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# An Analysis of the Match between Supply and Demand of Business Incubator Services: The Case of IT Incubation in Armenia

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# An Analysis of the Match between Supply And Demand of Business Incubator Services: The Case of IT Incubation in Armenia

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# Abstract

*With the purpose of enhancing economic development and growth, many governments and policy makers adopted business incubation programs aimed at promoting economic growth and job creation. To further enhance the development of the IT industry, the government of Armenia also adopted a new industry development strategy emphasizing business incubation as a development tool. Business incubators offer their tenants services mainly along three dimensions: infrastructure, business support and access to networks. The value of these services is seldom analyzed although researchers emphasize the critical importance of a match between the need and provision of business incubator support services.*

*The purpose of this study was to evaluate the perceived value of typical business incubator services and analyze the extent to which the offered services cover the needs of IT companies in Armenia. The study therefore involved both incubated and non-incubated companies. Non-incubated companies were studied on their need for business incubator services and the perceived value of such services for their future development. Analysis of incubated companies on the other hand concerned the need of these companies for business incubator services and the extent to which the currently received services were matching their needs. The research had a two stage procedure: first, interviews were conducted with pivotal people familiar with business incubation in Armenia; second, an electronic questionnaire survey was sent to the entire Armenian IT population.*

*The study results illustrate a weaker need for business incubator services than initially thought. Nevertheless, many non-incubated companies need business incubator services but are currently not served. Non-incubated companies find business incubator services to be moderately valuable for their future development, however, this value increases as their needs increase. Incubated companies on the other hand are generally satisfied with the services they enjoy but the satisfaction level decreases as their needs increase. The results of the study consequently point towards a gap between the need for business incubator services and the services actually offered by the Armenian business incubation system. The findings therefore suggest that a more extensive service provision is needed for creation of a better match between the offered and needed business incubator services. New Science Parks and Business Incubation Centers with a wider scope and more varying strategic objectives will benefit the match between the offer and need for business incubator services.*

# Preface

This graduation assignment is submitted to the faculty of Management and Governance of the University of Twente, in partial fulfillment of the requirements for the degree of Master of Science in Business Administration, specialization International Management.

I would like to take this opportunity to express my appreciation to my graduation committee: Mr. Tiago Ratinho and Dr. Rainer Harms for their attention, guidance and insight. I would also like to express appreciation to Mr. Tumasyan for giving me the opportunity of conducting a policy relevant study in Armenia, which hopefully will be of value for the future development of the country. I am also thankful to Mr. Gagik Torosyan for his support and valuable comments and also Dr. Aram Hajian for providing valuable feedback on the study.

My gratitude also goes to the members of the expert panel Mr. Kirakosyan, Mr. Vardanyan and Mr. Yengibaryan for their guidance and insight during the preliminary stages of the study. I especially want to thank Mr. Yengibaryan as the head of the Enterprise Incubator Foundation for his support and collaboration during research implementation.

I sincerely would like to thank my family, specially my lovely parents for their unconditional love and support throughout my life. Thank you dad for being a role model. Thanks also to my beloved wife, who has been the strongest motivating factor during my study period. The highest praise however, goes to my heavenly Father.

*"For from Him and through Him and to Him are all things. To Him be the glory forever! Amen."*

*Romans 11:36*

Armen Grigorian

Yerevan, May 18, 2010

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# Abbreviations

BI – Business Incubator
BIS – Business Incubation Services
EIF – Enterprise Incubator Foundation
ITDSC – Information Technologies Development Support Council
NBIA – National Business Incubation Association
OECD – Organization for Economic Cooperation and Development
USSR – Union of Soviet Socialist Republics
WEF – World Economic Forum

# Executive Summary

The growing importance of the IT industry led the government of the Republic of Armenia to declare IT as one of the priority sectors of the Armenian economy. To further enhance the development of the industry, the government adopted a new industry development strategy emphasizing business incubation as a development tool. The existent literature on Business Incubator Services (BIS) recognizes that business incubation is most effective when a match exist between the offered services by Business Incubators (BIs) and the needs of incubatees. Their however is a paucity of literature on the value of BIS for business development. The study therefore set out to evaluate the perceived value of typical BIS for business development and analyze the extent to which the offered BIS cover the needs of IT companies in Armenia.

BIs offer their tenants services mainly along three dimensions: Infrastructure, Business Support and Mediation. Drawing on the business incubation literature three important elements need to be considered for evaluating the match between the offered BIS and the need for BIS namely; "What", "How" and "How Much". "What" refers to the BIS offered by the BIs and the BIS needed by incubatees. "How" has to do with how incubatees prefer to receive the offered BIS or in other words the BI's approach to service provision. "How Much" is concerned with how much of any BIS are provided and how much of such services are needed. The study therefore evaluated the match between the offer and the need for BIS through these three elements.

A survey strategy was chosen and a two stage research procedure was employed to carry out the research objects. The first stage of the research comprehended interviews with pivotal people familiar with the business incubation system in Armenia and the second stage was a digital questionnaire survey of the complete population of IT companies in the country. Incubated companies were asked to indicate their need for a set of BIS and their respective level of satisfaction. Non-incubated companies on the other hand were enquired on their need for BIS and the perceived value of these services if offered. The use the qualitative information gathered from the in-depth interviews helped to create expectations on possible results and also contributed to the quantitative data gathering through the survey.

Regarding "What" the research results illustrated a weaker need for BIS than initially thought, especially by considering the various factors influencing companies' need for BIS. Non-incubated companies found BIS to be moderately valuable for their future development and incubated companies found the offered BIS to be matching their needs. Nevertheless, the findings demonstrated a gap between the need for BIS and the services actually offered by the Armenian business incubation system. Regarding "How", the second element for a match, the results suggest that both reactive and proactive service provision approaches are favored. This implies that BIs should strive towards an individual service provision approach. However, if the Armenian business incubation system is to cover the complete IT industry such an individual approach will be impossible to maintain by the currently operating BI(s). With regard to "How Much", non-incubated companies need many M.h.p.m of different Infrastructural and Business Support services; yet, only limited support exists regarding these business incubation dimensions. To this end, the findings suggest that the current business incubation efforts in Armenia do not cover the needs of the Armenian IT industry as a considerable gap exists between the offer and the need for BIS. Therefore, the study concludes that the current efforts with regard to business incubation in Armenia are on the right track; however there still much needs to be done to cover the demand of the IT industry for BIS.

Efforts aimed at enhancing the human capital of entrepreneurs regarding business management will be helpful in closing the existing gaps. In addition, New Science Parks and BIs with a wider scope and varying strategic objectives will be valuable additions in effectively targeting the need for BIS. Business Support services were perceived to have the highest value for the future development of non-incubated companies followed by Mediation and Infrastructural BIS. Future BIs should consider this ranking in their support provision which will enhance the match between their service provision and the needs of incubatees.

# Chapter 1 Introduction

## 1.1 Background

Before declaring its independence on September 21st in 1991, the Republic of Armenia was one of the fifteen republics of the USSR. As the main hub of the USSR's scientific and R&D activities, the country has historically been on the forefront of high-tech research, development, and manufacturing. Prior to the collapse of the Soviet Union, the Armenian technology sector focused primarily on the large-scale R&D and production projects targeted at industrial and military applications. After the independence of 1991, the industry switched its focus to the software development, outsourcing, and IT services. The software and services segment continued to develop quite rapidly during the last 10 years as it grew by 27 percent per annum.[1]

The growing importance of the IT industry has led the government of Armenia to declare IT as one of the priority sectors of the Armenian economy in 2000. Key initiatives in the policy field include preparation of Armenia's ICT Master Strategy and formation of Information Technologies Development Support Council (ITDSC) in 2001 and start of World Bank's "Enterprise Incubator" project in 2002. Within the framework of the Enterprise Incubator project aimed at supporting the development of Information Technology sector in Armenia the Enterprise Incubator Foundation (EIF) was established. EIF is a business development and incubation agency operating in Yerevan.

Despite the efforts of the government with regard to the development of the Armenian IT industry, the relative preparedness of Armenia to leverage IT advances for increased competitiveness and development has weakened during the last years. According to a recent report of the WEF the Armenian Networked readiness, in other words its relative ability for leveraging information and communication technology for increased competitiveness has fallen from 106th place 2007 to 114th place in 2008.[2]

In 2008, the government adopted a new industry development strategy focused on infrastructure, workforce, education, venture financing, and other key areas. The main goals of the new industrial development strategy executed by the Ministry of Economy are:[3]

- build a developed information society in Armenia;
- Make Armenia part of the knowledge creation global network;
- form a strong and advanced information technology sector.

The new strategy aims to increase the computer and internet penetration in various segments of the economy (public sector, businesses, education sector), build new techno-parks and Business incubators (BI), establish a venture fund and improve the quality of university graduates among others.

As business incubation is perceived to be helpful in realizing this objectives, however a flexible oversight with dynamic readjustment of incubation programs as dictated by local needs is important

[1] Enterprise Incubator Foundation, "*Armenian Information Technology Sector Software and Services, 2008 State of Industry*", available at: http://www.eif-it.com
[2] World Economic Forum, "The Global Information Technology Report 2008-2009", available at: http://www.weforum.org
[3] Enterprise Incubator Foundation, "*Armenian Information Technology Sector Software and Services, 2008 State of Industry*", available at: http://www.eif-it.com

for maintaining the vitality and effectiveness of incubators in a cost-effective manner (Hackett and Dilts 2004b). This is a point often emphasized in theorizing about business incubation, in other words the importance of a "match" between what is offered and what is needed. When theorizing about business incubation, both structural and contingency theory and the interdependent coproduction modeling approaches stress the importance of a match between the incubator itself and its offerings in relation to the local needs (Ketchen et al. 1993; Rice 2002). Consequently in order to be effective BIs do not just have to offer services, they also must offer the adequate services. Mismatches between BI's offer and the tenant's needs might lead to a failure of the incubators. An example is seen when BIs focus their offer entirely on infrastructure while entrepreneurs need high expertise and capital (Carayannis and von Zedtwitz 2005).

Furthermore, recently, the focus of the business incubation literature has been shifting away from incubators towards incubation through an enhanced understanding that the underlying processes of incubation. Such understanding may be far more critical for achieving accelerated firm growth than incubator infrastructure (Khavul et al. 1998; Lalkaka 1997; Lichtenstein and Lyons 1996; NBIA 1997; Reid and Garnsey 1998). Nevertheless the value of BIS for companies is seldom analyzed. Enhanced understanding on the value of different BIS will contribute to the incubation process and enhance the effectiveness of business incubation in achieving its objective such achieving accelerated firm growth.

This study will therefore set out to evaluate the perceived value of typical BIS and analyze the extent to which the offered services cover the needs of IT companies in Armenia. More extensive insight in the ability of the Armenian business incubation system for meeting the demand of the IT industry will enable the Ministry of Economy and other stakeholders to better direct any strategic efforts with regard to business incubation. A better developed incubation system will contribute to the economic development of the country as a whole and more specifically to the development of the Armenian IT industry.

## 1.2 Problem Formulation

Business incubation contributes to the economic development of a country through the creation of new companies, increasing employment, improving of industry structure and transfer of technology owned by universities and research institutions to companies and eventually end beneficiaries (OECD. 1997). On a community level BIs have also been found to be more cost effective economic development tools than other programs to attract firms to local regions (Markley and McNamara 1995; Sherman 1998; Sherman 1999; Sherman and Chappell 1998). However, as mentioned before a flexible oversight with dynamic readjustment of incubation programs as dictated by local needs, is important for maintaining the vitality and effectiveness of the BI in a cost-effective manner. The problem can therefore be formulated as follows:

*How does the business incubation system in Armenia meet the demand of the IT industry?*

Answering the above mentioned statement will make it possible to evaluate the current match between the incubation efforts regarding the local needs and elaborate on how a better match can be created between the BIS offered by the Armenian business incubation system and the needs of the IT industry.

## 1.3 Research Strategy

The business incubation concept is related to many forces involving new venture creation and business assistance, new product conceptualization and development. However, expanding the scope of this

study beyond business incubation would make this research project impossible to complete on a timely basis. A deductive research approach was used to address the problem stated above and a literature study was carried out to identify suitable models and perspectives prior to data collection.

The literature study resulted in the research framework including the main elements that need to be considered and the indicators used to measure these variables. A survey strategy was chosen for performing the study by targeting the complete IT company population in Armenia and a questionnaire survey was conducted to collect the necessary data. The analyses were intended to reveal any existing gaps between the BIS offered and the needs of the IT industry. The results of the analyses were subsequently used to drive recommendations on possible ways of addressing any identified gaps.

The remaining part of the thesis is organized as follows. In Chapter 2 the Theoretical Framework of the dissertation is presented. Chapter 3 presents the Methodology of the field analysis on the business incubation system in Armenia. The empirical findings are illustrated in Chapter 4 Findings and Empirical Analysis, which is devoted to the needs of the Armenian IT industry for BIS. This chapter is followed by Chapter 5 Discussion and Limitations and the dissertation is concluded with Chapter 6 Conclusion and Recommendations, elaborating on how a better match can be created in Armenia.

# Chapter 2 Literature Review

## 2.1 Defining Business Incubators

BIs started simply as resource sharing initiatives in the beginning of 1960s and have evolved into important tools of economic development (Bergek and Norrman 2008). The role of the BI has changed from just a business centre with office facilities to one offering training, networking and consulting in all areas of expertise to startup firms (Peters et al. 2004). BIs are by some even considered to be 'Change Agents' in the transformation of an economy from one that is based on large manufacturers to one with many new, small 'information age' firms (Campbell 1989). Theoretically, there has been a recurring problem of definitions in which science parks and BIs can encompass almost anything from distinct organizations to amorphous regions (Storey and Tether 1998).

Based on an extended list of definitions, Hackett and Dilts define a BI as "a shared office space facility that seeks to provide its incubatees (i.e. ''portfolio-'' or ''client-'' or ''tenant-companies'') with a strategic, value-adding intervention system (i.e. business incubation) of monitoring and business assistance. This system controls and links resources with the objective of facilitating the successful new venture development of the incubatees while simultaneously containing the cost of their potential failure (Hackett and Dilts 2004b).

Hackett and Dilts emphasize the existence of a shared office space within the BI (Hackett and Dilts 2004b). However other scholars do not see resource sharing as a necessary component of business incubation (Nolan 2003; von Zedtwitz 2003). This is also the reason why the definition used by The National Business Incubation Association (NBIA) was chosen for this study. The NBIA defines a BI as "an economic development tool designed to accelerate the growth and success of entrepreneurial companies through an array of business support resources and services. A BI's main goal is to produce successful firms that will leave the program financially viable and freestanding" (NBIA Website)[4].

## 2.2 Business Incubation Roles and Perspectives

BIs are often seen as an important component of a local economic development strategy and can serve a market failure bridging function by enabling entrepreneurship where it previously was too costly or too risky (Hackett and Dilts 2004b). Especially for new technology based firms, common in the IT industry, certain market failures are claimed to exist which reduce the access of these companies to essential inputs such as finance (Carpenter and Petersen 2002; Storey and Tether 1998), or appropriate professional networks (Peters et al. 2004; Smilor 1987; von Zedtwitz 2003). Causes for such market failure can for example be the insufficient competence of banks to assess the technology in need of financing and the lack of previous performance records. It is also possible that banks perceive the high-technology projects as too risky (Hall 1989; Oakey 1995; Storey 1994). Therefore, new technology firms suffer from credit rationing (Stiglitz and Weiss 1981). The presence of other financial intermediaries that are more sensitive to the requirements of such new technology based firms such as venture capital firms, is not sufficient to close the gap (Colombo and Delmastro 2002).

BIs also provide a protected environment in which new ventures representing opportunities both for local economic expansion and investment can develop (Campbell 1989). They help to reduce the high failure rate of new startups caused by a lack of management skills or capital by providing them

[4] Source, available at: http://www.nbia.org/resource_library/what_is/index.php

with assistance in this critical stage of business development (Smilor 1987). Some argue that especially in countries that are lagging behind in high-tech activities, policymakers should encourage the development of effective technology incubators as these are more valuable in countries with less developed high tech activities than in countries where the national innovation system is more advanced (Colombo and Delmastro 2002; Colombo and Grilli 2007).

For evaluating the business incubation system, it is important to consider the different incubation perspectives. The literature distinguishes two different yet interconnected perspectives affecting the business incubation process. These two perspectives distinguish the internal incubation process occurring inside the BI and the external components (Campbell et al. 1985; Smilor 1987). Different external factors are in the literature recognized as of critical importance to the success of the incubation process. These are factors such the existence of community support for business incubation, an entrepreneurial network, the existence of entrepreneurial education and ties to universities. The locus of much of the literature is however on the internal incubation process which discerns BIs from one another, incubatees and off-incubator companies and different incubation dimensions. However, regardless of the perspective used, for enhancing the effectiveness of incubation efforts the business incubation literature emphasizes the importance of a "match" in the incubation programs offered and the local needs. This study as well focused on the internal incubation process, consequently with this literature review it aimed to make clear and point out the elements through which such a match can be created.

## 2.3 Elements for a Match

The literature recognizes that business incubation is most effective when a match exist between the offered BIS (also influenced by the incubator archetypes), the service provision approach of the incubator and the needs of the incubatees. Consequently it can be stated that three important elements need to be considered for evaluating such a match namely "What", "How" and "How Much". The following section will further elaborate on these three elements for a match.

### 2.3.1 What services are offered

"What" refers to the services BIs offer and the support services needed by incubatees. To understand this element better, it is important to consider the different dimensions along which BIs create value for their incubatees.

Bergek and Norman (2008) categorize the benefits of BIs for their incubatees along five dimensions and discern the main business incubation dimensions as: Selection, Infrastructure, Business support, Mediation and Graduation (Bergek and Norrman 2008).

- Selection

  Selection refers to decisions of incubators concerning which ventures to accept for entry and which to reject. As a strong basis for effective resource allocation both to incubators and the general economy (Hackett and Dilts 2004b; Lumpkin and Ireland 1988), Selection is recognized as an important incubator management task (Colombo and Delmastro 2002; Lumpkin and Ireland 1988; Peters et al. 2004). Bergek and Norman recognize four different approaches of incubators to selection which they refer to as the different "Selection Strategies": Survival-of-the-fittest and idea, Survival-of-the-fittest and entrepreneur, Picking-the-winners and idea and Picking-the-winners and entrepreneur. These strategies are based on different selection criteria of incubators and their strictness in applying them.

- Infrastructure
  Infrastructure refers to localities such as office facilities and "administrative" services. Generally a comparable set of administrative services is offered by incubators including office space and equipment as well as facilities-related services and office services such as reception and clerical services (Bollingtoft and Ulhoi 2005; Chan and Lau 2005; Colombo and Delmastro 2002; Lalkalka 2003; Lyons and Li 2003; Mian 1996; Rice 2002).

- Business support
  Business support is associated with those training activities that are undertaken by incubators to help incubatees develop. They typically include entrepreneurial training and business development advice, consultancy and other services concerned with general business and legal matters, marketing issues such as advertising and financial assistance (Bollingtoft and Ulhoi 2005; Chan and Lau 2005; Lalkalka 2003; Lyons and Li 2003; Mian 1996).

- Mediation
  The incubation process transcends the incubator as a network of individuals and organizations including the incubator manager and staff and other parties involved in the incubation process. An incubator has a bridging function, an important incubator role consequently is to act as an intermediary or mediator between incubatees and relevant innovation systems (Merrifield 1987; Peters et al. 2004). The BI therefore creates a network of individuals and organizations including the BI manager and staff, BI advisory board, incubatee companies and employees, local universities and university community members, industry contacts, and professional services providers such as lawyers, accountants, consultants, marketing specialists, venture capitalists, angel investors, and volunteers (Hackett and Dilts 2004b).

- Graduation
  Finally graduation is related to the policies of BIs with regard to the exit of incubatees from the incubator. These are for decisions concerning the circumstances under which incubatees should leave the BI.

BIs however not always comprehend all these dimensions in their support provision. To understand "What" it therefore is also important to consider that the actual service mix offered by BIs affected by the BI taxonomies. Hackett and Dilts (2004b) recognize different taxonomies employed in the literature for categorization of differences between BIs. These taxonomies classify BIs on the basis of several elements of differentiation (see APPENDIX A). Such differentiations are important as they influence the business model of BIs in terms of what services they offer and the execution of their business plan.

Carayannis and von Zedtwitz (2005) also strived to explain how BIs differentiate themselves from other startup facilitators (such as venture capitalists, business angels, consulting companies) and among other BIs with a more managerial perspective. They allege that BIs can be classified based on their particular competitive scope, strategic objective and service package (Carayannis and von Zedtwitz 2005). Based on the work of (Porter 1986) they discern four different elements of competitive scope namely (see also APPENDIX B):

- *Vertical Scope*
  This scope in concerned with how BIs differentiate themselves from other startup facilitators in the business of providing financial and business support to companies in their initial development stages. They differentiate themselves along factors such as the development stage of the clients in their focus (Pre-venture, existence or Infancy, early growth) and the institutionalization of the coaching and other services they offer.

- *Segment scope*
  As competitive scope the segment scope is concerned with the actual source of the client companies in terms of any preferences regarding the actual entrepreneurs. University Incubators for instance typically prefer faculty students and staff entrepreneurs from their host university.

- *Geographical scope*
  This scope is concerned with the geographical focus of a Regional Incubator as a natural competitive factor. Network access as a crucial element of successful business incubations is usually bound to a certain region; this motivates BIs to establish a strong local presence. Exceptions do exist as for example Virtual Incubators that base their business models on a variety of startups rather than a certain geographical region.

- *Industry focus*
  This scope is concerned with the focus of the BI on a particular industry such as the IT industry. BIs can have different motivations for choosing such a specific focus such as the preferences of the BI manager or simply for the purpose of creating synergies.

Building on Porters four elements of competitive scope and the distinctive strategic objective (for-profit or non-profit), von Zedtwitz proposed a classification of five different incubator "archetypes" as the most frequently used incubator taxonomies:

- Regional Business Incubators,
- University Incubators,
- Independent Commercial Incubators,
- Company-Internal Incubators
- Virtual Incubators

Different authors recognize a shared office space as a necessary component of business incubators (Bergek and Norrman 2008; Hackett and Dilts 2004b). Von Zedtwitz ( 2003) however does not consider co-location as a necessary feature of BIs. This is also one of the underlying factors behind the recognition of "Virtual Incubators" by some authors and the rejection of these institutions as BIs by others. Influenced by their competitive scope and strategic objectives, BIs provide their incubatees with certain services. BIs however can incorporate elements of different archetypes. In other words "What" or the actual service mix or dimensions through which an BIs serves incubatees depends on the focus of the BIs as well as the needs and preferences of the incubatees (Nash-Hoff 1998). Regarding the later, Carayannis and von Zedtwitz (2005), point that the actual mix of services should be developed through an agreement between the BI and the incubatees.

### 2.3.2 What services might be needed

"What" is not only concerned with the BIS offered by BIs but also incorporates the demand side of the equation as the services needed by incubatees. Consequently, for evaluating the match between the offer and need for BIS it is just as important to evaluate possible factors affecting the demand for BIS by incubatees. Drawing on the business incubation literature it may be stated that the potential need of incubatees for BIS is influenced by different internal and external factors.

Regarding the internal factors influencing companies need for BIS it is important to consider the different company and managerial characteristics of incubatees. Such characteristics are important as they influence the operations and performance of companies. One of the company characteristics important to be considered is whether companies are subsidiaries of multinational enterprises. This is important as the role and position of subunits is largely decided and arranged by the head office which

obviously can have large effects on the business operations of such companies (Doz and Prahalad 1981). Foreign subsidiaries can for example be only concerned with the production of a certain product and the care for an efficient production of that certain product. Such companies are consequently not required to get involved in marketing, sales, R&D and other similar functions that normally also need to be performed. Similarly, nascent companies are assumed to be more fragile than mature companies (Peña 2004). The logic here is based on the high failure rates of nascent companies within the first five years of operation due to the lack of various resources (Peters et al. 2004). This implies that the need of companies for BIS can differ during the different stages of the company life cycle. Furthermore, Grimaldy and Grandi (2005) argue that new knowledge based companies common in the IT industry are characterized by a fast and completely different business models. Access to knowledge and intangible assets, to capital, and speed-to-market are major requirements for these companies. Such requirements are very likely to be reflected in the need of these companies for BIS respectively.

Concerning the Armenian context, in 2008 the Armenian IT industry existed of 175 enterprises of which 68 percent were local companies against 32 percent which were branches of foreign companies (EIF 2008). Considering the differences in characteristics and goals of local companies and branches of foreign companies, the presence of foreign branches in the industry might influence the needs of the IT industry as a whole. Furthermore many companies were founded after 2005 pointing towards the presence of nascent companies in the industry. As nascent companies are found to be more fragile, the large existence of nascent companies is expected to enlarge the need of the IT industry for BIS. In addition, currently the IT industry is mainly focused on low end outsourcing services. This makes competition of Armenian IT companies with foreign competitors form countries like India more difficult as these competitors have a massive workforce to their disposal (EIF 2009). In order to shift towards higher value services, such as engineering, research and product development, the IT industry might have a large need for support regarding R&D facilities.

Another internal factor potentially influencing the need for BIS is human capital. Human capital is a very important factor influencing the performance of companies as managers with advance education and business management experience are found to perform better than entrepreneurs without such skills (Cooper et al. 1989; Honig 2001; Peña 2004; Stuart and Abetti 1990). Availability of human capital can therefore be an important factor influencing the need of companies for BIS. In line with this, companies with limited human capital are likely to have a larger need for BIS to close any resource gaps in this regard. Human capital discussed here is mainly related to manager's education and experience, nevertheless, the needs of companies regarding non-managerial staff can also influence the demand of companies for BIS. The later may particularly be the case in Armenia as the shortage of qualified staff is currently one of the main factors constraining the growth of Armenian IT companies (EIF 2009). Such a shortage of qualified employees may enhance the need of IT companies for different BIS such as mediation regarding employees.

Regarding external factors influencing the need for BIS, Colombo and Delmastro (2002) suggest that in countries with an inefficient national innovation system business incubation initiatives are expected to play a relatively more important role than in technologically more advanced European countries, where the supply of inputs to new technology based firm is relatively more developed and market failures are more pronounced. Consequently, this implies that the need for BIS in Armenia should also be high as the national innovation system of Armenia is poorly developed (UNESCO 2009).

### 2.3.3 How (Much) services are offered/needed

Next to the different BI taxonomies discussed earlier, BI's also differ from each other based on their assistance approaches (Hackett and Dilts 2004a; Rice 2002). As Bahabra and Remedios (2003) recognize, the effectiveness of BIS in relation to the success of the tenants is not only effected by the nature of the services offered, but also by *How* services are provided.

In line with this, Bergek and Norman (2008) refer to two different categorizations of how services are provided, these categories describe the dimension within the different approaches that BIs may have to provision of assistance to incubatees. The first and more specific categorization is that of Hackett and Dilts (2004a). The authors recognize that the provision of services by BIs differ along three dimensions: Time intensity (percentage of working hours devoted to monitoring and assisting incubatees), comprehensiveness (the degree to which assistance includes strategic and operational assistance as well as administrative-related services) and degree of quality (the relative value of the assistance). The second more general categorization of service provision approaches is the one developed by Rice (2002). He distinguishes three different approaches to service provision: Reactive and episodic counseling, which is entrepreneur initiated, the entrepreneur requests help for dealing with a crisis or problem and the assistance is focused on that specific problem and is generally of limited duration. Proactive and episodic counseling is BI initiated, the manager engages entrepreneurs in informal, ad hoc counseling. Continual and proactive counseling, is BI initiated, the venture is subjected to an ongoing review and "intense-aggressive" intervention by BI managers (Bergek and Norrman 2008).

## 2.4 Research Framework

It is logical that incubatees in need of certain BIS and expecting a proactive counseling will be unsatisfied if the BI does not provide such a service or it has a more reactive and episodic counseling approach to service provision. The same is the case if the BI practices a strong intervention approach when this is not needed or the volume/quantity of the offered BIS do not match the needs of the incubatees. Regarding the match between the offered and needed BIS three important elements were discerned namely; "What", "How" and "How Much". The match between the offer of BIS by BI(s) in Armenia and the needs of the Armenian IT companies is therefore analyzed through the identified framework of "What", "How" and "How Much". Furthermore, internal and external factors influencing companies' need for BIS such as the managerial (human capital) and company characteristics of companies were also taken in to consideration in evaluating the need for BIS.

To this end, it is important to create a more extensive understanding of the needs of companies who already received BIS services in comparison to those who never received such services. The first group we will further refer to as the incubated companies and later (companies who never received support services) will be referred to as the non-incubated companies.

# Chapter 3 Methodology

## 3.1 Research Design

By taking the limitations and benefits of different research strategies into account a survey strategy was found most suitable to carry out the research objects. A survey strategy is typically associated with a deductive research approach which also is the case with this study (Saunders et al. 2007). Such a strategy is suitable where the population or a representative sample of the population is available to be studied. If applicable, surveys allow the collection of a large amount of data from a sizeable population in a highly economical way (Saunders et al. 2007). This strategy also provided a larger control over the research process and made it possible to generate findings which are representative of the whole population of IT companies. The availability of a representative population size was also a reason behind the choice for a survey strategy.

The study is a cross-sectional study within the specific time frame of the research starting from March to September 2009. For answering the research question, a two stage research procedure was employed. The first stage of the research comprehended interviews with pivotal people involved or related with the business incubation system in Armenia and the second stage was a self-administered questionnaire survey. Such a two stage approach made it possible to use the qualitative data gathered from the in-depth interviews for improving the quantitative data gathering through the survey of the IT companies. The results of the interviews also helped develop expectations regarding the needs of IT companies for BIS. This research design also made it possible to reach a sufficient number of the target group economically and also allowed making better inferences on the collected data.

Surveying both incubated and non incubated companies would allow the study to evaluate how the incubation system covers the (perceived) needs of different companies for BIS and make comparison between these two groups. Such a comparison of incubated and non-incubated companies would provide valuable information on the differences between these two company groups. It would also make it possible to evaluate the perceived value of BIS for the future development of non-incubated companies and the match between the received BIS and the needs of incubated companies which can be seen as a sign of the quality and availability of BIS to incubated companies. Furthermore, surveying off-incubator companies would allow evaluations of the needs of incubated companies who did not reside in the BI premises. The existence of any gaps in demanded and offered BIS in the framework of “What”, “How” and “How Much” was set as a condition for negatively answering the research question.

## 3.2 Survey Design

The survey strategy had a tailored design with different features aimed to encourage high quantity and quality of the responses to the survey. The tailored design is a scientific approach to conducting sample surveys with a focus on reducing the four sources of survey error namely (Groves 1989):

- coverage
- sampling
- non-response
- measurement

Such errors can undermine the quality of the information collected trough a survey. Tailoring is also about developing suitable survey procedures that interact and work together to encourage all

people in the sample in this case the total IT population to respond. This was done by for example taking into account elements as the nature of the survey population. Choosing an e-mail questionnaire was for example also related to the new technology orientation of the IT companies. Reducing the survey error means selecting a survey mode which provides an adequate coverage of the entire population, encourages the targeted population to respond. It also means developing an approach which enable the respondents to provide the information needed (Dillman 2007).

Interviews were used in the initial more explanatory stages of the research which were aimed to help develop a better understanding of the major issues concerning Armenian IT firms (See APPENDIX C). These in-depth interviews were conducted with entrepreneurs, managers, consultants and other professionals operating within the IT industry. The acquired insight made it possible to develop expectations regarding the needs of IT companies for BIS and create a questionnaire that better addressed key issues of concern to these companies. The interviews also aimed to contribute to decreasing the measurement error of the study which occurs when a respondent's answer is inaccurate or imprecise.

During the second research stage, the questionnaires were administered to all reachable IT companies in Armenia. Targeting the whole population of IT companies made it possible to at least decrease the survey coverage error which occurs if not all different companies are included in the sample. The precision of the survey estimates was also increased by targeting the entire population rather than a sample. This contributed to decreasing the survey sampling error. Further, the assistance of EIF as an established and legitimate authority for the Armenian IT society was also aimed to increase the trust level of the respondents with regard to the survey and assist in addressing the non-response error.

## 3.3 Operationaliziation

According the literature, BIs offer various services to enable their tenants get through the initial and critical stages of business development. To evaluate the first important element for a match namely "What", various most common BIS were categorized under the three main business incubation dimensions; Infrastructure, Business Support services and Network Mediation. The two remaining dimensions of business incubation namely Selection and Graduation were less relevant to the Armenian context as very limited selection procedures existed for receiving BIS by companies.

Infrastructure was operationalized through three lines of support services as office Space, R&D facilities and clerical services. The choice for including these specific lines of services was based on the most emphasized BIS in the literature. Inclusion of Infrastructural services such as office space which is not offered by all BI archetypes would also allow evaluation of the match between the scope and focus of currently operating BIs with the needs of the IT industry. Furthermore, Business Support was operationalized through nine different lines of BIS namely; training and coaching regarding leadership, business plan development, innovative problem solving techniques, legal issues, project management, financial management, marketing management, HR management and strategic management. However, before inclusion, the chosen BIS were also presented to the expert panel. The panel evaluated the presented lines of BIS and provided their expert opinion on the relevancy of these lines of support and also made suggestion for inclusion or exclusion of different BIS. The same was done with regard to Mediation, here BI's Mediation regarding seven different important external parties namely partners, customers, suppliers, employees, university researchers and financiers was measured. Following the advice of the expert panel, venture capital was added to the list of Mediation

services as this type of investment is believed to have specific importance for IT companies in general and more particularly for nascent companies.

To evaluate the second element of match namely "How", the preferred BI approach to support provision was operationalized through the two divergent approaches BIs can have to services provision. These two approaches consisted of a BI initiated (proactive) service provision approach and an incubatee initiated (reactive) approach. The preferences of the companies regarding "How" were evaluated for the general preferred service provision approach and the preferred BI support provision approach regarding different lines of Mediation services.

In order to evaluate the third element of match namely "How Much", the study mainly used "Man Hours per Month" (M.h.p.m) as a unit of measurement. M.h.p.m stands for the total hours that all employees together are using or incase of non-incubated companies expect to use any BIS if offered. Further, square meters were used as a unit of measurement for operationalizing the need for office space.

However, before turning to the need for BIS, different company characteristics of the responding population of companies were studied. All companies with IT as priority were incorporated in the study regardless their specific company characteristics. In addition to company characteristics, formal education and working experience of managers were studied as indicators of the entrepreneurial and managerial education level in the industry. The entrepreneurial and managerial education level was used a control variable for evaluating the possible need for Business Support services. Furthermore, since poor quality of the available infrastructure could logically lead to a higher need for BIS regarding infrastructure, the quality of the currently available infrastructure was used as a control variable for evaluating the need for Infrastructural BIS. The attribute variables on company and entrepreneurial characteristics and also the variables concerned with need for BIS are provided in Table 2.

**Table 1 Indicators Used to Measure the Target Variables**

| Key Measured Variables | Measurement Indicators |
|---|---|
| **Enterprise Characteristics** | ❖Years of existence<br>❖(Foreign)Subsidiary/Individual Company |
| **Entrepreneurs Characteristics** | ❖Individual or a team of entrepreneurs<br>❖Level of and IT relatedness of education<br>❖Business Management education and experience |
| **"What" (services are needed)** | |
| Infrastructure | ❖Office Space<br>❖R&D facilities<br>❖Accounting and Secretarial Services<br>❖Quality of currently available infrastructure |
| Business Support | ❖Consulting regarding Leadership<br>❖Business plan support<br>❖Innovative Problem Solving techniques<br>❖Project management training and coaching<br>❖Financial management training and coaching<br>❖Marketing management training and coaching<br>❖HR management training and coaching<br>❖Strategic Management training and coaching |

| | |
|---|---|
| | ❖Operations Management training and coaching |
| Mediation and Venture Capital | ❖Mediation with regard to Partners<br>❖Mediation with regard to Customers<br>❖Mediation with regard to Suppliers<br>❖Mediation with regard to Employees<br>❖Mediation with regard to University Researchers<br>❖Mediation with regard to Financiers<br>❖Mediation with regard to Venture Capital |
| **"How'' (services are provided)** | |
| Preferred Incubator Approach | ❖Pro-active (incubator initiated)<br>❖Re-active (incubatee Initiated) |
| **"How Much" (services are provided)** | |
| Volume/Quantity of Services | ❖Man Hours per Month (M.h.p.m)<br>❖Square meters (for office space) |

The Mann-Whitney U test was used for analyzing the statistical differences between manager's educational attainments and the needs of incubated and non-incubated companies for BIS. The choice for this particular test was based on the fact that the computation concerned two independent groups and the collected data were ordinal. The Spearman's correlation coefficient was used for analyzing the interrelation between the need and perceived value of these services. The Spearman's correlation coefficient was chosen as it is based on ranking of two variables and the collected data were ordinal. Moreover, this test does not make any assumptions about the distribution of the values in the collected data. Furthermore, the chi-square test was chosen for analyzing the interrelation between managerial education level and receiving BIS from the BI.

Two different questionnaires were developed for incubated and non-incubated groups of companies (see APPENDIX D). The major difference among the two questionnaires was the evaluation approach to BIS. As non-incubated companies did not receive BIS before, next to their perceived need for such services, these companies were asked to indicate the perceived value of different BIS if offered. The incubated companies on the other hand, were asked to indicate their level of satisfaction regarding the BIS they received. The need of both incubated and non-incubated companies regarding different lines of BIS was evaluated on a five point Likert scale. The match between the offered BIS and the needs of the incubated companies was evaluated through a three point scale ranging from Does not Match, Matches and Surpasses. The gathered data was recoded for evaluating the interrelation between the five and three point scales used during data collection.

## 3.4 Reliability and Validity

Reliability and validity need to be taken into account as two important aspects of research design. To enhance the quality of the study it is essential to reduce the possibility of obtaining incorrect findings and consequent erroneous inferences. A valid questionnaire helps to collect accurate data and one that is reliable will mean that these data are collected consistently (Saunders et al. 2007).

### 3.4.1 Validity

In order to develop a questionnaire able to measure what was intended to be measured, several preoperational steps where undertaken. The content validity referring to the adequate coverage of the investigative questions, is in addition to the thorough literature review also addressed though the expert interviews. The panel of experts was asked to assess whether each measurement question in the questionnaire was relevant and clear. They were also asked to rank the needs of the IT industry

operationalized in the questionnaire from their own perspective. Concerning external validity, this study is believed to cover the total IT industry in Armenia.

### 3.4.2 Reliability

One of the first questions with regard to research reliability that needs to be addressed is whether the measures will yield the same results in other occasions. Having this in mind, a pilot survey was carried out that among a number of IT companies which together with the expert interviews helped filtering any ambiguities in the questionnaire. This enhanced the reliability of the research by increasing the consistency of the survey results which on its own contributed to the research validity discussed above.

# Chapter 4 Findings and Empirical Analysis

## 4.1 Enterprise Incubator Foundation (EIF)

The Enterprise Incubator Foundation (EIF) is the single main BI in Armenia. The study therefore involved those companies who did or did not have received any services of EIF. EIF is a non-profit publically sponsored BI. The main goal of EIF is to foster economic growth in Armenia via business assistance to IT companies, alleviation of skills constraints and stimulation of entrepreneurial activity with an industry focus on the IT sector. EIF provides a comprehensive package of BIS via its two major components: the Business Service component and the Facility services. The Business Services component focuses on assisting Armenian technology firms on a variety of areas including business development, marketing and promotion, management, accounting and finance, legal, and other areas. Business Services unit helps companies in growing their businesses within Armenia and internationally, facilitates the development of start ups, and assists local entrepreneurs in building their ideas into successful businesses. EIF tries to help companies to improve professional and business skills of the employees and managers via provision of a tailor made support through short term advanced trainings and seminars and creation of learning partnerships within the industry and universities. EIF does not have a specific geographical scope or a focus on a certain region and currently it tailors its services to the needs of the recipients. Facility Services, this component provides high end infrastructural facilities to existing technology companies and newly created startups. Options included in the base package are high quality office space, shared meeting and conference rooms, shared resource center with access to literature and other information resources, high speed internet connection, receptionist and security, cleaning and utilities, parking, and 24/7 access to the building. EIF facilities are located at the premises of the Russian Armenian (Slavonic) University, one of the major educational institutions in Armenia.

According to the beneficial survey included in the 'Implementation Completion and Results Report' of the World Bank, in terms of the number of companies assisted, EIF's main role seems to be one of a "Virtual Incubator" (see APPENDIX E). This is given to the relative small number of the companies that are residents of the managed workspace of EIF compared to the total number of companies that benefit from EIF's services. EIF on average has 6 tenant companies that employ an approximate of 150 workers in its work space. For the purpose of this study, five of the six tenants were questioned. Only 5 of the six tenants of the BI were included in the study as the remaining one was not occupied with IT practices. One of the five tenants was a branch of a foreign company. The tenant companies of EIF proved to be very diverse as both foreign branches and local initiated companies existed with different fields of activity within the IT segment. EIF supports start-ups but the companies that had used the services of the EIF were both nascent companies and companies that existed for a longer time, requiring an upgrading of skills and business development.

## 4.2 Summary of Data Collection Experience

Of the approximate 175 IT companies in Armenia, approximately 120 companies that were reachable were asked to their needs regarding BIS. The remaining 55 companies proved to be unreachable as it was not possible to obtain any contact details on these companies. Of the total 120 enterprises questioned, 55 enterprises responded and returned the questionnaire resulting in an active response rate of 46 percent.

The system of standardized industry codes is not adopted by the Armenian authorities concerned with the registration of companies as legal entities; this made distinguishing IT companies more difficult. A second issue with regard to indentifying and reaching the entire IT population was the extreme difficulty of obtaining a complete list of the IT company population from the responsible authorities. In order to get around these problems the EIF was approached for their support. EIF generously assisted in reaching a significant portion of the population through their mailing list containing more than 250 companies from which not all are active in the IT industry. As it was simply not possible to obtain the post addresses of all companies, the mailing list of EIF allowed reaching more companies than initially possible.

An e-mail was prepared carrying the questionnaires as a digital template that the respondents could complete and return automatically by just clicking on the designated button placed on the template for that specific function (see APPENDIX F). After completion, a small XML file was automatically returned, carrying the information provided by the respondents. In addition, as the questionnaire could be returned automatically without requiring the respondents to physically visit the post office (mail boxes do not exist in Armenia) the e-mail survey made it more convenient and less expensive for the respondents to comply. It also made the questionnaire more interesting to the respondents as a digital questionnaire is less conventional than the more standard paper based questionnaire.

In order to further enhance the coverage of the survey beyond the mailing list of EIF and increase the survey response rate the annual Digitech Business Forum which was visited by a significant number of managers of the Armenian IT industry was attended. During this two day event managers of IT companies were invited to participate in the survey and complete the questionnaire. In addition some of the companies were also visited and personally requested to complete the questionnaire.

## 4.3 Findings

### 4.3.1 First Research Stage

The first research stage comprehended interviews with pivotal people involved or related with the business incubation system in Armenia. In addition to commenting on the validity and relevance of the questions included in the questionnaire, the panel was asked to evaluate the "What" element or in other words the needs of the IT industry for the measured BIS. The panel was requested to rank the needs of the industry through the same scaling used in the main questionnaire. The evaluation of the needs regarding different BIS by the panel is illustrated in Table 2.

**Table 2 Evaluation of the Industry Needs by the Expert Panel**

| Business Incubator Services | Mr. Kirakosyan | Mr. Vardanyan | Mr. Yengibaryan | Average Ranks |
|---|---|---|---|---|
| **INFRASTRUCTURE** | | | | |
| Office space | 3 | 4 | 3 | 3.3 |
| R&D Facilities | 4 | 5 | 3 | 4.0 |
| Secretarial Services | 4 | 5 | 2 | 3.7 |
| Bookkeeping Services | 4 | 3 | 2 | 3.0 |
| **BUSINESS SUPPORT SERVICES** | | | | |
| Consulting Services | 5 | 4 | 4 | 4.3 |
| Business Plan Development | 2 | 4 | 5 | 3.7 |
| Project Management | 5 | 4 | 5 | 4.7 |
| Financial Management | 4 | 4 | 4 | 4.0 |

**Table 2 Evaluation of the Industry Needs by the Expert Panel (continued)**

| Business Incubator Services | Mr. Kirakosyan | Mr. Vardanyan | Mr. Yengibaryan | Average Ranks |
|---|---|---|---|---|
| **BUSINESS SUPPORT SERVICES** | | | | |
| Marketing Management | 5 | 4 | 5 | 4.7 |
| HR Management | 4 | 4 | 3 | 3.7 |
| Strategic Management | 5 | 4 | 4 | 4.3 |
| Operations Management | 2 | 4 | 4 | 3.3 |
| **MEDIATION SERVICES** | | | | |
| Partners | 5 | 4 | 4 | 4.3 |
| Customers | 2 | 4 | 5 | 3.7 |
| Suppliers | 5 | 4 | 5 | 4.7 |
| Employees | 4 | 4 | 4 | 4.0 |
| University Researchers | 5 | 4 | 5 | 4.7 |
| Financiers | 4 | 4 | 3 | 3.7 |
| Direct supply of financing by incubator | 5 | 4 | 4 | 4.3 |

*Notes: 1 = no need at all, 2 = little need, 3 average need, 4 = Large need, 5 = Very large need*

Generally, the results of first research stage developed expectation for a large need for BIS by IT companies. Regarding Infrastructure, the results pointed towards a high need for BIS regarding R&D facilities and secretarial services as these were found to be the most needed lines of BIS by the expert panel. The expert panel evaluated office space and book-keeping services to be the de least needed BIS in this regard. Based on the comments of the panel, the initial measurement approach regarding book-keeping and secretarial services was revised and these two lines of BIS were combined into clerical services as one variable. This change was also in line with the literature on BIS since the literature considers these services as parts of clerical services. With regard to Business Support services, the panel found marketing management and project management the most needed lines of Business Support services followed by strategic management and consulting services. The panel also pointed towards certain lines of services relevant to IT companies which initially were not operationalized. These were training and coaching regarding leadership, innovative problem solving techniques and legal matters. Consulting services and operational management were excluded as they to some degree already were covered by the other lines of BIS operationalized. Furthermore, the panel found mediation regarding suppliers and university researchers to be the highest needed line of Mediation by IT companies. Mediation regarding partners was the second most needed line of Mediation. In the questionnaire, direct supply of financing was replaced by mediation regarding venture capital which was considered to be vital and very relevant to IT companies.

## 4.3.2 Second Research Stage

### 4.3.2.1 Enterprise Characteristics

11 respondents or 20 percent of all respondents had received BIS from EIF. The remaining 44 respondents making up to 80 percent of all respondents, indicated not to have received any such services before. The majority of the responding companies proved to be nascent companies established after 2005. More detailed image of the respondent's distribution regarding the year of their establishment is provided in Table 3.

**Table 3 Year of Company Establishment**

| | 1990-1995 | 1996-2000 | 2001-2005 | 2005-2009 |
|---|---|---|---|---|
| Percentage of all Companies | 9.0% | 16.0% | 22.0% | 53.0% |

Regarding company origin, the share of foreign subsidiaries and local companies was not equal for incubated and the non-incubated companies. Of incubated companies 45.5 percent were subsidiaries of foreign companies when this was only 20.9 present for non-incubated companies.

**Table 4 Company Origin of Responding Companies**

| Company Groups | Foreign Branch | Local Company |
|---|---|---|
| Percentage of Incubated | 45.5% | 54.5% |
| Percentage of Non-incubated | 20.9% | 79.1% |

### 4.3.2.2 Managers Characteristics

A chi-square test was performed to examine the relation between manager's educational attainments and receiving BIS. The following Table illustrates the educational attainments of the managers of the industry including the chi-square values, degrees of freedom and probability values of statistically significant relations.

**Table 5 Percentage of Companies Categorized by Manager's Educational Attainments**

| Lines of education | Non-of the managers (1) | At least one of the managers (2) | All of the managers (3) | $X^2$ | df | P-value |
|---|---|---|---|---|---|---|
| **IT related Education** | | | | 7.000 | 2 | .030 |
| % of incubated companies | 10.0% | 20.0% | 70.0% | | | |
| % of non-incubated companies | 18.2% | 50.0% | 31.8% | | | |
| **Business Management Education** | | | | 34.778 | 2 | .000 |
| % of incubated companies | 40.0% | 60.0% | .0% | | | |
| % of non-incubated companies | 25.0% | 70.5% | 4.5% | | | |

*Notes: $X^2$ = chi-square statistic, df =degrees of freedom*

The chi-square test confirmed that there was clear evidence for an interrelation between manager's educational attainments and receiving BIS. The results pointed towards higher levels of technical IT related education of managers of incubated companies. In contrary to IT related education, managers of non-incubated companies had slightly higher educational attainments regarding business management education.

**Table 6 Prior Work Experience of Managers**

| Field of Experience | | | | Yes | No |
|---|---|---|---|---|---|
| % of companies had managers with prior IT related work experience | | | | 96.0% | 4.0% |
| % of companies had managers with prior Business Management experience | | | | 70.0 % | 30.0% |
| **Years of working experience** (average 13 years) | **0-5** | **6-10** | **11-20** | **21-30** | **31+** |
| Years of IT related experience | 34.8% | 21.7% | 21.7% | 13.0% | 8.7% |

With regard to working experience, 96 percent of all companies had managers with prior IT related work experience who on average also had 13 years of experience in this field. At the same time, 70 percent of companies had manager(s) with prior business management experience.

### 4.3.2.3 Need for Business Incubator Services

The Mann-Whitney U test was used for analyzing statistical differences between the needs of incubated and non-incubated companies. The needs for BIS, the probability values of a significant change, the average ranks and the average expected use of the different lines of support services by incubated and non-incubated companies are illustrated in Table 7.

**Table 7 Percentage of Companies Categorized by their Need for BIS**

| Lines of support services | No need at all | little need | Average need | Large need | Very large need | M.h.p.m | Average Ranks | P-value |
|---|---|---|---|---|---|---|---|---|
| **INFRASTRUCTURE** | | | | | | | | |
| **Office space** | | | | | | | | 0.148 |
| Incubated | 63.6% | 9.1% | 18.2% | 9.1% | .0% | N.A | 1.73 | |
| Non-incubated | 36.4% | 22.7% | 22.7% | 6.8% | 11.4% | N.A | 2.34 | |
| **R&D Facilities** | | | | | | | | 0.365 |
| Incubated | 72.7% | 9.1% | 9.1% | 9.1% | .0% | N.A | 1.55 | |
| Non-incubated | 61.4% | 6.8% | 9.1% | 11.4% | 11.4% | 131 | 2.05 | |
| **Clerical Services** | | | | | | | | 0.631 |
| Incubated | 63.6% | .0% | 18.2% | .0% | 18.2% | N.A | 2.09 | |
| Non-incubated | 68.2% | 11.4% | 2.3% | 11.4% | 6.8% | 40 | 1.77 | |
| **BUSINESS SUPPORT SERVICES** | | | | | | | | |
| **Leadership Training and Coaching** | | | | | | | | 0.244 |
| Incubated | 54.5% | 27.3% | 9.1% | 9.1% | .0% | 2.3 | 1.73 | |
| Non-incubated | 39.5% | 25.6% | 11.6% | 14.0% | 9.3% | 16.5 | 2.28 | |
| **Business-plan development** | | | | | | | | 0.035 |
| Incubated | 81.8% | 9.1% | 9.1% | .0% | .0% | 1 | 1.27 | |
| Non-incubated | 48.8% | 14.0% | 9.3% | 20.9% | 7.0% | 17 | 2.23 | |
| **Innovative problem solving techniques** | | | | | | | | 0.457 |
| Incubated | 48.8% | 14.0% | 9.3% | 14.0% | 14.0% | 1 | 2.00 | |
| Non-incubated | 63.6% | .0% | 9.1% | 27.3% | .0% | 22.5 | 2.30 | |
| **Project Management** | | | | | | | | 0.185 |
| Incubated | 63.6% | 9.1% | 27.3% | .0% | .0% | 1.5 | 1.64 | |
| Non-incubated | 46.5% | 16.3% | 7.0% | 16.3% | 14.0% | 15 | 2.35 | |
| **Financial Management** | | | | | | | | 0.593 |
| Incubated | 72.7% | .0% | .0% | 27.3% | .0% | 0 | 1.82 | |
| Non-incubated | 60.5% | 9.3% | 9.3% | 14.0% | 7.0% | 20 | 1.98 | |
| **Legal Issues** | | | | | | | | 0.159 |
| Incubated | 72.7% | .0% | 18.2% | 9.1% | .0% | 0.5 | 1.64 | |
| Non-incubated | 47.7% | 11.4% | 18.2% | 11.4% | 11.4% | 15 | 2.27 | |
| **Marketing Management** | | | | | | | | 0.043 |
| Incubated | 72.7% | 9.1% | .0% | 9.1% | 9.1% | 0 | 1.73 | |
| Non-incubated | 36.4% | 6.8% | 9.1% | 29.5% | 18.2% | 20 | 2.86 | |
| **HR Management** | | | | | | | | 0.352 |
| Incubated | 63.6% | 9.1% | 18.2% | 9.1% | .0% | 1 | 1.73 | |
| Non-incubated | 48.8% | 14.0% | 18.6% | 9.3% | 9.3% | 17 | 2.16 | |
| **Strategic Management** | | | | | | | | 0.070 |
| Incubated | 72.7% | .0% | 18.2% | 9.1% | .0% | 0 | 1.64 | |
| Non-incubated | 43.2% | 13.6% | 6.8% | 20.5% | 15.9% | 15 | 2.52 | |
| **MEDIATION SERVICES** | | | | | | | | |
| **Mediation regarding Partners** | | | | | | | | 0.040 |
| Incubated | 63.6% | 9.1% | 18.2% | 9.1% | .0% | N.A | 1.73 | |
| Non-incubated | 34.9% | 7.0% | 20.9% | 18.6% | 18.6% | N.A | 2.79 | |
| **Mediation regarding Costumers** | | | | | | | | 0.030 |
| Incubated | 54.5% | 9.1% | 27.3% | 9.1% | .0% | N.A | 1.91 | |
| Non-incubated | 23.8% | 14.3% | 21.4% | 23.8% | 16.7% | N.A | 2.95 | |
| **Mediation regarding Suppliers** | | | | | | | | 0.142 |
| Incubated | 90.9% | .0% | .0% | .0% | 9.1% | N.A | 1.36 | |
| Non-incubated | 64.3% | 26.2% | 4.8% | 4.8% | .0% | N.A | 1.50 | |
| **Mediation regarding Employees** | | | | | | | | 0.795 |
| Incubated | 45.5% | 18.2% | 18.2% | .0% | 18.2% | N.A | 2.27 | |
| Non-incubated | 52.4% | 11.9% | 9.5% | 16.7% | 9.5% | N.A | 2.19 | |
| **Mediation University Researchers** | | | | | | | | 0.340 |
| Incubated | 81.8% | .0% | 18.2% | .0% | .0% | N.A | 1.79 | |
| Non-incubated | 69.0% | 2.4% | 14.3% | 9.5% | 4.8% | N.A | 1.36 | |

**Table 7 Percentage of Companies Categorized by their Need for BIS (continued)**

| Lines of support services | No need at all | little need | Average need | Large need | Very large need | M.h.p.m | Average Ranks | P-value |
|---|---|---|---|---|---|---|---|---|
| **Mediation regarding Financiers** | | | | | | | | 0.011 |
| Incubated | 72.7% | 9.1% | 18.2% | .0% | .0% | N.A | 1.45 | |
| Non-incubated | 37.2% | 7.0% | 11.6% | 23.3% | 20.9% | N.A | 2.84 | |
| **Mediation Equity investments** | | | | | | | | 0.161 |
| Incubated | 90.9% | .0% | 9.1% | .0% | .0% | N.A | 1.18 | |
| Non-incubated | 69.0% | 11.9% | 11.9% | 4.8% | 2.4% | N.A | 1.60 | |

*Notes: the average need is based on the following ranks, no need at all =1, little need=2, average need =3, Large need= 4, Very large need =5. M.h.p.m stands for the total hours that all employees together are using or incase of non-incubated companies expect to use such services if offered. The correlation coefficient is illustrated as the ($r_s$).*

Regarding "What" the first element of match, the need of IT companies for BIS was smaller than expected, particularly when considering the results of the first research stage which pointed towards a large need for BIS. Nevertheless, a considerable group of the non-incubated companies needed BIS. Statistically significant differences in the needs of incubated and non-incubated companies were only found regarding business plan development, marketing management support services and mediation services regarding partners, costumers and financiers. These differences illustrated an interesting pattern of systematically smaller needs by incubated companies. Furthermore, incubated companies found mediation regarding employees, clerical services and services regarding innovative problem solving techniques to be the largest needed BIS. Non-incubated companies on the other hand found mediation regarding costumers to be the largest needed BIS followed by marketing management and mediation regarding financiers.

The need for Infrastructural services was moderate; nevertheless, 63.6 percent of the non-incubated companies had a need for BIS regarding office space. Office space was the highest needed Infrastructural BIS by non incubated companies followed by clerical services and R&D facilities. These needs were however slightly different for incubated companies as these companies had a larger need for clerical services than for offices space. The need for R&D facilities was considerably low for both incubated and non incubated companies as 61.4 percent of non-incubated and 72 percent of incubated companies indicated not to need such services at all. Such a low need contrasted the need evaluations of the expert panel. Regarding Business support services marketing management, innovative problem solving techniques and strategic management were on average the highest needed Business Support services. Except for project management, the identified need was quite in line with the expert panel expectations. The most obvious difference in the needs of incubated and non-incubated companies for Business Support services was regarding the need for strategic management trainings which was considerably lower for incubated companies. Mediation regarding customers, partners and employees were on average the highest needed Mediation services, followed by mediation regarding financiers, university researchers, suppliers and finally equity investors as the lowest needed line of mediation. Non-incubated companies however had a larger need for mediation regarding financiers. Mediation regarding financiers was namely the second highest needed line of mediation for non-incubated companies and the fourth for incubated companies.

Concerning the third element of match namely "How Much", non-incubated companies clearly perceived a larger usage of Business Support services than incubated companies were receiving. With an average expected use of 22.5 M.h.p.m, non-incubated companies found innovative problem solving techniques to require the highest volume of assistance. Innovative problem solving techniques were followed by marketing management and financial management which on average were expected to require 20 M.h.p.m of support services. The lowest support volumes of Business Support services

were needed for project management training and coaching regarding legal issues and strategic management.

## Value of Business Incubator Services

The Spearman's correlation coefficient was used for determining the interrelation between the need for BIS and the perceived value of these services for the future development of non-incubated companies. During data analysis it was apparent that in some cases when there was no need for a line of service, respondents omitted to indicate the value of such a service if provided. These (missing) responses were corrected with (no value at all) answers. The following Table illustrates this interrelation by the correlation coefficient ($r_s$) and the probability of an interrelation through the significance value. The table also includes the average ranks of different BIS.

**Table 8 Percentage of Companies Categorized by the Value Perceived of BIS and the Interrelation between the Need for and the Expected Value of BIS.**

| Lines of support services | No value at all | little value | Average value | Large value | Very large value | Average ranks | ($r_s$) | Sig (2-tailed) |
|---|---|---|---|---|---|---|---|---|
| **INFRASTRUCTURE** | | | | | | **2.22** | | |
| Office space | 31.8% | 20.5% | 2.3% | .0% | 9.1% | 2.43 | 0.806 | .000 |
| R&D Facilities | 59.5% | 2.4% | 9.5% | 14.3% | 14.3% | 2.21 | 0.743 | .000 |
| Clerical Services | 60.5% | 4.7% | 18.6% | 7.0% | 9.3% | 2.00 | 0.708 | .000 |
| **BUSINESS SUPPORT SERVICES** | | | | | | **2.48** | | |
| Leadership Training and Coaching | 37.2 | 20.9% | 9.3% | 18.6% | 14.0% | 2.51 | 0.884 | .000 |
| Business-plan development | 51.2% | 11.6% | 9.3% | 16.3% | 11.6% | 2.26 | 0.979 | .000 |
| Innovative problem solving techniques | 48.% | 14.0% | 4.7% | 16.3% | 16.3% | 2.37 | 0.994 | .000 |
| Project Management | 46.5% | 9.3% | 11.6% | 11.6% | 20.9% | 2.51 | 0.897 | .000 |
| Financial Management | 55.8% | 7.0% | 9.3% | 11.6% | 16.3% | 2.26 | 0.857 | .000 |
| Legal Issues | 46.5% | 11.6% | 11.6% | 11.6% | 18.6% | 2.44 | 0.974 | .000 |
| Marketing Management | 31.8% | 6.8% | 9.1% | 20.5% | 29.5% | 3.02 | 0.823 | .000 |
| HR Management | 46.5% | 4.7% | 23.3% | 11.6% | 14.0% | 2.42 | 0.947 | .000 |
| Strategic Management | 48.9% | 8.9% | 8.9% | 13.3% | 20.0% | 2.50 | 0.870 | .000 |
| **MEDIATION SERVICES** | | | | | | **2.32** | | |
| Partners | 30.2% | 9.3% | 18.6% | 23.3% | 18.6% | 2.91 | 0.945 | .000 |
| Costumers | 21.4% | 14.3% | 19.0% | 21.4% | 23.8% | 3.12 | 0.860 | .000 |
| Suppliers | 63.6% | 27.3% | 4.5% | 4.5% | .0% | 1.50 | 0.947 | .000 |
| Employees | 52.4% | 9.5% | 4.8% | 19.0% | 14.3% | 2.33 | 0.982 | .000 |
| University Researchers | 66.7% | 2.4% | 11.9% | 14.3% | 4.8% | 1.88 | 0.953 | .000 |
| Financiers | 37.2% | 9.3% | 11.6% | 14.0% | 27.9% | 2.80 | 0.965 | .000 |
| Equity investors | 66.7% | 11.9% | 9.5% | 4.8% | 7.1% | 1.74 | 0.917 | .000 |

*Notes: the average value is based on the following ranks, no value at all =1, little value=2, average value =3, Large value= 4 and Very large value =5. The correlation coefficient is illustrated as the ($r_s$)*

In general, non-incubated companies perceived BIS to have a moderate value for business development. The correlation analysis however showed a significant interrelation between respondents need for BIS and the expected value of these services for the future development of companies. The positive interrelationship pointed towards a higher value perception for these BIS in case the need for such services increased. In other words, the larger the need for Business Support services became the perceived value of these services for businesses also increased. Regarding Infrastructural services

office space was the highest valued BIS followed by R&D facilities and clerical services. Business support was on average the highest valued business incubation dimension. The highest valued BIS in this regard were marketing management which had a large perceived value followed by project management and leadership training and coaching. The lowest valued lines of Business Support services were financial management followed by business plan development and trainings of innovative problem solving techniques. Regarding Mediation, the highest valued BIS were mediation regarding customers and partners followed by mediation regarding financiers. Mediation regarding costumers was also the highest valued BIS compared to all other BIS. The lowest valued lines of mediation were mediation regarding suppliers, equity investors followed by mediation regarding university researchers.

## Match of the Needs and Received Services

The Spearman's correlation coefficient was used to compute the interrelation between the need for BIS and the satisfaction level of incubated companies. For using this test an equal number of ranks are required for both tested variables, therefore the ranking of the needs of incubated companies was changed form a five point scale to a three point scale. This was done by recoding the ranks 2 and 3 into 1, rank 4 into 2 and the rank 5 into 3. The responses indicating no need for BIS were disregarded as dissatisfaction in such cases would be of no avail. As companies with no need for BIS were disregarded from the correlation analysis the result of the test were quite limited. The test however still made it possible to evaluate whether the high satisfaction level of incubated companies regarding the BIS received was only based on a low need for such services or on the actual match between their needs and the offer. The following Table illustrates the satisfaction level of incubated companies regarding the BIS received, the correlation coefficient and the probability of an interrelation by the significance value.

**Table 9 Match of the offered BIS with the Needs of Incubated Companies and the Interrelation between the Needs and the Match of the Received BIS**

| Matching the needs | Is less | Matches | Surpasses | ($r_s$) | Sig (2-tailed) |
|---|---|---|---|---|---|
| **INFRASTRUCTURE** | | | | | |
| Office space | .0% | 100% | .0% | . | . |
| R&D Facilities | .0% | 100% | .0% | . | . |
| Clerical Services | .0% | 81.8% | 9.1% | . | . |
| **BUSINESS SUPPORT SERVICES** | | | | | |
| Leadership Training and Coaching | 27.3% | 72.7% | .0% | . | . |
| Business-plan development | 9.1% | 90.9% | .0% | . | . |
| Innovative Problem Solving Techniques | 27.3% | 72.7% | .0% | -1 | . |
| Project Management | 18.2% | 81.8% | .0% | . | . |
| Financial Management | 20.0% | 80.0% | .0% | . | . |
| Legal Issues | 18.2% | 81.8% | .0% | -.500 | .667 |
| Marketing Management | 18.2% | 81.8% | .0% | -866 | .333 |
| HR Management | 18.2% | 81.8% | .0% | -.557 | .432 |
| Strategic Management | 27.3% | 72.7% | .0% | . | . |
| **MEDIATION SERVICES** | | | | | |
| Mediation regarding Partners | 10.0% | 90.0% | .0% | .333 | .667 |
| Mediation regarding Costumers | 11.1% | 88.9% | .0% | -1 | . |
| Mediation regarding Suppliers | 20.0% | 80.0% | .0% | . | . |
| Mediation regarding Employees | 36.4% | 63.6% | .0% | -.500 | .312 |
| Mediation regarding University Researchers | 10.0% | 90.0% | .0% | . | . |
| Mediation regarding Financiers | 11.1% | 88.9% | .0% | . | . |
| Mediation regarding Equity investments | 10.0% | 90.0% | .0% | . | . |

The percentages of companies satisfied with the BIS offered initially gave an impression that the offered BIS were highly matching the needs of incubated companies. In case of office space and R&D facilities, even all incubated companies found the offered services to be matching their needs. Regarding Business support the highest matching services were business plan development followed by project management, training regarding legal issues, marketing management and HR management. Services regarding leadership training and coaching, innovative problem solving techniques were the Business Support services which were matching the needs of incubatees. Regarding mediation, the highest matching services were mediation regarding partners, university researchers and equity investors. The lowest match between the offer and needed mediation services was for mediation regarding employees followed by mediation regarding suppliers and customers. However, the results of the correlation analysis suggested that despite the generally high satisfaction level, a negative correlation existed between the need for services and the match of the offered services. Significant negative interrelation was found between the need and satisfaction level of BIS concerning innovative problem solving techniques and mediation regarding costumers. The negative interrelation pointed towards a decrease in the satisfaction level regarding the received services as the need for these services increased.

## Quality of the Available the Infrastructure

The results of the Mann-Whitney U test demonstrated no statistically significant differences between the quality of the infrastructure available to incubated and non-incubated companies. The following table illustrates the quality of the available infrastructure, the average group ranks and the probability values of significant differences between incubated and non-incubated companies.

**Table 10 Percentage of Companies Categorized by the Quality of the Available Infrastructure and the Statistical Differences between the Incubated and Non-Incubated Companies**

| P-value = 0.094 | Excellent (1) | Good (2) | Moderate (3) | Poor (4) | Not-useful (5) | Average Ranks |
|---|---|---|---|---|---|---|
| **Incubated** | 36.4% | 36.4% | 27.3% | .0% | .0% | **1.91** |
| tenant companies | 60.0% | 20.0% | 20.0% | .0% | .0% | 3.60 |
| non-tenant companies | 16.7% | 50.0% | 33.3% | .0% | .0% | 2.17 |
| **Non-incubated** | 11.4% | 45.5% | 34.1% | 9.1% | .0% | **2.05** |

The over majority of companies evaluated the quality of the currently available infrastructure as good and even excellent. The relative high quality of the currently available infrastructure was therefore in line with the moderate need for Infrastructural BIS. Incubated companies found the quality of the available infrastructure to be higher that than the non-incubated companies. However, no statistical significant differences were found. Regarding incubated companies 60 percent of the BI tenant companies evaluated the overall quality of the infrastructure available to them as excellent. This percentage was only 16 percent for companies residing outside the BI premises, indicating a higher satisfaction of tenant companies on the quality of the available infrastructure compared to non-tenant companies.

## Service Provision Approach

Regarding *"How"*, the third element of match; the preferences of companies were quite diverse regardless whether they were incubated or non-incubated. The preferred BI approach towards service provision by incubated and non-incubated companies and the probability value of a significant difference between the preferences of these two groups is illustrated in the Tables 11 and 12.

**Table 11 Companies Categorized by the Preferred Service Provision Approach in General and the Statistical Differences between the Preferences of Incubated and Non-Incubated Companies.**

| P-value = 0.871 | Very Much Reactive | Somewhat reactive | Neither | Somewhat proactive | Very much proactive | Average Ranks |
|---|---|---|---|---|---|---|
| Incubated | 36.4% | 9.0% | .0% | 27.3% | 27.3% | 3.00 |
| Non-incubated | 25% | 16% | 14% | 18% | 27% | 3.07 |

Both reactive and proactive service provision approaches were favored regarding services provision in general. The differences between the preferences of incubated and non-incubated companies were very small no statistical significant difference was found between the preferences of these two groups.

**Table 12 Percentage of Companies Categorized by the Preferred Services Provision Approach for Mediation Services**

| | Partners | Costumers | Suppliers | Employees | University Researchers | Financiers | Equity Investments |
|---|---|---|---|---|---|---|---|
| **On-demand** | 48.1% | 43.8% | 84.6% | 56.0% | 57.1% | 34.6% | 58.3% |
| **Pro-active** | 51.9% | 56.2% | 15.4% | 44.0% | 42.9% | 65.4% | 41.7% |

Concerning the preferred incubator support provision for different lines of mediation services, again the preferences varied very much among different companies. For mediation with regard to partners, costumers and financiers a proactive or incubator initiated service provision approach was more often favored. A reactive service provision approach was more often favored for mediation regarding suppliers, employees, university researchers and equity investors. The preferences of companies who indicated to have a need for mediation support services are illustrated in the table above.

# Chapter 5 Discussion and Limitations

## 5.1 Discussion

The needs of IT companies for BIS were weaker than initially thought, especially when considering different internal and external factors which might have had an influence on need of companies for BIS. Human Capital (manager's educational attainments and experience) is an important factor influencing company performance and managers with advance education and business management experience are expected to perform better than entrepreneurs without such skills (Cooper et al. 1989; Honig 2001; Peña 2004; Stuart and Abetti 1990). Furthermore, suggestions are made in the literature regarding high-technology laggard countries where the presence of bridging institutions such as BIs may relatively be more beneficial than in countries where the national innovation system is more advanced (Colombo and Delmastro 2002). Drawing on the above mentioned, The moderate level of business management education of managers and the moderate developed national innovation system in Armenia were expected to results in higher need for BIS that actually seen. The results of the first research stage (expert panel evaluations) also pointed towards a much higher need for BIS than actually found in the second research stage. The high expected needs and the actual moderate needs of IT companies for BIS is an interesting paradox which is possibly caused by unfamiliarity of managers with BIS. In other words, if companies do not use a certain service, they may not value the service, but are in fact the most in need of that service. So, what appears to be an overestimation of the needs by the expert panel may be caused by the relatively high level of knowledge and appreciation of the value and need for BIS by the expert panel vs. the lack of knowledge and the corresponding low value ascribed to BIS by the IT community.

Furthermore, companies found the quality of the currently available infrastructure to be high, which logically may have been an important factor influencing the low need for BIS regarding infrastructure. The identified moderate need for Infrastructural BIS to some degree justifies the primary focus of the current BI on the remaining business incubation dimensions as the service mix should depend on the focus of the BI as well as the needs and preferences of the incubatees (Nash-Hoff 1998). This also suggests that (future) BIs should also have a relative low focus on the provision of Infrastructural services than other BIS. The need for R&D facilities was even smaller than the need for office space. Such a low need was also against expectations regarding possible high need of Armenian IT companies for R&D facilities caused by the low competitiveness of the Armenian IT companies on low-end IT products (EIF 2009). The low need for R&D facilities is assumed to be related to the main activities of the Armenian IT companies which are mainly concerned with customized software and web design (EIF 2009). Such activities do not need extensive R&D facilities such as labs. The need for such facilities is therefore only likely to increase in case the industry will become more engaged in activities that require higher levels of innovational attainments. Once this is the case it may be better if BIs would base their business models on companies with high needs for R&D facilities in a certain geographical region which is typical for Regional Business Incubators (Carayannis and Zedtwitz 2005).

Also interesting was the low need for access to knowledge and intangible assets. Grimaldy and Grandi (2005) argued that access to knowledge and intangible assets, to capital, and speed-to-market are major requirements of new knowledge based companies. Mediation regarding university researches was however one of the lowest needed and valued lines of BIS.

Slightly higher appreciated than Mediation services, Business Support was the highest needed business incubation dimension identified by Bergk and Norrman (2008). Regarding Business Support and Mediation, non-incubated companies perceived marketing management training and coaching and mediation with regard to costumers as very valuable for their future development. This can signify issues regarding the market and costumer orientation of these companies. The small Armenian domestic IT market can be an underlying factor for such a high need for marketing training and coaching and mediation with regard to costumers (EIF 2008). As costumers need to be found on the international market the geographic and businesswise distance between producer and costumer is increased. The third highest needed line of mediation was mediation regarding employees which also supported suggestion regarding shortage of qualified staff as currently one of the main factors constraining the growth of Armenian IT companies (EIF 2009). Therefore, enhanced provision of these services by the Armenian business incubation system is likely to have a crucial effect on the development of the Armenian IT industry.

Financial management involves three major types of decisions: (1) long-term investment decisions, (2) long-term financing decisions and (3) working capital management decisions. These decisions concern the acquisition and allocation of resources among the firms various activities (H K Baker and Powell 2005). The low revealed need for BIS regarding financial management can therefore point towards a low necessity of making financial decisions as for example investments are limited and no sales need to be funded on credit. The extreme low need for mediation regarding equity investments was also interesting in this regard. Logically, such a low need can be caused by two factors, one is that companies already have sufficient access to equity investors, or that companies are not ready to receive financing in exchange of company shares. In case the later is causing such a low need, this might also tell more about the willingness of businesses to invest. Consequently, for the development of the industry it may be interesting to explore what barriers businesses see for investing and developing their business before offering services such mediation regarding equity investors.

Bearing in mind that incubated companies had a significant lower need for BIS than non-incubated companies; it is probable that the currently offered BIS are effective in addressing the needs of the incubated companies and consequently do not need BIS as much as non-incubated companies. Nevertheless, needs of incubated companies might also have been affected by company characteristics of these companies as 45 percent of the incubated companies are subsidiaries of foreign companies compared to 20 percent of the non-incubated ones. Being a subsidiary of a foreign company can affect the need for BIS as such a company usually is established for a very specific purpose such as R&D and the role and position of subunits is largely decided and arranged by the head office (Doz and Prahalad 1981). A subsidiary may have very limited list of responsibilities next to this specific purpose. Such reduced responsibilities can however decrease/eliminate the need for support regarding different functions such as marketing which are not performed.

The results of the study also illustrated that the offering of BIS is perceived to be valuable by a considerable share of non-incubated companies. Moreover, the positive significant correlation between the need for BIS and the value of these services suggest that the perceived value increases as the needs increase. A high value perception of BIS implies that the non-incubated companies are likely to become part of the incubation system if the chance occurs. The willingness of companies to participate in incubation efforts will have consequences for future incubation initiatives and should consequently be taken into account.

Regarding “How”, general service provision preferences were diverse and no differences exited between incubated and non-incubated companies as about one half of both incubated and non-

incubated companies choose either proactive or reactive support provision. Motivating factors influencing the preferences of companies were not found as possible mediating variables such as having received services from EIF, company maturity level or company specialty, were not confirmed by correlation analysis. As mediating variables affecting company preference remain unclear and a gap continues to exist between the offer and need for BIS, agreements on a preferred service provision approach between BIs and incubatees remains important. This in line with point made by Carayannis and von Zedtwitz (2005), indicating that the actual mix of services should be developed through an agreement between the BI and the incubatees. From an industry development point of view BIs should only stop making agreements with incubatees on their support provision approach when various different BIs exist adhering to different incubating models. This idea supports the suggestions of Grimaldy and Grandi (2005) arguing the importance of BIs to specialize in the services that they provide rather than trying to diversify their offers with the aim of attracting different types of companies.

## 5.2 Limitations

As with every other research, caution is recommended in the interpretation of the study results. An important limitation of this study is that it relies upon a reduced-size sample. This is as, the number of incubated companies in the sample is smaller than the non-incubated companies and no probability sampling is applied. However the effect of not using a probability sampling if existing is very limited as the probability sampling would still only represent a share of the reachable respondents that currently are included.

A different point is the division between incubated and non-incubated companies. As mentioned before, companies were recognized as incubated if they have received services of EIF before. EIF can be characterized as a Virtual Incubator as most of the recipients of its services are located outside its promises. It is possible that such a division could have been unclear to the respondents, resulting in companies who received some kind of services of EIF before could have indicated otherwise. This might have been further enhanced as currently the scale of EIF's services has reduced compared to prior years. recently appointed managers could therefore have been unaware of previously received services. As much as this possibility is acknowledged, the scale of it is very limited as EIF continues to keep contact with companies that have received services.

Furthermore, as mentioned under reliability, the study was carried out during the global financial and economic crisis which started in the end of 2007. The crisis may have affected the reliability of the study through for example a higher need for venture capital due to declining funds available or a lower need for Infrastructural BIS due to declining real-estate prices in Armenia.

With all the shortcomings and limitations in mind, the study results are still believed to be robust enough to shed some light on the specific needs of IT companies with regard to business incubation in general and more specifically in Armenia. Generalizations of the study results are believed to be possible for countries with a developing IT industry and a small domestic market.

## 5.3 Further Research

The target group of this study was IT companies in a moderately developed industry. The extent to which the new insights gained from this research are generalizable to other geographical contexts and industry development must be tested through follow-up studies. Comparative studies of the influence of industry development and innovativeness level on the need for BIS will be a valuable addition to

the existing literature. In line with this it would also be interesting to evaluate the need for BIS outside of Yerevan.

Similar research in other developing countries can shed more light on the needs of IT companies in other context. Hence, it would also be interesting to analyze the needs of the Armenian IT companies in later points in time when the business incubation system in the country has developed further. Such longitudinal studies will allow researchers to further develop the theory on business incubation.

It would also be desirable to develop a clearer understanding on the needs of companies with different orientation than the ones studied here. Moreover, further research is required to assess the necessary measures that must be taken in order to meet the needs of these companies. In line with this, feasibility studies are needed to assess the most efficient and effective ways of providing the needed BIS.

Interesting point for further research will also be the underlying factors influencing the preference of companies regarding the BI's approach to support provision. Such an understanding will contribute to the match between incubators and their (potential) target companies. BIs could therefore be able to adjust their involvement approach to their target companies before the start of the incubation process.

# Chapter 6 Conclusion and Recommendations

## 6.1 Conclusion

Regarding "What", the study results suggest a moderate need for BIS by the IT industry. Nevertheless the needs are more pronounced for non-incubated companies. A considerable share of non-incubated companies also finds BIS to be valuable for their future development. There is consequently a considerable group of non-incubated companies in need of BIS which currently is not served. Furthermore, despite the high satisfaction level of incubated companies on the received BIS, the negative correlation between the need for BIS and the match of the offered services points that the high satisfaction level of incubated companies' is likely to be the result of the moderate need of these companies for such services. Consequently, BIs fall short to cover the needs of companies if the needs increase. The study results therefore reveal a gap between the need for BIS and the BIS actually offered by the BIs in Armenia.

Regarding "How", the second element of match, the results suggest that both reactive and proactive service provision approaches were favored regarding service provision in general. Currently EIF often tailors it support services to the needs of individual companies. The incubator is therefore able to adjust its approach to the preferences of the incubatees in this regard and utilize this element for increasing the effectiveness of its support provision. There however is a large group of companies which are in need of BIS. Consequently, covering the needs of the complete IT industry with such an individual approach will be impossible by the currently operating BI(s).

With regard to the third element "How Much", there was a large difference between the use of BIS by incubated companies and the expected usage by non-incubated companies. Non-incubated companies need many M.h.p.m of different Infrastructural and Business Support services; however, only limited support exists regarding these business incubation dimensions. Regarding Business Support services, the most M.h.p.m were needed for innovative problems solving techniques, followed by financial management and marketing management. Different components such as R&D facilities and services regarding innovative problem solving techniques are however not offered at all, again pointing towards a gap between the demand and offer of BIS.

To this end, the findings suggest that the current business incubation efforts in Armenia do not cover the need the Armenian IT industry for BIS. The current efforts with regard to business incubation in Armenia are therefore on the right track; however much needs to be done to effectively cover the demand of the IT industry for BIS.

## 6.2 Reflections

The actual outcomes of the study very much met the initial objectives. By analyzing the match between supply and demand for BIS the study results provided the necessary understanding on the shortcomings of the business incubation system in Armenia. The needs of companies and the perceived value of different BIS became more apparent which will hopefully make a dynamic readjustment of the incubation system possible. What I would do differently next time, will be to reflect more carefully on the use of the gathered data, most suitable statistical tests and the final presentation of the results in more early stage of the research design process. This will save time in later stages during research implementation.

Business incubation has been the focus of a considerable research effort. The existent literature was very suitable for identifying different aspects of BIs and the offer of BIS. The literature on the other side of the equation namely factors affecting the need for BIS was however less developed. Nevertheless, the existent literature was generally very applicable. The availability of different systematic reviews of the business incubation literature made it easier to create an overview of the existing work on this topic.

## 6.3 Recommendations and Policy Implications

Regarding the revealed gap between the technical knowledge and experience of entrepreneurs and their general business management knowledge and expertise, policy makers and directors of BIs should focus on enhancing the human capital of entrepreneurs regarding business management. PR activities directed towards the value of business management education can be effective in this regard.

Furthermore, the findings of the study suggest that more extensive service provision is needed for creation of a better match between the need and demand for BIS in Armenia. New Science Parks and BIs will therefore be valuable in effectively targeting the need for different common BIS. A wider scope and more varying strategic objectives of different BIs and Science Parks will benefit the service provision in general as a larger assistance can be provided regarding the needed and valued BIS. Business Support services were perceived to have the highest value for the future development of non-incubated companies followed by Mediation and Infrastructural services. Future BIs should consequently consider this ranking in their support provision. This will enhance the match between their service provision and the needs of incubatees.

Regarding Business Support services, basic and advanced marketing management training and coaching services will be valuable in meeting the large need of companies for these services at different levels. Developing the capacity of companies regarding innovative marketing approaches such as E-marketing will support the IT industry in rising above barriers linked to a small domestic markets and will help decrease the difficulties concerned with large geographic distance between potential clients.

Increased efforts aimed at enhancing the information flow from and towards BIs will help them fulfill their function regarding Mediation which proved to be a highly needed business incubation dimension. Such enhanced information flows, will also make paradigms such as open innovation possible where companies can benefit from sharing technology and innovation (Chesbrough 2003). Creation of inter-institutional collaboration schemes will enhance the ability of BIs in providing any line of Mediation needed. For example regarding mediation with customers and partners which are the most needed lines of Mediation, collaboration among BIs will help BIs in finding and mediating with potential customers and partners who are for example incubatees of other BIs. Enhancing the connection of BIs with other institutions such as universities will also enhance the capability of BIs in mediating with regard to employees which is the third most needed line of Mediation. Furthermore, awareness raising initiatives directed towards increasing the awareness of IT companies on the benefits of equity investments will be helpful in addressing the need for finances.

The findings also suggest that both reactive and proactive service provision approaches are favored. Managers of BIs and Science Parks should therefore strive to become aware of the preferred approach incubatees have regarding BIs support provision approach through mutual agreement.

## 6.4 Contribution

This work extends prior research on business incubation by targeting the specific needs of IT companies and shedding more light on the needs of such companies in a moderately developed industry with a relative low level of innovativeness. Such a study in this geographical context is an interesting addition to the literature that usually is focused on Northern European and American countries where business incubation and the national innovation system is more advanced.

Despite the less advanced national business incubation system and the existence of considerable market failures in Armenia, the need for BIS appeared to be moderate. The results of the study, consequently contradict suggestions made in the literature regarding high-technology laggard countries where the presence of bridging institutions such as BIs may relatively be more beneficial than in countries where the national innovation system is more advanced (Colombo and Delmastro 2002).

Moreover, this study shed more light on the value of typical BIS for non-incubated companies which was seldom done before. Enhanced understanding on the value of BIS contributes to knowledge on the demand of companies for BIS before receiving BIS and is therefore also an interesting addition to the existing literature on business incubation.

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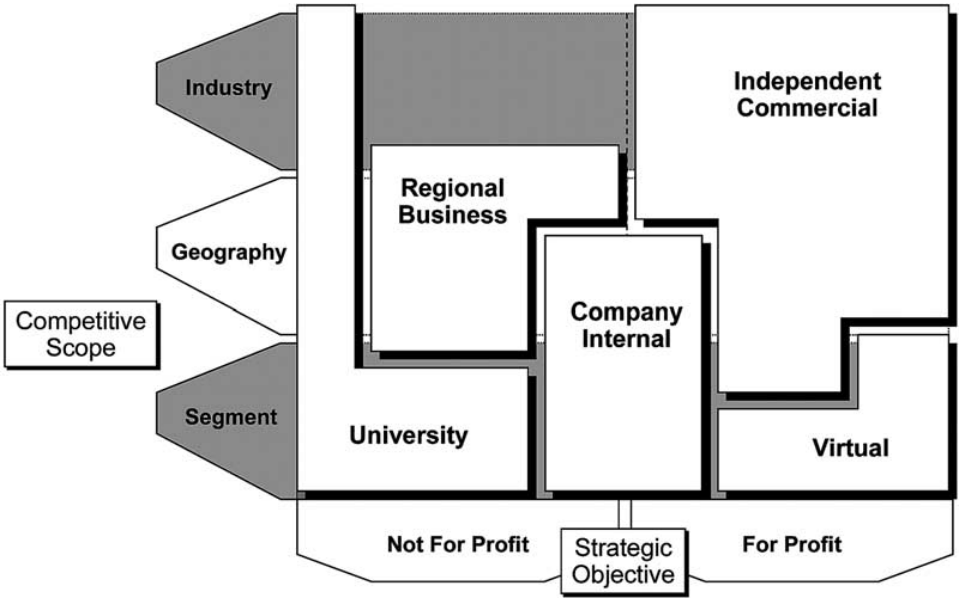
# APPENDIX A - Incubation Taxonomies

| Elements of Differentiation | Taxonomies |
|---|---|
| The incubator's primary financial sponsorship | - Publicly sponsored<br>- Nonprofit sponsored<br>- University sponsored<br>- Privately sponsored |
| Nature of incubatees when founded | - Spin-offs<br>- Start-ups |
| The business focus of the incubatees | - Product development<br>- Manufacturing<br>- Mixed-use |
| The business focus of the incubator | - Property Development<br>- Business Assistance |

*Source: Hackett and Dilts, a Systematic Review of business incubation Research.*

# APPENDIX B - Incubator Archetypes Model

E.G. Carayannis, M. von Zedtwitz / Technovation 25 (2005) 95–110



# APPENDIX C - Expert Interviews

As indicated in the preliminary stages of the research, expert interviews were carried out to further enlarge our understanding of the realities we were studying. Three experts from different backgrounds where asked to contribute to the study. The experts were interviewed separately and where asked to provide a general picture of the main issues concerning the Armenian IT industry and the needs of the industry regarding business incubation services. A brief introduction of these individuals and the content of the interviews are provided below.

The first interview was conducted with Mr. Vache Kirakosyan, Head of High Tech and IT Department of the Ministry of the Economy of Armenia. As a former consultant Mr. Kirakosyan has a reach expertise and experience with regard to IT companies.

The second interview was conducted with Mr. Karen Vardanyan, Director of the Union of IT Enterprises in Armenia. Due to his close relationship with the field of IT enterprises as the Director of UITE Mr. Vardanyan has a large insight on the current shortcomings and needs of the IT industry in Armenia.

The third expert interviewed was Mr. Bagrat Yengibaryan. Mr. Yengibaryan is the Director of the Enterprise Incubator Foundation (EIF) and is occupied with managing and coordinating the EIF activities on business development, marketing and promotion, management, accounting and finance, start-up creation, helping companies to improve professional and business skills, creation of learning partnerships within the industry and the universities.

## Interview with Mr. Kirakosyan:

The interview of Mr. Kirakosyan was initiated as Mr. Kirakosyan provided a short description of the structure of the industry and its characteristics. Mr. Kirakosyan pointed that the industry is consisted of foreign and local companies and the large differences between these two groups of companies as foreign companies are far more developed compared to the local firms. Mr. Kirakosyan continued by describing the main players and their influence on the industry. It was mentioned that all major players in the industry have had their own approach towards doing business and all have influenced the industry differently. One of the mentioned companies which influenced the Armenian IT industry was Lycos Armenia from which 10 spin-offs have successfully been created. Synopsis was the third player mentioned by Mr. Kirakosyan. According to Mr. Kirakosyan all players have contributed to educating the Human Capital of the IT industry.

The concentration of the Armenian IT industry was mostly put on outsourcing or better said in-sourcing which puts the industry in a weaker position globally. The industry mainly consists of small but quite dynamic enterprises. Besides software development the industry is mainly occupied with chip design, engineering design and multimedia. Consultancy was thought to be poorly developed and usually only concerned with consulting the government. The main era needing consultation services is management. Earnest and Jung Armenia and Ameria CJSC are the only consulting companies that to some degree are serving the market. The factors were mentioned as underling factors resulting in such poorly developed consultancy domain:

- Not enough understanding of what consultancy is
- Small firms have a smaller need for consultancy

When asked about the competence of the managers within the Industry Mr. Kirakosyan indicated that management skills are lacking, and that the managers usually are IT specialist without the right management skills. Managers lack an active approach to business development as they usually have few main clients and are fully dependent on them, making them extremely vulnerable.

The Enterprise Incubator Foundation (EIF) was indicated as government's main initiative with regard to business incubation. Business incubation is however only a part of what EIF is concerned with; the main objective of the foundation is sector development rather than business incubation. Mr. Kirakosyan also mentioned Viasphere technopark as an incubator. Viasphere technopark is however is not really dedicated to improving entrepreneurship but is more concerned with developing dependant companies which are able to work on designated projects of Viasphere itself. Mr. Kirakosyan indicated that the First main business incubation effort should be the Gyumri technopark, from which the plans are now developing and should be presented in the near future.

As the needs of the IT industry were discussed the need for infrastructure was found to be less critical due to the fall of rental prices caused by the financial crises. The need for R&D facilities was rated to be high as the existing facilities are dated and non-functioning. Book keeping and accounting services were mentioned as one of the view services that actually are sufficiently developed. HR is also very poorly developed. Networking and mediation is only available to a very small part of the industry, namely member of the Union of Information Technology enterprises (UITE). Mr. Kirakosyan also added that in contradiction to the common understanding that small enterprises benefit the most from business incubation efforts. Influenced by their lobbying power, currently in Armenia larger companies are the grate beneficiaries.

## Interview with Mr. Vardanyan:

Mr. Vardanyan pointed towards a high need for business incubators and a developed business incubation system in Armenia. However according to Mr. Vardanyan the most crucial problem of the Armenian IT industry with regard to entrepreneurship is a lack of vision. Students and other potential entrepreneurs do not have the required vision for changing matters. Consequently there is no drive for solving problems or meeting the needs of others which is assumed to be the basic factor driving entrepreneurship. In addition to a lacking entrepreneurial vision, fear of entrepreneurship is also a factor dominantly present in Armenia.

Mr. Vardanyan also touched upon a more directly relevant issue to this study, namely the competences of the entrepreneurs. As mentioned before during our meeting with Mr. Kirakosyan, Mr. Vardanyan mentioned the lacking Business Management competences of the entrepreneurs and managers. IT entrepreneurs and managers were indicated to be a special kind of people who have a poor business management background as they rarely have sold something. They lack the skills to understand their potential customers, and so in recognizing the needs of the market. With regard to their technical expertise Mr. Vardanyan noted that an approximate 15 percent of the students graduating from the universities have high technical expertise, the entrepreneurs of the industry are usually from this 15 percent and so no large problems exist with regard to technical competences of the entrepreneurs.

With regard to the existing business incubation efforts in Armenia, not much was mentioned by Mr. Vardanyan as it practically is very small. It was mentioned that EIF is the only Incubator which does not deliver mature enterprises as they stay in the incubator and no new start-ups can take their place. According to Mr. Vardanyan most of the services of EIF are sector development services and only a small portion of their work can really be considered business incubation.

Besides the needs mentioned in the questionnaire Mr. Vardanyan broad up other needs that he thought were relevant for the IT industry such as the ability to innovate and be creative. As an underling factor for this Mr. Vardanyan mentioned the lack of a critical mass of experts like creators and the failing networking among the experts that do exist in the industry. The high need for Mediation and networking were also visible of the ratings Mr. Vardanyan gave to these needs. According to Mr. Vardanyan large needs exist regarding to entrepreneurial training and coaching, motivation and leadership and TRIZ training which is for generating innovative ideas and solutions for problem solving. With regard to Venture capital Mr. Vardanyan proposed to ask to questions more detailed in the sense of what kind of financial support is needed, in other words the pay mechanism as selling shares of the enterprise, how the restitution will be organized and done. We can in this sense see how far the organizations are willing to go for acquiring access to funding, which was referring to equity investments.

## Interview with Mr. Yengibaryan:

Mr. Yengibaryan referred to the IT industry as the fastest growing industry in Armenia, providing the largest number of vacancies in the country. Currently the industry generates even more jobs than the mining industry which is considered one of the largest employers of Armenia. The IT industry is significantly important for the transition of the Armenian economy from a commodity economy to a knowledge based economy. However the industry currently is more based on outsourcing rather than being self innovative. The industry approximately exists of 200 enterprises from which Synopsis currently is the largest. Before being stopping its activities in Armenia Lycos Europe was with eight spin-offs the largest generator of spin-offs in the industry.

The entrepreneurial drive in the industry according to Mr. Yengibaryan is poor as entrepreneurship is not facilitated through the existence of the needed facilities and hard needed funds. In other words, no supportive environment exists with regard to entrepreneurship. Potential entrepreneurs prefer to be occupied by larger companies and work on smaller personal work assignments alongside their fulltime jobs. This takes away their drive to develop their products and to be innovative as there are satisfied with just an additional income next to their income from their fulltime occupation at a larger, already further developed company.

The entrepreneurial competence of the entrepreneurs is poorly developed, as managerial schooling is often shortcoming. There is a lack of mid level managers as the industry is lead by the leaders and developers and no mid level managers exist to take over a piece of the burden on themselves. The few leaders that lead the industry lack simply the physical capabilities to carry the industry development to its full potential. Mr. Yengibaryan also referred to a large gap between the Universities and the professional environment. Mr. Yengibaryan pointed the wide range of activities that EIF performs as it functions as a sector development agency. The efforts of EIF include industry sales encouragement outside Armenia and country promotion. The EIF offers skill development services to the industry as it also fulfills a lobbying function in favor of the IT industry.

According to Mr. Yengibaryan the largest needs of the industry with regard to business incubation is the lack of venture capital or equity investment. Innovation is not supported as financing is lacking which results in the outsourcing nature of the projects that are carried out. No funds exist for startups and they receive the same treatment as the already established and developed enterprises. With exception of equity investments, EIF does not make use of special selection procedures for its services. Mr. Yengibaryan indicated the large need for business incubation and venture capital as a zero failure rate exists for equity investments.

# APPENDIX D- Survey Questionnaire

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Section 1:** ***Enterprise characteristics*** | | | | | | | | | |
| ***1*** | In which year was your enterprise established? | | | | | | In……. | | |
| ***2*** | Is your company a branch of a foreign company? | | | | | | ☐ | Yes | ☐ No |
| ***3*** | What is the specialization of your firm? | | | | | | | | |
| | ☐ | Customized software and outsourcing | | | ☐ | Internet service provider | | | |
| | ☐ | Chip design, testing, and related | | | ☐ | Internet applications and ecommerce | | | |
| | ☐ | Computer graphics, multimedia, and games | | | ☐ | IT services and consulting | | | |
| | ☐ | Accounting, banking, and financial software | | | ☐ | Web design and development | | | |
| | ☐ | Databases and MIS | | | ☐ | Other | | | |
| | ☐ | Networking systems and communications | | | | | | | |
| ***4*** | What is the total number the employees (including managers) currently working within your premises? | | | | | | ……. employees | | |
| ***5*** | How large is your current office space? (pleas indicate in square meters) | | | | | | ……. $m_2$ | | |
| ***6*** | How large is the share of your secretarial and accounting services? (In percentage of your Total costs) | | | | | | | | |
| | ☐ | ≤5 % | ☐ | 6.0 – 10 % | ☐ | 11 – 15 % | ☐ | 16 – 20% | ☐ >20 % |

| **Section 2:** ***Entrepreneurs' characteristics*** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| ***7*** | Is the enterprise established by a team of entrepreneurs? | | | | ☐ | Yes | ☐ | No | |
| ***8*** | Does anyone in your management team have IT related education? | | | | | | | | |
| | ☐ | No, none of us has | ☐ | Yes, at least one of us has | ☐ | Yes, all of us have | | | |
| ***9*** | Does anyone in your management team have any prior experience in IT related practices? (if Yes pleas indicate how many years) | | | | ☐ | Yes<br>Years…….. | ☐ | No | |
| ***10*** | Does anyone in your management team have Business Management related education? | | | | | | | | |
| | ☐ | No, none of us has | ☐ | Yes, at least one of us has | ☐ | Yes, all of us have | | | |
| ***11*** | Does anyone in your management team have prior experience in the field of business management? | | | | | | | | |
| | ☐ | No, experience at all | ☐ | Yes I was involved in the management of **non-IT related** enterprises | ☐ | Yes, I was involved in the management of an **IT related** enterprise | | | |
| ***12*** | Are you familiar with the EIF (Enterprise Incubation foundation)? | | | | ☐ | Yes | ☐ | No | |
| ***13*** | Have you ever used any services offered by EIF? (if **Yes go to Section 4** if No continue with section 3) | | | | ☐ | Yes | ☐ | No | |

| **Section 3:** ***Services Needed*** | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **3.1** | **Services relating to Physical resources and Office support** | **How large is your need for these services?** *Please indicate by circling "1" for 'Not at all' to "5" for 'very large'* ***Not at all ----------Very large*** | | | | | **How much/often would you use such a service if offered:** *Please indicate in total man hours per month** | **How large do you expect the value of these services will be for the development of your enterprise?** *Please indicate by circling "1" for 'Not at all' to "5" for 'very large'* | | | | |
| Office space | | 1 | 2 | 3 | 4 | 5 | $m_2$: | 1 | 2 | 3 | 4 | 5 |
| R&D facilities *(facilities for designing, simulating and testing new products such as labs, servers)* | | 1 | 2 | 3 | 4 | 5 | M.h.p.m: | 1 | 2 | 3 | 4 | 5 |
| Bookkeeping and Secretarial Services | | 1 | 2 | 3 | 4 | 5 | M.h.p.m: | 1 | 2 | 3 | 4 | 5 |
| ***14*** | How large is your general need for services regarding Physical resources? | | | | | | | 1 | 2 | 3 | 4 | 5 |
| ***15*** | How do you evaluate the overall quality of the physical resources currently available to your enterprise? | | | | | | | | | | | |
| | ☐ | Excellent | | ☐ | Moderate | | | | | | | |
| | ☐ | Good | | ☐ | Poor | | | ☐ | Not useful at all | | | |

* Total hours that all staff members (you and your employees) will make use of such services per month.

| 3.2 | **Business Support Services** | **How large is your need for these services:** *Please respond by, circling "1" for 'Not at all' to "5" for 'Very Large'* | | | | | **How much/often would you use such a service if offered:** *Please indicate in total man hours per month* | **How large do you expect the value of these services will be for the development of your enterprise?** *Please indicate by circling "1" for 'Not at all' to "5" for 'very large'* | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ***Not at all ----------Very large*** | | | | | | ***Not at all ----------Very large*** | | | | |
| Leadership training and coaching | | 1 | 2 | 3 | 4 | 5 | M.h.p.m: …….. | 1 | 2 | 3 | 4 | 5 |
| Business Plan development support services | | 1 | 2 | 3 | 4 | 5 | M.h.p.m: …….. | 1 | 2 | 3 | 4 | 5 |
| Training in Innovative problem solving techniques | | 1 | 2 | 3 | 4 | 5 | M.h.p.m: …….. | 1 | 2 | 3 | 4 | 5 |
| Project management training and Coaching | | 1 | 2 | 3 | 4 | 5 | M.h.p.m: …….. | 1 | 2 | 3 | 4 | 5 |
| Financial management training and Coaching | | 1 | 2 | 3 | 4 | 5 | M.h.p.m: …….. | 1 | 2 | 3 | 4 | 5 |
| Training and coaching with regard to legal issues | | 1 | 2 | 3 | 4 | 5 | M.h.p.m: …….. | 1 | 2 | 3 | 4 | 5 |
| Marketing management training and Coaching | | 1 | 2 | 3 | 4 | 5 | M.h.p.m: …….. | 1 | 2 | 3 | 4 | 5 |
| HR management training and Coaching (staffing) | | 1 | 2 | 3 | 4 | 5 | M.h.p.m: …….. | 1 | 2 | 3 | 4 | 5 |
| Strategic Management training and Coaching | | 1 | 2 | 3 | 4 | 5 | M.h.p.m: …….. | 1 | 2 | 3 | 4 | 5 |
| ***16*** | How large is your general need for Business Support services? | | | | | | | 1 | 2 | 3 | 4 | 5 |
| ***17*** | How would you describe the service provision intensity or involvement of the incubator that you would prefer? | | | | | | | | | | | |

| | **Very much agree** | **Somewhat agree** | **Neither** | **Somewhat agree** | **Very much agree** | |
|---|---|---|---|---|---|---|
| No intervention at all, and reactive | ☐ | ☐ | ☐ | ☐ | ☐ | Strong intervention, and proactive |

| 3.3 | Services regarding Network Mediation and Venture Capital | How large is your need for these services: *Please respond by circling "1" for 'Not at all' to "5" for 'Very large'* | | | | | How often would you prefer such a service: *Pleas choose between sporadic assistance or continuous provision of assistance* | | | | How large do you expect the value of these services will be for the development of your enterprise? *Please indicate by circling "1" for 'Not at all' to "5" for 'very large'* | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ***Not at all ----------Very large*** | | | | | | | | | ***Not at all----------Very large*** | | | | |
| Mediation with regard to Partners | | 1 | 2 | 3 | 4 | 5 | On-demand | ☐ | Proactive | ☐ | 1 | 2 | 3 | 4 | 5 |
| Mediation with regard to Customers | | 1 | 2 | 3 | 4 | 5 | On-demand | ☐ | Proactive | ☐ | 1 | 2 | 3 | 4 | 5 |
| Mediation with regard to Suppliers | | 1 | 2 | 3 | 4 | 5 | On-demand | ☐ | Proactive | ☐ | 1 | 2 | 3 | 4 | 5 |
| Mediation with regard to Employees (staffing) | | 1 | 2 | 3 | 4 | 5 | On-demand | ☐ | Proactive | ☐ | 1 | 2 | 3 | 4 | 5 |
| Mediation with regard to University Researchers | | 1 | 2 | 3 | 4 | 5 | On-demand | ☐ | Proactive | ☐ | 1 | 2 | 3 | 4 | 5 |
| Mediation with regard to Financiers | | 1 | 2 | 3 | 4 | 5 | On-demand | ☐ | Proactive | ☐ | 1 | 2 | 3 | 4 | 5 |
| Capital through Equity Investment ** | | 1 | 2 | 3 | 4 | 5 | On-demand | ☐ | Proactive | ☐ | 1 | 2 | 3 | 4 | 5 |
| ***18*** | How large is your general need for services regarding Network Mediation and Venture Capital? | | | | | | | | | | 1 | 2 | 3 | 4 | 5 |

** Capital is invested in your organization as your company shares are made available to investors

IF you have **received** any services please continue to section 4. If you have **not received** any services of EIF before then the questionnaire for you ends here. We hereby would like to thank you for your participation in the survey. Pleas click on the <<Send by E-mail>> button on the first page to return the form automatically.

| ***Section 4: Services Needed*** | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **4.1** | **Services regarding Physical resources and Office support** | **How large is your current need for these services?** *Please respond by circling "1" for 'Not at all' to "5" for 'very large'* | | | | | **How often are you using such services?***(Man hours per month)** | **To what extend does the amount of the currently provided services mach your needs?** | | |
| | | ***Not at all ----------Very large*** | | | | | | **Does not mach** | **Matches** | **Surpasses** |
| Office space | | 1 | 2 | 3 | 4 | 5→ | → → → | ☐ | ☐ | ☐ |
| R&D facilities *(facilities for designing, simulating and testing new products such as labs, servers)* | | 1 | 2 | 3 | 4 | 5→ | M.h.p.m:…….. | ☐ | ☐ | ☐ |
| Bookkeeping and Secretarial Services | | 1 | 2 | 3 | 4 | 5→ | M.h.p.m:…….. | ☐ | ☐ | ☐ |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| ***19*** | How large is your general need for services relating to Physical resources ? | 1 | 2 | 3 | 4 | 5 |
| ***20*** | How do you evaluate the overall quality of the physical resources currently available to your enterprise? | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | ☐ | Excellent | ☐ | Moderate | | |
| | ☐ | Good | ☐ | Poor | ☐ | Not useful at all |

* Total hours that all staff members (you and your employees) will make use of such services per month.

| 4.2 | Business Support Services | How large is your current need for these services: *Please respond by circling "1" for 'Not at all' to "5" for 'Considerably'* | | | | | How much / often are you using such services? *(Man hours per month)* | To what extend does the amount of the currently provided services mach your needs? | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | ***Not at all ----------Very large*** | | | | | | **Does not mach** | **Matches** | **Surpasses** |
| Leadership training and coaching | | 1 | 2 | 3 | 4 | 5 → | M.h.p.m:…….. | ☐ | ☐ | ☐ |
| Business Plan development support services | | 1 | 2 | 3 | 4 | 5 → | M.h.p.m:…….. | ☐ | ☐ | ☐ |
| Training in Innovative problem solving techniques | | 1 | 2 | 3 | 4 | 5 → | M.h.p.m:…….. | ☐ | ☐ | ☐ |
| Project management training and Coaching | | 1 | 2 | 3 | 4 | 5 → | M.h.p.m:…….. | ☐ | ☐ | ☐ |
| Financial management training and Coaching | | 1 | 2 | 3 | 4 | 5 → | M.h.p.m:…….. | ☐ | ☐ | ☐ |
| Training and coaching with regard to legal issues | | 1 | 2 | 3 | 4 | 5 → | M.h.p.m:…….. | ☐ | ☐ | ☐ |
| Marketing management training and Coaching | | 1 | 2 | 3 | 4 | 5 → | M.h.p.m:…….. | ☐ | ☐ | ☐ |
| HR management training and Coaching (staffing) | | 1 | 2 | 3 | 4 | 5 → | M.h.p.m:…….. | ☐ | ☐ | ☐ |
| Strategic Management training and Coaching | | 1 | 2 | 3 | 4 | 5 → | M.h.p.m:…….. | ☐ | ☐ | ☐ |

| ***21*** | How large is your general need for Business Support services ? | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|

| ***22*** | How would you describe the service provision involvement of the incubator that you would prefer? |
|---|---|

| | **Very much agree** | **Somewhat agree** | **Neither** | **Somewhat agree** | **Very much agree** | |
|---|---|---|---|---|---|---|
| No intervention at all, and reactive | ☐ | ☐ | ☐ | ☐ | ☐ | Strong intervention, and proactive |

| 4.3 | Services regarding Network Mediation and Venture Capital | How large is your current need for these services? *Please respond by circling "1" for 'Not at all' to "5" for 'Very large'* | | | | | How often would you prefer such a service: *Pleas choose between sporadic assistance or continuous provision of assistance* | | | | To what extend does the amount of the currently provided services mach your needs? | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ***Not at all ----------Very large*** | | | | | | | | | **Does not mach** | **Matches** | **Surpasses** |
| Mediation with regard to Partners | | 1 | 2 | 3 | 4 | 5 → | On-demand | ☐ | Proactive | ☐ | ☐ | ☐ | ☐ |
| Mediation with regard to Customers | | 1 | 2 | 3 | 4 | 5 → | On-demand | ☐ | Proactive | ☐ | ☐ | ☐ | ☐ |
| Mediation with regard to Suppliers | | 1 | 2 | 3 | 4 | 5 → | On-demand | ☐ | Proactive | ☐ | ☐ | ☐ | ☐ |
| Mediation with regard to Employees (Human Capital) | | 1 | 2 | 3 | 4 | 5 → | On-demand | ☐ | Proactive | ☐ | ☐ | ☐ | ☐ |
| Mediation with regard to University Researchers | | 1 | 2 | 3 | 4 | 5 → | On-demand | ☐ | Proactive | ☐ | ☐ | ☐ | ☐ |
| Mediation with regard to Financiers | | 1 | 2 | 3 | 4 | 5 → | On-demand | ☐ | Proactive | ☐ | ☐ | ☐ | ☐ |
| Capital through Equity Investment ** | | 1 | 2 | 3 | 4 | 5 → | On-demand | ☐ | Proactive | ☐ | ☐ | ☐ | ☐ |
| ***23*** | How large is your general need for services regarding Network Mediation and Venture Capital? | | | | | | | | | | 1 | 2 | 3 | 4 | 5 |

**Capital is invested in your organization as your company shares are made available to investors

The questionnaire ends here; we hereby would like to thank you for your participation in the survey. Pleas click on the <<Send by E-mail>> button on the first page to return the form automatically.

# APPENDIX E - Beneficiary Survey Results

**ARMENIA**

**ENTERPRISE INCUBATOR PROJECT (EIP)**

**REVIEW OF BENEFICIARY RESPONSE TO THE ENHANCED**

**IT BUSINESS INCUBATOR**


**Summary**

An evaluation of a sample of 64 of the 109 companies that the Enterprise Incubator Foundation (EIF) assisted under the Enterprise Incubator Project (EIP) seems to confirm the hypothesis tested by the project that there is a significant demand in the Armenian context for an enhanced incubator –one that provides business services and training in addition to a workspace. Also company data show that a variety of services is necessary to address differing needs of companies based on their size and age. Although many companies received a combined package of business consulting and training services during the project's implementation, the number of training services companies used was about a third higher than the number of business services used. However the aggregate number alone does not reveal the entire picture of demand and depending on the functional area, the age of the company, and the size of the company, the demand for business consulting services in some cases can exceed that for training. In terms of the number of companies assisted, EIF's main role seems to be as a "virtual incubator" given that only about eight percent of the companies in the sample are residents in the managed workspace that EIF provides. The service package most in demand seems to be a combination of business services and training in both technical aspects of the IT industry and sales/promotion. The next highest demand is for business management services and related training. There is considerably less demand in the area of financial management, with none of the companies in the sample receiving business services in this area and only about 11 percent of the companies in the sample using training services in the financial field. However, there seems to be a significant need for consulting services in the legal field and taxation/customs, mostly for nascent companies (developed since 2004) and startup companies.


**Evaluation Approach**

EIF provided a list of 109 companies and institutions receiving business and consulting services during the project's implementation period. Information on the date of a company's establishment and number of employees was available for 64 of these entities. No data was available for sales revenues of due to EIF's agreement with the individual companies not to disclose this data. The evaluation looked at the demand for business services by age and size of company/institution. It also grouped the business services and training into the following five categories to see the types of service packages that emerged during the project. Finally, the evaluation reviewed the companies occupying the managed workspace to see their demand for services and the extent to which this differed between start-up companies and nascent companies.

**Findings by Category**

**By functional area of service.** The largest area of demand for EIF's services was for training in various technical aspects of the IT industry, about 76 percent of companies in the sample, followed closely by sales and promotion at 73 percent. However, the number of companies using training services in technical areas was more than double the number using consulting services. In contrast for sales and promotion, the number of companies using training services was about 35 percent higher than the number of companies using business services. For the combined category of legal, accounting, tax and customs services, the number of companies using business service was more than double the number using related training services. None of the companies used business consulting services for specified for financial management, while the demand for training services in this area was equal to the demand for training in the legal, accounting taxes/customs areas of business operations (Table 1).

Table 1: No. of Sample Companies Using Services by Functional Area

| **Functional Area** | **Business Consulting Services** | **Training Services** | **Both Services** |
|---|---|---|---|
| Business and Project Management | 20 | 17 | 37 |
| Sales and Promotion | 20 | 27 | 47 |
| Technical Aspects of the IT industry | 15 | 34 | 49 |
| Financial management | 0 | 7 | 7 |
| Legal, accounting, taxes/customs | 14 | 7 | 21 |

***Notes:***
*Enterprise and project management:* business plans, entrepreneurship grants, etc.
*Sales and promotion:* Negotiations, assistance in participation in trade fairs, presentation skills, internships abroad for training and business contacts, etc.
*Technical aspects of the IT business:* Network security, CMMI certification, Dot Net Post training consultancy, etc.
*Financial Management:* There was no further specification of this area of business consulting or training
*Legal, Accounting, Customs and Taxes:* Companies often received these services grouped together and there was no further specification

**By size of company.** The average size of client entity using EIF's services was about 200 employees mainly due to the fact that in addition to start-up and nascent companies in the IT industry, EIF provided services to institutes, universities and the large telecommunications company, Armentel. However, a closer look at the profile shows, about 69 percent of companies had fewer than 50 employees and 43 percent of companies had fewer than 20 employees. These figures are in line with the average company size in the IT industry, which are about 30 employees. Companies with fewer than 10 employees used about 47 percent more training services than business consulting services. And the same pattern appeared for companies on the other end of the spectrum, those with more than 100 employees, though by a far greater order of magnitude; they used four to ten times as many training services as business services. Companies with between 20 and 100 employees used nearly an equivalent amount of business and consulting services. However, contrary to the trend for the rest of the group, companies with between 10 and 20 employees used more business consulting services than training services (See Table 2).

| Table 2: Use of EIFs Business and training Services By Size of Company | | | |
|---|---|---|---|
| **No. of Employees** | **No.of Enterprises in Category** | **No. Of Business Services Used** | **No. Of Training Services Used** |
| <10 | 15 | 17 | 25 |
| 10 to 20 | 12 | 28 | 22 |
| 20 to 50 | 16 | 28 | 30 |
| 50 to 100 | 7 | 23 | 23 |
| 100 to200 | 6 | 3 | 12 |
| >200 | 7 | 2 | 22 |
| Total | 63 | 101 | 134 |

**By age of company.** About half of the entities receiving services from EIF had a founding date before 2001 and the start of the project. For the companies that were established before 2003 the number of training services used was about 40 to 60 percent higher than business consulting services used. However, for the most recently founded companies, since 2004, the numbers of business consulting services and training services were close, with business services slightly higher (See Table 2).

| Table 3: Use of EIF's Business and Training Services by Age of Company | | | |
|---|---|---|---|
| **Year of establishment** | **No.of Enterprises in Category** | **No. Of Business Services Used** | **No. Of Training Services Used** |
| Before 2001 | 15 | 17 | 25 |
| 2001-2003 | 19 | 23 | 37 |
| 2004-2006 | 13 | 27 | 25 |
| Total for all sample companies | 64 | 101 | 134 |

**By companies using the Managed Workspace (MWS).** Of the 64 companies in the sample, four companies were tenants of the MWS that the project provided, with a combined total of 90 employees. One of the companies were nascent companies (founded in 2003), with total of 30 employees and the other three were start-up companies (two founded in 2006 and one in 2005) with a combined total of 50 employees. Most of the companies used combination of business consulting and training services. The nascent companies, M-possible, engaged in the development of wireless entertainment content (30 employees), and used services for capability assessment and software process improvement along with business development services. The training services the company used were multi-faceted covering IT project management, financial management, and tax and custom legislation.

The service needs of the three start-up companies were varied as well. AIT, with four employees, engaged in the implementation and support of large-scale technological systems and their components did not use any training services at all but used consulting services for legal matters and business development. In contrast, Ismotech, the other small start-up company (six employees), engaged in mobile applications development, used legal services, technical consulting for positioning and tracking solutions, including training in this area and received an internship in Europe. Sourcio, the largest of the three start-ups (40 employees), contracted for a wide variety of consulting services and training. The business services used include legal and accounting services, assistance for participation in trade expositions and consulting in technical aspects of the industry. The training of the company's

employees covered product management, Java web components, computer and network security and effective sales.

**Conclusions**

There appears to be a considerable demand for EIF's services, from which about 70 percent of the companies in Armenia's IT sector have benefited. The project's hypothesis that a combination of business services, sales, promotion and training is necessary in addition to the provision of a workspace seems to be valid in the current Armenian market. Also, given that only a small portion of the company's assisted (eight percent of the companies in the sample) actually occupy the workspace that EIF provides, the Foundation functions more as a virtual incubator, Also, as envisaged at appraisal, the EIF assisted primarily nascent companies and companies that have been in existence for a long time, requiring an upgrading of skills and business development. EIF's services were not only confined to IT enterprises. The company also provided services to institutes and universities, primarily technical training. With hindsight, in designing and incubator project, it may be best not to specify a number of business services and training packages in advance, instead allowing flexibility in meeting the varied needs of Armenia's IT industry.

# APPENDIX F - Introduction E-mail


## Your Needs With Regard to Business Incubation

Dear Sir/Madam,

This questionnaire is part of a research project aimed at understanding the specific needs of IT enterprises with regard to business incubation and is conducted by Economic Development and Research Center (EDRC) with the support of EIF. Your responses are essential in enabling our partners to obtain as full an understanding as possible of your needs as a high-tech enterprise in Armenia.

The questionnaire should take you about seven minutes to complete. We kindly ask you to answer the questions in the space provided; you may choose to High-light the fields to make them more visible. After completion, you can return the questionnaire automatically by clicking on the <Submit by Email> button. All the information you provide will be treated in the strictest confidence.

The findings from your questionnaire will be used as the main data set for the research. The research results will help to improve the business incubation system in Armenia by further focusing it on the specific needs of the Armenian IT industry. A summary of the findings will be sent to you digitally.

We hope you will find completing the questionnaire enjoyable. The responses of all significant IT enterprises will be collected until the 8th of June 2009.

Sincerely,

Bagrat Yengibaryan
Director
EIF