financial capital*. Literature indicates that business incubators usually have the ability to provide seed capital, either from own funds, or through network of contacts (business angels).

² ELEFTHO is the name of the initiative for the development of private business incubators. The initiative, which is part of EU's 'competitiveness' program, is run by the General Secretariat of Research and Technology, a department of the Greek Ministry of Development.

Given that venture capital is still under-developed in Greece, an incubator's ability to provide own seed capital or to enable capital flows from other sources, may influence its success.

Knowledge based resources reflect the services provided to tenants in the context of a business supporting organization. Depending on the development stage of incubate, some services are more valuable than others. To be more specific, when a business idea is transforming to a new venture, the *pre-incubation services* provided by an incubator may simplify bureaucratic procedures. This is an essential service in Greece, as bureaucratic procedures are –to an extent– accused for the lack of entrepreneurial activity. In later stages, ventures may struggle with operational issues and *administration support*, such as joint use of photocopiers and secretary may reduce their operational cost. Also *professional services* like accounting, legal, and marketing, can help start-ups as they often lack the people and, or knowledge in these fields. Another type of service that the incubator can provide incubates is the *technology expertise*. Technological know-how and knowledge of using technological equipment can help incubates in translating their research findings into commercial products (Murray, 2004). Incubators may also provide *consulting* and training-programs. Particularly in Greece, the business incubators' ability to cultivate entrepreneurial spirit to entrepreneurs is important. In Greece, people do not commit easily to entrepreneurial activities because of the high levels of fear and uncertainty that they feel. A business incubator can implement this by selecting the entrepreneurs they host and by interesting potential entrepreneurs.

The **managerial issues** refer to the *organizational structure* of the business incubation, either flat or hierarchical. The structure influences the communication and information exchange in the context of the organization (Jones, 2004). Another important factor that influences the incubator is the admission criteria. *Admission criteria* refer to the entry criteria as set by the incubator. This will involve whether the new venture can benefit from the services, resources and networks as provided by the incubator. Similarly, the exit criteria determine the extent to which the new venture can take advantage from the benefits as provided by the incubator. In addition, the tenant firm can become dependent on the incubator if the incubator managers are involved in managerial tasks. For instance the incubator manager can help and, or provide assistance in negotiations with potential clients and investors. Also incubators will use performance evaluation criteria during the period incubate is at the incubator. These criteria will involve objectives of all the involved parties, along with pure financial goals (Hackett & Dilts, 2004). We will investigate here the extent to which the objectives are clearly defined in the *performance evaluation*. Management involvement is another managerial issue that follows from resource dependency. It reflects the inclusion of incubator managers in the tenant's operations, either through the advisory board, or through incubator's assistance in negotiations while setting up business contracts.

The **network** of the business incubator can be important to the incubate as it provides access to benefits such as important information and resources, but may also provide the incubate with legitimacy, influence, and power. We distinguish in internal networking and external networking. Internal networking is between the tenants. These networks may facilitate the distribution of knowledge and experience regarding setting up a new business. External networks refer to the access to the business environment and venture capital community.

Validity

This research focuses on a local incubation market. Although its objective is to contribute to the national studies, the findings cannot generalize without validation. Another validity concern is due to the research method. The main method of data collection is interviewing that reflect memories and subjective judgments of the respondents. This constraint could have been limited if in the analysis, multiple respondents from the same organization have been

interviewed. This was not possible in the case of Greek business incubators where many incubators were management by a single manager. Also, the nature of the examined phenomenon, the way that the data was collected and the way that insights are presented, are highly dependent on the researchers interpretative skills, knowledge and experience. This may cause bias regarding the questioning as well as the way that responses are interpreted.

5. CASE DESCRIPTIONS

Thessaloniki Technology Park:

The TTP was founded in 1988 by the Chemical and Process Engineering Research Institute (CPERI), an institute of the Foundation of Research and Technology Hellas (FORTH). Operations started in 1994 based on non-profit motives and aimed at facilitating the exchange of technology, people and ideas between industry and university, and thereby contributing to local wealth creation. The shareholders are both public and private. Since its establishment, TTP has assisted approximately 28 businesses and can accommodate about 10 firms. The maximum length of time that tenants can be located at the incubator is limited to three years.

Patras Science Park

The PSP was founded in 1989 from the Foundation of Research and Technology Hellas (FORTH) to exploit the research capabilities of the University of Patras. In 1992 a business incubator started at PSP as a private non-profit company, entirely owned by the Ministry of Development. Aim of the incubator is to contribute to competitiveness and local job creation, through the hatching of innovative projects and R&D exploitation. The incubator, which is operating on its capacity limits, has currently 25 tenants and has assisted approximately 30 companies as far. More than half of the current tenants are start-ups, with the majority of the rest being spin-offs mainly from the university and R&D centers. Tenants are theoretically expected to leave the incubator's units after five years, but the rule has been flexible in the past and tenants are not pushed to exit as long as they achieve the goals of their business plan. The park is considered to be attractive because of the flexible rental terms, low prices, and their strong ties with the Ministry of Development which may make it easier to get informed about and participate in sponsored projects.

Science & Technology Park of Crete

The Foundation of Research and Technology-Hellas (FORTH) was the founder organization also in the case of STEP-C in the late 80s. The managing company of the park (EDAP SA) was established in the late 1993 with 30% participation in the initial capital from FORTH, 30% from Piraeus Bank and 24 smaller shareholders; mostly private companies. The managing company of the Park is a private entity operating for-profit. STEP-C main objective is to help universities and research institutions to commercialize academic knowledge. Encouragement and assistance on start-up firms and the establishment of an educational center for executives' and entrepreneurs' specialization are additional objectives of the Park. The incubator has assisted more than 60 companies and has a failure rate of 9%. In the park there are currently located 20 businesses, half of them start-ups, 9 academic spin-offs and 1 corporate start-up of. The Park is operating with an occupancy rate of 85%.

Science & Technology Park of Epirus

The STEP-Epirus was established in 1999 by the University of Ioannina. Its function as an incubating organization though, started in 2004, after the establishment of the managing company STEP-Epirus SA. The incubator is designed to be for-profit, in contrast to the previous examined organizations, despite the fact that it is funded by 70% from the public segment. The University of Ioannina, the local municipality and the Ioannina Cooperative

Bank are some of the main shareholders. The incubator has no graduates as far, because of its young age and it is currently hosting 14 ventures; the maximum of its capacity. From the businesses that are located in the Park, three are spin-offs from the University and R&D centers, five are branches of existing firms and seven started as new ventures. The length of time that a firm can occupy incubator's units is three years (plus two after evaluation) but from the as far experience, rules are flexible. The park is considered to be attractive for new businesses, firstly because of its infrastructure, and then because of the image it infuses to tenants and because of the abilities for networking that provides; so internally as externally.

Technology Park of Thessaly

The Technology Park of Thessaly SA was established in 2001 and manages the incubator TEPATHE. TEPATHE is a private for-profit company, which has 39 shareholders equally coming from the public and the private segment. A public company (Metallurgical Industrial Research & Technology Development Center – MIRTEC SA) is the main shareholder; participating with 30% in the initial capital, through the provision of the premises where the incubator's facilities were developed. TEPATHE facilitates the transfer of technology and knowledge from Universities and R&D institutes to the private sector, through supporting new and existing companies. The Park is currently assisting ten companies and operates at 80% of its occupancy. More than 25 firms have been assisted from TEPATHE. The current tenants are all private start-ups, while University spin-offs and branches of established firms have been hosted before. The Park does is considered to be attractive because of its location in the region's industrial area. TEPATHE does not take equity position on tenant firms due to the lack of the appropriate fund. However, consulting regarding finding the appropriate fund and advices on pursuing it are provided from the incubator's manager.

Incubator of new enterprises CHANIA

Although the organization is called 'Incubator of new enterprises' it is classified in the first 'expansion wave' of business supporting organizations. The Incubator of new enterprises CHANIA was established in the mid 2000 from the Hellenic Organization of Small & Medium Enterprises and Handicraft (EOMMEX) which is the major shareholder, owing 90% of the shares. The Prefecture of Chania and the Industrial & Commercial Chamber of Chania participated also with equal shares (5% each) a fact that results to a entirely public owned organization. The incubator is not for-profit and its management reports to EOMMEX. EOMMEX is part of the Ministry of Development, General Secretariat of Industry. Main objective of the incubator is to cultivate innovation in the local region and to create new jobs by supporting new start-ups. The incubator differs from other incubators because it is not allowed to offer professional services to external clients. The incubator has assisted so far 19 businesses, while is currently hosting 8 start-ups and 2 spin-offs. Maximum time that tenants can stay is determined to be 3 (plus 2) years; but shows this rule is flexible.

Business Incubator BIC-of-Attika

'Business Incubator BIC-of-Attika' is the most recently established incubator in Greece, started operating during 2007. The incubator is branch of BIC-of-Attika, member of the European Community of BICs and is located in the Technological Cultural Park of Lavrion. The Mother-Corporation; BIC-of-Attika, is a private non-profit company, owned by public as well as private organizations. The Athens Chamber of Small & Medium Sized Industries, private banks, Universities, the Municipality of Piraeus and the Hellenic Organization of Small & Medium Enterprises and Handicraft are some of the main shareholders. The incubator is positioned neither to the first, nor to the second wave of policy initiatives as it did not receive support from subsidies. However, for the discussion we placed it in the first

wave because of its non-profit character. The incubator mainly helps universities commercialize know-how and helps companies to generate spin-offs. The incubator is currently assisting three firms; operating at a 25% rate of its capacity, while several admission requests are under examination to cover the remaining positions. The most attractive characteristics are considered to be: the flexible rental agreements, as well as the availability of professional services in low charges through the BIC-of-Attika.

i4G (Incubation for Growth)

i4G was set-up in 2003 during the second ‘wave’ of policy initiatives to support entrepreneurship. It was established by EUROCONSULTANTS SA, the largest consulting company in Northern Greece, as a private for-profit incubator with a capacity of 15 tenant firms. EUROCONSULTANTS SA is located next to the facility. The incubator, has assisted 22 companies as far, and is now operating at its capacity limits. i4G helps entrepreneurs in realizing their business ideas and in generating spin-off activities. The incubator focuses on the development of internal networks and business clusters in the facility, and this is considered to be attractive from the tenants’ perspective. i4G has three successful stories to present as far; ex-tenants, which grew fast and needed more room to expand.

VCI (Velti Center for Innovation)

VCI is a corporate incubator, established in 2005 by Velti; an international company providing platforms and services to enable mobile marketing in 12 countries worldwide. The incubator VCI was established as a distinct private company, in order to participate in ELEFTHO program. VCI is a profit-oriented incubator, specialized in information, new media, telecommunications and related services. Mission of VCI is to assist mainly start-ups in these sectors. The project is relatively small, which is reflected in the limited capacity. Currently, six start-ups are located at the incubator and it operates at its capacity limits. Due to the young age of the incubator (two years), no successful graduations have been achieved yet. VCI does not employ strict rules regarding the maximum length a tenant can stay. Despite the successful graduations, the project is considered to be very competitive because of the specialization of VCI and the parent Velti in the fore-mentioned sectors. This is also the main reason why the incubator is perceived as an attractive location for new start-ups.

THERMI (Thessaloniki Research & Management Incubator)

THERMI is a business incubator that hosts technology-based start-ups. The incubator started in 2004, when the managing company; THERMI SA was founded with the support of ELEFTHO initiative. The incubator’s mission is to transform innovative entrepreneurial ideas into new business and to contribute to competitiveness and job creation in the region. THERMI is a privately owned company seeking financial results. The incubator is considered to be one of the larger facilities in SE Europe, with a capacity of around 30 tenants. Currently, the occupancy rate is with 27 firms 90%. Two of them are established firms and two R&D spin-offs. Tenant firms cannot stay longer than 3 years, but management intends to be flexible. Taking into account the relatively newness of the incubator, it is quite successful with three graduations yet. People, infrastructure and the availability of business support services are considered to be the most attractive characteristics of THERMI.

6. CASE STUDY RESULTS & ANALYSIS

In Table 1 we report the findings of the 10 case studies of the Greek Business Incubators. We distinguish in the table two categories: incubators established during the first expansion wave and during the second expansion wave. The former have increased public involvement and aim to commercialize mainly R&D results, whereas the later are coming from the private

sector and focus at general start-ups. For each business incubator the table presents the level of business support with respect to the categories of the theoretical framework. We scored the level of services by ranging from 'no service' provided (-) to high levels of service provided (*****).

The *physical resources* were distinguished in infrastructure and financing. Table 1 indicates some large differences among incubators established during the first expansion wave. Specifically, TTP, STEP-C and PSP ranked high for infrastructure. TEPATHE and STEP-Epirus do not offer advanced laboratories, and together with the private incubators of the second category (i4G, Thermi and VCI) they ranked medium. The incubator BIC of Attika is a very young organization which is probably still developing its facilities, while the Incubator of New Enterprises Chania scored as last. Regarding capital provision, incubators developed during the second expansion wave have a clear advantage. Their private character and financial incentives allowed them to participate in the equity structure of tenant firms: VCI, i4G and Thermi scoring highest. BIC of Attika that also invests in tenant firms, follows and the Incubator of New Enterprises Chania, which neither provides own seed capital, and has insufficient links with capital providers, scores as last.

With respect to the *knowledge-based resources*, the incubators developed during the second expansion wave are more effective. Particularly the private incubators VCI and i4G score high. This may be the result of the influence by the parent corporation that supports these functions. The third private sector incubator, Thermi, is scoring third. The public-sector incubators are scoring considerably lower with the Incubator of new Enterprises Chania and the BIC of Attika as last. It is clear that the private-sector involvement in the incubation industry hatched the provision of knowledge-based services. Some other interesting conclusions can be drawn by analysing one by one the aspects of knowledge-based resources that were investigated. In particular, the empirical investigation indicates that Greek business incubators provide little pre-incubation services. Merely VCI contributes to the development of business concepts for entrepreneurial ideas in fields of its interest: multimedia, IT, internet services. Administrative support is especially provided by the private sector incubators. Technology transfer is provided mainly by the first expansion wave incubators. Their focus on the commercialization of R&D results is clear from their objectives and their infrastructure. The more effective organizations in terms of technology transfer are STEP-C, TTP and PSP. The business incubator VCI is scoring relatively high on technology transfer because of its focus on IT and multimedia. Professional and consulting services are again more present in private incubators. The corporate incubators i4G and VCI are again scoring highest, followed by Thermi, and leaving PSP, TTP and BIC of Attika next. It is worthy to mention, that public policy has the intention to extent their support with more knowledge-based resources.

Flat structured organizations are beneficial for internal communication and information exchange. Business incubators that are constructed in that way may be more supportive in developing a collaborative environment among their tenants. The empirical research revealed that private incubators are not implementing flat structures as public ones do. Incubator of New Enterprises Chania, TEPATHE and STEP-Epirus are ranking highest in terms of flat structures. TTP, VCI, i4G and Thermi, however, are more supportive in cultivating an internal collaborative environment despite their hierarchical structures. This apparent paradox may be because of the small management teams of the incubators, which is often a single manager. The *admission criteria* of the potential clients screening process is believed to be one of the determinants of business incubators' success. The business incubators i4G and VCI correspond closely with the criteria recommended in literature. Thermi and PSP are following, while the other business incubators employ in the screening process also criteria

related with the ability of potential tenants to participate, together with the incubator, to subsidized research programs. This criterion is implemented because participation in research programs is a major source of income for business incubators, especially in the public sector. In terms of *management competencies*, the private incubators developed during the second expansion wave (VCI, i4G, Thermi) are scoring higher than those in the first wave. BIC of Attika, although very young, presented effective competencies. It seems that the emphasis to knowledge based services promoted by the second policy initiative found response. The fact that public incubators score lower; Incubator of New Enterprises Chania, TEPATHE, STEP-Epirus, may reflect the fact that they are managed mainly by academia instead of business experts. PSP and BIC of Attika seem to be more consistent with the propositions of previous research regarding criteria of *self-performance evaluation*. These organizations, in accordance to their objectives are monitoring their performance in terms of graduates and gather feedback from tenants and shareholders. The private incubators (VCI, Thermi, i4G) and also most of the remaining public monitor their performance on a financial-return basis. Hence, tenants are not pushed to exit the facility as far as they pay the rents, a fact that may lead to disagreement with incubator's objectives; development of free-standing enterprises.

Regarding *networking*, the empirical research focused on two categories. Internal networks is the first category and aims at the development of peer-supporting environment and of business clusters, the second category is external networks which consists of partnerships and informal connections with the marketplace. The private incubators, VCI, i4G and Thermi, were the most sufficient in enhancing collaborations and corporations among tenants, while the public support incubators scored low. With respect to the external networks, VCI and i4G were the most effective, followed by BIC of Attika to foster partnerships with business partners. Those are all corporate incubators, and connections were provided mainly through the network of the mother-corporation. Regarding the external networks, the main resources that an incubator can offer are access to knowledge/information, access to capital, legitimacy and other knowledge-based services. Given that seed and venture capital are underdeveloped in Greece, the incubators that are able to provide access to capital are those who have an international character and connections with foreign investors. These organizations are mainly the corporate incubators, VCI, i4G and BIC of Attika; because of their mother corporation. On the other hand, incubators developed during the first expansion wave; specifically STEP-C, TTP and PSP, are more effective to offer access transfer capabilities because of their close relations with universities and R&D centres.

Table 1. Support provided by Business Incubators in Greece.

	CRITERIA	FIRST EXPANSION WAVE							SECOND EXPANSION WAVE		
		Chania	TTP	STEP-C	PSP	Tepathe	STEP-Epirus	BIC of Attika	i4G	Thermi	VCI
	Founded	2000	1988	1993	1989	2001	1999	2007	2003	2004	2005
	Aim	Public NP-JC	Public NP-TF	Public NP-TF	TF	Private FP-TF	70%Public FP-TF	Private NP-TF	Private FP-SE	Private FP-SE	Private FP-SE
	Capacity	10	10	20	25	12	14	12	15	30	6
	Record	19	28	60	30	25	14	3	22	27	6
PHYSICAL RESOURCES	Infrastructure	*	****	*****	****	***	***	*	***	***	***
	Financing	*	**	**	**	*	*	***	*****	****	*****
KNOWLEDGE -BASED RESOURCES	Pre-incubation Services	-	*	*	*	-	**	*	*	**	***
	Administrative Support	-	**	*	*	-	-	*	***	***	****
	Technology Transfer	-	****	*****	****	**	**	-	*	*	***
	Professional Services	**	***	***	***	**	**	***	*****	****	****
	Consulting	*	*	**	**	*	**	**	****	***	****
MANAGERIAL ISSUES	Organizational Structure	****	***	**	**	****	****	***	***	***	***
	Admission Criteria	*	***	**	***	**	**	**	****	***	****
	Management	*	***	***	***	***	***	***	*****	****	*****
	Performance Evaluation	***	**	**	****	***	**	****	***	*	***
NETWORKING	Internal Networks	*	**	***	**	**	*	**	***	***	****
	External Networks	**	***	***	**	***	***	****	*****	***	*****
TOTAL SCORE		17	33	34	33	26	27	29	45	38	50

TTP = Thessaloniki Technology Park
 STEP-C = Science & Technology Park of Crete
 PSP = Patras Science Park
 TEPATHE = Technology Park of Thessaly
 STEP-Epirus = Science & Technology Park of Epirus

I4G = Incubation for Growth
 THERMI = Thessaloniki Research & Management Incubator
 VCI = Velti Center for Innovation

JC = Job creation
 NP = Non-profit
 FP = For profit
 TF = Technology transfer
 SE = Support Entrepreneurship

7. CONCLUSION AND DISCUSSION

In Greece, where the market is small and has no long industrial tradition, the establishment and success of new technology-based ventures is subject to several problems related to investment gap, research gap and information/trust gap. To deal with the obstacles of entrepreneurship, policy makers have undertaken some actions to support the establishment of business incubators. The development of business incubators in Greece occurred in two expansion waves. The first took place with the policy's initiative to promote the Universities' technology transfer in the early 90's, while the second took place after 2001 with the policy's intensive to transfer funds (through private incubators) to new ventures. Based on the case study analysis we can draw some conclusions regarding the effectiveness of business incubation. In terms of capital provision, incubators developed during the second expansion wave are in advantageous position as they are able to utilize public funds, together with their own, to invest in tenant companies. Corporate incubators can make more use of the capital and network available at the parent corporation.

Regarding knowledge-based resources, the research identified in Greece a necessity for the provision of pre-incubation services and support in administrative issues; mainly because of the uncertainty that nascent entrepreneurs face and the complex-bureaucratic procedures to incorporate a new venture. Again, private incubators seem to be more effective here. Technology transfer is achieved mainly through incubators developed during the first expansion wave. TTP, STEP-C and PSP are considered the most effectively functioning incubators in this aspect, because of their close ties with universities and R&D centres. Furthermore, the findings reveal that tenants do not use the services provided extensively. This is even clearer for incubators with a public character. The private incubators that are managed by business experts seem to resolve this inconsistency by offering training workshops and seminars. VCI, which moreover has a specialized client focus, seems to be most effective. Worthy to mention are the attempts by TTP to reactivate tenants to make use of the knowledge-based offerings.

Regarding networking, we distinguish between internal and external networks. Private incubators are more efficient in fostering internal collaborations; Thermi, i4G and VCI are successful examples. In terms of external networks, the corporate incubators; VCI, i4G and BIC of Attika are the most efficient providers of resources through their network of contacts. Another interesting result is that none of the Greek business incubators has links with its graduate firms. Unfortunately little can be learnt from these graduates. The identified best practices, lead to the conclusion that the most effective incubator model is the private incubator. More particularly, the corporate incubators seem to be in advantageous position as they utilize the expertise, the experience and the networks of the mother corporation. Additionally, the links with the market, which provide information flows and potential customers for tenants' products, are considered valuable. Connections with the research field should also exist, although only public incubators seem able to utilize research knowledge.

Implications for Policy

Overall, analyzing the Greek business incubators indicate that the university-based incubator model is facing a decline in comparison to the private sector business model. This corresponds with findings by Finer's and Holberton's (2002). Also the empirical findings are consistent with the results of Ryker's (2001) research on the Norwegian incubation industry. He claims that the 'run as a business' model is more efficient. The policy shift in Greece to follow the private model may be effective. Still, in order to improve the entrepreneurial activity we recommend that policy makers should tackle some of the core constraints of entrepreneurship in Greece. More specifically, as far as the lack of the appropriate funds is an

obstacle for the emergence of new ventures, policy makers should promote the development of high-risk funds. By encouraging business incubators to reduce their dependencies on public funding, they could deregulate capital as to be used to subsidize the development of private high-risk funds. Additionally, policy should tackle the bureaucracy embedded to the procedure of incorporating a new enterprise. These regulations discourage the promotion of entrepreneurial activity, and more simple procedures should be implemented. Also, the uncertainty that keeps entrepreneurial activity in low levels can be tackled by the education system. Concluding, as aforementioned the policy shift to the private sector for the development of business-supporting organizations is considered as quite successful. We suggest that some time has to pass; in order for a rational assessment to take place, before the next wave of policy initiatives. The age of incubation facilities is however a crucial determinant of success (Allen and McCluskey, 1990), so after some time their impact in entrepreneurship could more rationally be assessed and measured.

Limitations & Recommendations for Future Research

The young age of incubators is one of the main limitations of the present study, and does not allow testing the progress over longer periods or larger amount of incubator tenants. Future research may be better assessing the impact of business incubators in Greece. Moreover, the current project does not offer any performance measurement. Future research may consider individual goals of the sponsors, but also the goals of participants involved: tenants, institutions, investors, etc. Also the performance of business incubators can be related to business models and theory, which will additionally help to explain to what extent the theoretical framework is able to predict the success of business incubators' functioning.

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