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Factors Determining Success/Failure in Business Incubators: A Literature Review of 17 Countries

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Factors Determining Success/Failure in Business Incubators: A Literature Review of 17

Countries

A Major Qualifying Report

Submitted to the Faculty of

Of the

Worcester Polytechnic Institute

In partial fulfillment of the requirements for the

Degree of Bachelor of Science

By

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Approved By:

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1. Introduction

The best estimate indicates that as of October 2006 there are about 5,000 business incubators worldwide; 1,115 of these located within the United States alone (NBIA₃, 1). In the most literal sense, a business incubator is a building that houses tenant companies that are in the initial phases of formation. Business incubators are, however, much more than companies whose goal is to house new entrepreneurs; they are more than just buildings. What defines a business incubator is a mix of internal and external services that come together within the context of a country's government and culture to generate new businesses that contribute to that country's economy.

The business incubator community consists of those who have a knowledge base about business incubators, either from working in one, or undertaking evaluative research. Among the international business incubator community, there is no one recognized "science" or step-by-step method for starting and successfully producing a business incubator. However, the published literature in the aggregate does suggest guidelines for the design and management of a business incubator. The research, from which these guidelines can be inferred, addresses the questions: what are the factors that produce successful business incubators, as well as those that lead to less success.

This paper is about more than just "success" and "failure." It goes beyond these factors to present the anatomy of a business incubator, and what role, if any, government and culture play in its formation and continuation. It also includes case studies of existing business incubators that explain success and failure factors in a real-life context. A substantial body of appendices is included as well to present additive case studies and

raw data that bolster the explanation of business incubators and what leads to success and failure.

1.1 Purpose/Scope of Paper

This paper is in fulfillment of the need to do a Major Qualifying Project (MQP), within the Society, Technology, and Policy major at Worcester Polytechnic Institute (WPI). The research for the project took place at SRI International Center for Science, Technology, and Economic Development (CSTED), located in Arlington, Virginia. While WPI does offer various MQP sites outside of the main campus, the Arlington, Virginia branch of SRI International had not previously been one of these sites, although SRI International's main branch located in Silicon Valley is an annual MQP site for WPI students. With the help of Professors John Wilkes, Kent Rissmiller, George Heaton of the WPI Social Science and Policy Studies Department, Natalie Mello of the Interdisciplinary and Global Studies Division at WPI, Charles Kornik, Administrator of Academic Programs at WPI, and David Cheney Director of SRI International's Science and Technology Policy Program, this project was able to take shape. A residency at SRI International occurred from June 12th 2006 until July 28th 2006.

1.2 Organization

This paper is broken down into six logical components. The first part discusses the specific attributes of what makes up a business incubator (Section 2). Next, it goes on to explain why business incubators are becoming more common in the international landscape (Section 3). Section 4 covers Methodology and Data. After this, the paper analyses Problem areas (Section 5) and “success factors” (Sections 6 and 7) in relation to business incubators. The fifth part of this paper is to discuss relevant cases from within

the literature throughout all sections, in order to show examples from the business incubators that were reviewed. Specific case studies of individual business incubators are also included within the paper in order to provide an in depth analysis of “successful” business incubators (Sections 8.0 and Appendices: 1.0).

In conclusion this paper shows that due to external factors such as government policies and culture, there cannot be a method of producing business incubators that always leads to success. The paper thus asserts that these external factors play the most important role in the ultimate success or failure of a business incubator. This elucidates whether or not there are only certain external environments in which business incubators can flourish.

2. What is a Business Incubator?

2.1 Definition of an Incubator

In its most literal sense, a business incubator is a building that houses tenant companies that are in their initial phases. However, a business incubator is more than just a building. Their goal is to assist in the development of new entrepreneurial organizations while they are in their initial phase. By doing this, business incubators are able to help these new companies survive and grow during a period in which they are most at risk for failure. The overall goal of any business incubator is to produce companies that are “successful.” More specifically, the goal is for these companies to be able to “graduate” or leave the incubator in a financially stable state and be able to operate on their own upon graduation from the business incubator (NBIA₄, 1).

While an inexpensive building to house a new company’s first business is a plus (and is offered by a business incubator), it is not the main reason why new companies

choose to enter a business incubator. The reasoning behind entering is mainly because of the services that are offered to these new companies by the business incubator. In any business incubator the ideal situation is that they are capable of providing client companies with business support services and resources that are tailored specifically to the individual firms.

These services are generally developed by the management of the incubator. They can either be offered within the business incubator's walls or outside the incubator through contact networks. Internally, there are two types of services that are offered: facilities and business services. When it comes to facility services, business incubators tend to offer rental space, flexible leases, shared equipment, shared basic business services, and technology support services. A business incubator's offer of service tends to include management guidance, technical assistance, consulting that is geared towards the individual company, and aid in obtaining the finances needed for company growth (NBIA₆, 1).

External services tend to depend on what types of internal services the particular business incubator offers. For example, if an incubator does not have a person on staff who is knowledgeable about filling out government grant forms, most incubators will know someone within their contact network to whom they can send a tenant company. As a result the tenant company can receive help even though the service is not offered internally. The costs for these services can vary depending on the agreement the particular business incubator has with that person/company. The majority of the time fees are reduced, but not free.

2.2 Types of Incubators

According to the National Business Incubation Association (NBIA) there are five basic classifications of business incubators. The NBIA will be discussed further in later paragraphs. These classifications are mixed use, technology, manufacturing, service, and other. The NBIA breakdown of incubation programs (of those incubators the NBIA has researched) for these five types is the following: Mixed use - 47%, Technology – 37%, Manufacturing – 7%, Service – 6%, and Other – 4% (NBIA₅, 1). While the meaning of what technology, manufacturing, and service incubators are is generally understood, “mixed use” and “other” are not. Mixed use relates to business incubators that have more than one type of company under its roof. This means that a mixed use business incubator can have tenant companies that not only produce new technology, but also ones that produce services. By comparison, technology incubators only have tenant companies that produce new technologies. The classification of “other” according to the NBIA includes business incubators that are for web-related businesses, community revitalization programs, and simply “other.” Because of these five different classifications, business incubators are sometimes more commonly referred to as technology incubators.

2.3 Definitions of Related Terms

2.31 Tenant Company

Tenant companies are, for the purposes of this paper, what fledgling companies will be called. These are new companies that choose to come into the business incubator in order to take advantage of the services offered by the particular business incubator that they choose to enter.

2.32 Research Park

Research parks are seen as property-based ventures that have research and development facilities. These facilities are used for technology and science based companies. Research parks tend to be larger projects than business incubators; they usually span many acres or miles. Unlike business incubators, they house big and small companies, and government, university, and corporate labs. Research parks also do not offer the types of business assistance that is seen within business incubators. However, some research parks do include a business incubator that tends to be focused on new companies (NBIA₂, 1).

2.33 Science Park

Science Parks are usually described as a development of industrial nature, which accommodates high technology ventures. Generally, they are associated with a higher education research establishment. This linkage allows for the “cross-fertilization” of ideas between researchers and entrepreneurs. As a result, academic knowledge can be effectively applied to commercial use (Narains, 1).

One key piece of information to remember concerning both science and research parks is that many people within the business incubator community not only feel they are the same thing, but also use the terms interchangeably.

3.0 International Interest in Business Incubators

Business Incubators can be found in more than seventeen countries around the globe; everywhere from Argentina to the United States.

A business incubator’s ultimate goal is to produce financially viable companies. As a result, the main reason there is such a high level of interest in business incubators internationally is that these business incubators bring with them a possibility of

increasing a country's economy. Tying in with this reason is a second reason behind international interest in business incubators: they aid in the development of new start-up businesses. A third reason is that business incubators help create jobs in the specific countries they are in.

All of these reasons point back to the goal of not just increasing a country's wealth, but also how the country is viewed by the rest of the world. For those countries that may not be economically superior, business incubators allow them to help themselves become more affluent. By increasing employment rates they also increase morale. Likewise, when a particular country's business incubator results in a best practice(s) becoming recognized by the international community, this aids in further increasing morale. When a country becomes recognized as a serious competitor in particular areas, it leads to new opportunities for that country, such as consulting and thus even more job opportunities. The reason morale (relative to business incubators) is so important is that it affects how those within a country view the specific incubator. An increase in morale can lead to more of the population becoming willing to take a chance, bring forth their new ideas, and enter into a business incubator. When morale is lowered however, just the opposite occurs; it leads to disinterest and possibly the ultimate failure of the business incubator due to their not being able to find tenant companies willing to enter the business incubator. Another reason it can lead to failure is that if the public is against business incubators, the government could pull out funding, which in some cases could cripple individual business incubators.

One example that represents all three of these reasons is the case of Helsinki, Finland. In 1994, Helsinki had an unemployment rate of 19%. Seven years, and fifteen

incubators later, the business incubators of Helsinki, Finland had created 3,352 new jobs (Abetti, 34). The opportunity for new jobs does not just come from within a business incubator. There is also opportunity when a company graduates and is successful for an even greater number of jobs to be produced.

Another positive side to business incubators, in conjunction with the three previous reasons, is that business incubators can be started in vacant buildings with a country. One example of this is The Austin Technology Incubator (ATI). By 1989, in Austin Texas, vacant office spaces were a problem. However the idea was proposed to start a business incubator and in 1989 the ATI was founded to aid in pursuing the goal of filling empty office spaces (Gibson & Wiggins, 59). Not only do business incubators remove the problem of unused real estate, they can also eliminate the problem of a business incubator trying to find a space in which to locate themselves. In some cases it can even lead to land being bought at a lower rate. This is helpful because it not only aids in decreasing startup costs for the business incubator but can lead to even cheaper rent for tenant companies.

One last reason that there is such a large interest internationally in business incubators is that it aids in the transfer of technology between universities and corporations. Universities are able to not only bring their new ideas into an incubator and bring them to life, but are also able to get the managerial training they may not be able to receive when going through a university program. In addition, those coming from a university are able to more easily promote and garner the attention of corporations, so that technology transfer can occur.

To those outside of the international business incubator community, or those not well-versed in what business incubators are and/or what their purpose is, business incubators are viewed as a “current fashion” that sooner or later will not exist. This does not seem to be the case to those who within the international business incubator community however. To those who are very knowledgeable and well-versed on what an incubator is, especially those in the international business incubator community, business incubators are seen in a positive manner. They are viewed, if handled successfully, as a huge asset to the particular country they are located within. They are not seen as a current fashion, but rather as a here to stay.

The reasoning of those outside the business incubator community who view business incubators as just a “current fashion” is manifold. The first is the conversations held among those in the academic and also Science, Technology, and Policy communities. Few of those spoken to had an understanding about not only what a business incubator was, but what their purposes are and how they function. Those that were knowledgeable about business incubators were those within the business incubator community, who for some reason or another, had done research on business incubators. This includes those who have firsthand knowledge of business incubators from working at one and also those who have done reviews on business incubators to see how they function.

A prime example of a group within the international business incubator community is the National Business Incubator Association (NBIA), a nonprofit, private membership organization that was started in Athens, Ohio. The NBIA quotes itself as being “the world's leading organization advancing business incubation and

entrepreneurship”. Their mission is to offer training and provide a “clearinghouse” for information pertinent to incubator management and development. Also, they make available information on tools for assisting start up and fledgling firms. The NBIA provides professionals around the globe with advocacy, education, information, and networking resources. It is primarily comprised of incubator developers and managers. However, educators, technology commercialization specialists, and business assistance professionals are involved. They are governed by a fifteen member board of directors that are said to represent the world’s leading incubators. They claim that they currently have 1,450 members. Also, they do not represent just one type of business incubator, but “engage and represent all segments of the business incubation industry” (NBIA₁, 1).

4.0 Methodology and Data: What Factors were looked at?

4.1 Methodology: Analytical Approach

The conclusions of this paper are largely based upon a comprehensive literature review of seventeen countries. The countries were chosen based upon the interests of SRI International and those countries for which literature could be found. The following are the seventeen countries whose literature was reviewed: Argentina, Brazil, Canada, China, Czech Republic, Egypt, Finland, Germany, India, Ireland, Israel, Italy, Nigeria, Philippines, Taiwan, United Kingdom, and the United States of America. In addition, five specific business incubators were reviewed from within the literature of these seventeen countries: two from Brazil (Biominas and ParqTec), one from Germany (Technologie Centrum Chemnitz), and three from the United States of America (Akron/Summit Industrial Incubator, Advanced Technology Development Center, and the Austin Technology Incubator). It is important to note that there are many more

business incubators found throughout the world than just in these seventeen countries. The data and examples that this paper uses are solely based upon the literature that was reviewed; no outside sources were used.

From this literature review the information presented was synthesized and then critiqued. Literature used was found via internet researching using key words. The following are the broad key words that were first used: business incubators and international business incubators. Following this, specific countries were placed into the Google search engine, along with the phrase “business incubators.” For example: “Business Incubators in China”. There was no set way to choose the particular countries that would ultimately become part of the data set. It was a very random selection, due to literature not being abundant. Countries were chosen if enough literature was present such that it could be analyzed according to what type of data the study was looking for.

The literature used in this study was secondary research rather than interviews. In all, twenty one sources were examined. The majority of the literature found was informative, meaning that its purpose was to provide information in an unbiased manner. The general setup would include background on the country and/or the specific area in which the incubator was located and what the incubator did or did not do well. Within these sources, there were also comparative papers. These papers would give all the same type of information the informative papers would, but also would compare and discuss the particular business incubator to at least one other business incubator. The conclusions of this paper thus are limited in respect to this secondary research style.

After the information presented in the literature was synthesized, it was broken down into three basic groups: data attributes, and services provided by business

incubators. These groups aided to facilitate the process of critiquing the individual business incubators. The following sections will give further detail about these specific groups or types of information.

4.2 Data

The “data” group was split into two parts, one being statistical data and the other being basic information pertaining to the individual incubator that was reviewed within the literature.

Statistical data:

- Total number of business incubators within the country
- Number of business incubators that have succeeded
- Number of business incubators that have failed
- Total number of tenant companies
- Number of tenant companies that have been successful
- Number of tenant companies that have failed
- Number of tenant companies that have graduated
- Percent of graduates
- Survival rate
- Revenue Generated
- Number of jobs tenant companies have produced
- Number of jobs Graduate companies have produced
- Total number of jobs produced by business incubators

Basic information:

- “Success” or “failure”
- Year the program started
- Year of information
- Affiliation
- Type(s) of industry
- Biggest issue

Specific descriptions/explanations of each of these categories can be found in the appendix.

4.3 Attributes of Business Incubators

Attributes of business incubators are external and internal factors that have an impact on an individual business incubator. External factors are factors that are outside of the realm of specific individual business incubators' control. Internal factors are those factors that a particular business incubator has control over.

4.31 External

The following will be a brief description of all the external factors that were looked at. The external factors that were looked at are the Country's Science and Technology Program, Intellectual Property Program, Risk Culture, and if autonomy is needed from the government. In regards to the science and technology program, this refers to if a country has a strong program within the government pertaining to science and technology or not. Likewise, "Intellectual property system" is if within each particular country there is a government run intellectual property system. "Risk culture" represents if within a country that the individual business incubator is located in, if it is deemed acceptable to take risks, or not. A fourth external factor is if autonomy from the government is needed or not. This refers to whether a specific business incubator within their country would benefit if they were to cut ties with their respective government in regards to money and the management of the particular business incubator.

4.32 Internal

The internal factors that were analyzed are: a process to pick tenants, set stay period of tenant companies, whether rent increases over time, and whether or not tenants

leave the incubator. The idea of a process to pick tenants in regards to this study is if a particular business incubator has a set process and requirements for entry into the business incubator. "Set stay period" is whether or not an individual business incubator has decided upon a specific period that a tenant company can stay within the incubator's walls and when it must leave. Accompanying this is the idea of rent increase, or if an individual business incubator will increase the price of rent to tenant companies depending on how long they stay within the business incubator. Lastly, if tenants leave, refers to if tenant companies that are residing in the particular business incubator are graduating and leaving the business incubator.

4.33 Cooperation among Business Incubators

Cooperation among business incubators is both an external and internal factor, so it is difficult to place it in one group or the other. For this study, cooperation among business incubators is whether within a country there is cooperation among all of the business incubators or not. The reason it is an external factor is that the government can and sometimes does play an active role in starting and facilitating cooperation. Internally however, an individual incubator must not just agree to cooperate with other incubators, but must also ensure this cooperation actually occurs.

4.4 Services Provided by Business Incubators

The last group is services that the individual business incubator offers to its tenant companies. The following are the services that were looked at: whether the manager was strong/skilled, type of administration, networking, facilities, finances: sources, finances: type, finances: what needs finances addresses, technology infrastructure, entrepreneurial

culture, inter-tenant communication, laboratory facilities, job training, advisory staff/board, and if the business incubator keeps records.

5.0 Problem Areas

Regarding the topic of Business Incubation and incubators internationally, there are those countries that are deemed “successful” and those that are seen as “failures”. This can vary depending on the view that one takes. This view can come from either an internal position, or from within a particular business incubator, or an external position, one who is not associated with the incubator. The issue of “success” or “failure” also depends on why the specific business incubator was set up originally. The following are areas of program deficiencies seen within the context of the research, which will be discussed further in the following sections: government policies, culture, finance/funding management, tenant entry and exit, monitoring, and services. Again, any information that is used for this section comes from the literature itself, and no outside sources.

5.1 Government Policies

One of the largest problem areas for business incubators is that of national government policies within the specific area it is located. This problem has been referenced in literature involving business incubators and the incubation process of Argentina, Chile, Germany, India, Nigeria, and the Philippines. The Philippines is one of the standout cases of this particular problem. In the beginning, when the idea of business incubators in the Philippines was being explored, little or no attention was paid by those in charge of what actually constituted a businesses incubator (Joseph & MacDonald, 24). The end result was that the business incubators were built in haste, without taking into account local infrastructure. To those involved with the Philippine incubators, it did not

seem to matter what was being created, just that something was being created. This thought has resulted in the business incubator program in the Philippines losing focus and direction. Also, problems are “unnoticed” at the policy level (Joseph & MacDonald, 24).

A second example of a country with the problem of government policies negatively affecting themselves is that of Argentina. Business incubator programs in this country were not started out of need, but because they had worked elsewhere around the globe. Almost every change in the government of Argentina resulted in prior policies and government officials being discarded. In addition, government programs were not “officially” being ended (Joseph & MacDonald, 10). This can lead to confusion over who to talk to and how to get in contact with someone to help the particular business incubator. It is a huge problem for business incubators who are funded mostly by their particular governments, because a change in the political environment can lead to the loss of funds and the business incubator could collapse.

In the City of Buenos Aires, in Argentina, yet another problem can be seen: lack of cooperation among the business incubators due to politics. In Buenos Aires alone, there are four public business incubators: UBATEC, BAITEC, INCUBA, and FADU. FADU and INCUBA both specialize in the field of design, while INCUBA and BAITEC both partially belong to the Secretariat of Economic Development. Neither of these two sets of business incubators cooperates with the other. While it could be said that competition is good, it is not when a business incubator has difficulties finding tenant companies to fill its building (Joseph & MacDonald, 9).

5.2 Culture

Cultural issues arise for business incubators when a country has an aversion to entrepreneurs. A business incubator is only as good as the tenant companies within it. Tenant companies come from local entrepreneurs who are willing to strike out on their own and take a chance in creating their products from their idea. When there is a lack of entrepreneurs, there is a lack of quality tenant companies, which is a problem for business incubators.

The country of India appears to have a strong aversion to entrepreneurs, which runs very deep within their societal system. The first issue is that those in society that to outsiders would appear “innovative” are largely ignored by those internally, unless a foreign country acknowledges these individuals (Gupta & Shukla, 2). Another problem that is present in India is that their education system is highly rigid. This also ties in with a suppressive social environment. In this social environment, deviation from traditional paths is viewed in a negative light. The result is that few people are willing to deviate from the social norms and become entrepreneurs (Gupta & Shukla). This leads to the business incubators of India having an overall lack of tenant companies available for entrance into the business incubator, because it is socially unacceptable to do so.

Another issue related to culture is that of what happens when a business incubator or any person involved is labeled as a failure. In some countries, those who fail in the business world can find jobs again in the same type of field because they are viewed as having expertise. However, in China this is not the case. In China, failure is unacceptable and can lead to one becoming a target of criticism, both from peers and the government. Being labeled as a “failure” can lead to one becoming a target of criticism (Harwit, 5) and the potential of finding another job in a business incubator highly unlikely.

5.3 Funding

Without funding business incubators could not exist. The main problem related to funding is the lack of or limited access to it. In the majority of the cases, the process of business incubation is taken up by the respective nation's government. While a good idea in practice, its result is that business incubators become heavily reliant upon government funds.

Brazil is one example of a country with funding issues. In Brazil, the SEBRAE organization within the government gives forty percent of the nation's business incubators funding (Joseph & MacDonald, 9). The problem that arises is that there is limited access to funding in Brazil; there are no established venture capital funds. As a result, if the government decided to stop financing business incubators, they would have few places left to turn and could end up having to close their doors. Biominas, an individual business incubator located in Brazil, further shows the problems that are present in Brazil's system of funding for its business incubators. Not only did Biominas lack money in the early stages of construction, because they need to payback their loan from the government, this loan is now limiting the profitability of the business incubator (Joseph & MacDonald, 25).

The country of Germany presents a twist to the same problem of government funding seen in the case of Brazil. The funding responsibilities of German business incubators have trickled down to being that of the host towns the particular business incubators are located within. Out of one hundred and thirty individual business incubators seventy-five percent of their local host towns hold equity in the business incubators. Forty-five percent of the cases receive money specifically from local town banks. Similar to the problems that arise when a national government is giving business

incubators most of its funding, the same goes for when towns give a majority of the funding for business incubators (OECD, 55). If the internal government changes and the towns decide to pull out support, the business incubators would have very few places to turn.

5.4 Management

The issue of management is not so much a matter of whether managers are present or not, but that of management qualification and level of involvement that managers take within the business incubator. The majority of business incubator managers from the seventeen countries are employed by the government. The result is that the managers tend to be inefficient and lack the proper business training, or even have no business training at all. One instance of this problem can be seen in the case of the Philippines. There are two separate issues that arise here. The first is that while some managers are extremely helpful to their tenants, they are under qualified. This means that as much as they attempt to help tenant companies they are just not able to productively help them with all of the tenant company's needs or issues. The second issue is that many managers in Philippine business incubators will not admit that they are actually managers (Joseph & MacDonald, 15). This results in tenant companies having no one to turn to when an issue comes up.

Yet another problem in the realm of management is embodied by Chinese business incubators. In the Jinghai Hi-Tech Business Incubator located in Beijing, the particular manager only devotes her time to aiding five out of the thirty two tenant companies located within her business incubator. It is these five she deems those most likely to succeed and thus the most profitable. What the manager probably would not say

is that of each of these five business incubators, she holds fifty percent equity of the companies (Harwit, 3).

5.5 Tenant Entry and Exit

Business incubators can only achieve positive results if their tenant companies are successful. Without tenant companies who can grow and graduate in a timely fashion, an incubator will not become a “success”. This idea of timely fashion varies from business incubator to business incubator. While an important aspect of tenant entry is admission criteria, it is not the only aspect. One must first have entrepreneurs and thus potential tenant companies willing to enter a business incubator because admission criteria can be applied. One example of this is Argentina. In Argentina, they have a low quantity of potential tenant companies available for entrance into a business incubator. The result of this problem is that the mission statement and admission criteria of the Argentinean business incubators are kept vague. This is done so that possible tenant companies are not excluded from entrance into the business incubator (Hoeser, 12). This is a problem, because when there are no specifics to just what type of entrepreneur can be let in, it points at a lack of understanding of what the surrounding area (town or even country) can support economically. Meaning if there is no demand for a certain product or even a need, the product will not be bought. As a result the tenant company will not grow and prosper.

Admission Objectivity is also a problem. In Nigeria and the Philippines, those who have political connections have a much better chance of getting into a business incubator. “In some instances genuine entrepreneurs are denied admission in favor of speculators, political appointees and top government functionaries” (Adebite, 163). This

means that regardless of how big an impact your product could have, you need the right connections to even be admitted into a business incubator. This can ultimately lead to discouraging others to attempt entrance into business incubator and no tenant companies wanting to enter the business incubator. Both of these can lead to the ultimate failure of a business incubator.

The process by which tenants exit an incubator can also bring forth problems. Like the previously mentioned issue of tenant entry, this is also a problem for Nigeria. In Nigeria, tenant companies have been known to stay up to twenty years within a business incubator. One reason this appears to be the case is because of the overall reduced rent rates. Another reason brought forth by the tenant companies as to why they are not willing to exit the business incubators, is because they say the government has yet to provide a suitable alternative location (Adegbite, 163). When tenant companies do not exit business incubators in a timely fashion, usually set forth by the individual business incubator, it has a profound effect on the business incubator. The biggest reason is that it stops the flow of new tenant companies coming into the business incubator. If there is no room within, new tenant companies cannot enter, because the business incubator cannot support them.

5.6 Monitoring

The lack of monitoring refers more specifically to the lack of records that are being kept of specific business incubators' activities. When there is a lack of monitoring, there is a lack of information. Therefore when there is no accurate record of information it is difficult to probe if a business incubator is "successful" or even if it is making progress and what type of progress. The following concerning the Philippines is an

example of how not keeping records can negatively affect a business incubator. In the Philippines the managers of business incubators are afraid to monitor the progress of their particular business incubator. This is due to the fact that they fear keeping records will result in those that need less technology transfer and an incubator becoming more successful (Joseph & MacDonald, 12). This would ultimately defeat the purpose of a business incubator. Another country that has a problem when it comes to monitoring is Canada. In Canada there are no independent studies of financial performances done or even any studies measuring success (Kumar & Kumar, 18). The lack of monitoring is specifically important when it comes to this paper. Finding research on business incubators is no easy task. This is due to the fact that if incubators do not keep records of information it is hard to have any discussion on what is working and what is not. All that can be determined is if it is making money or not. Some countries feel that if they do not monitor they will have a less likely chance of getting funding taken away. This is bad because no records of what went wrong means that there cannot be any improvements made because the staff does not know what to fix or is not willing to admit to the problems that are present within a business incubator.

5.7 Services

Out of the literature that was read pertaining to the above mentioned seventeen countries' business incubators, the following conclusion can be made: offering services to tenant companies is a must for any business incubator. What is not clear however, is what combination of services is the best choice to offer tenant companies. The other main issue is that regardless of what these countries are saying they offer, in practice they may not actually be offering these services they say they are.

Services usually come in the form of infrastructure support or consulting/business support. Infrastructure is important because it allows for new companies to not have to worry about issues such as meeting rooms or laboratory facilities, because they are already in place. As a result they can spend more time focusing on their own personal businesses. Also, infrastructure is important because it decreases the overall costs of tenant companies, because they do not have to build their own laboratories or meeting rooms.

Consulting/business services are important because the majority of new start-ups have no idea how to run a business. Some business incubator programs offer outside consulting contacts, as well as internal. This is done when a particular business incubator cannot internally supply a tenant company with the service(s) they need. While this is better than not offering the service, it usually does end up requiring the tenant company to pay an extra fee.

Germany and the Philippines are two instances where the issue of problems with services comes up. In Germany business incubator programs put more emphasis on physical infrastructure and office services rather than actual consulting services. Few German business incubators have in-house financial facilities (OECD, 58). The problem with the Philippines can be summed up in the following quote: “That was the problem – TBIs [technology business incubators] were always looking for a phone” (Joseph & MacDonald, 18).

5.8 Other Problems

There are also various other problems that incubators have run into that do not fit into any broad categories. For example, in Argentina, scientific research is not produced

for industry (Hoeser, 3). This results in a lack of strong links with the market. Another problem that has arisen, that could be seen as both positive and negative, is that of business incubators being based on foreign models. This is positive not just when the country is basing itself on a model that has been successful, but more so if and when a country is able to translate the business model used, to their own specific country and its capabilities. Examples of this can be seen in Argentina, who based themselves on Italian business incubators (Hoeser, 11), and China who based themselves on North American business incubators (Harwit, 1). Both of these business incubators have chosen role models, but still were unable to become successful.

6.0 What is “Success in Relation to Business Incubators?”

It is very difficult to define just what “success” represents relative to business incubators represents. There are a number of reasons for this. The first is that business incubators are started for many different reasons; some, to increase the economy, others to increase the job market. Other business incubators are not started with a clear mission in mind. Because of different starting points, or no starting point at all, it is difficult to view how well a business incubator is doing. Within the international business incubator community there is also no clear markers of what “success” actually is. One can even review the problem of business incubators not monitoring their activities to show another reason why “success” in business incubator terms is hard to define. The following is one way that has been suggested to mark “success”:

1. Surviving and growing profitably
2. Surviving, growing, and on a path to productivity

3. Surviving, but is not growing and is not profitable, or is only marginally profitable
4. Operations were terminated while still in the business incubator, but losses were minimized
5. Operations were terminated while still in the business incubator and losses were large.

Of these five, numbers one and two are clearer measures of success, while three and four tend to be debatable, and five is a definite measure of failure. Due to this issue of defining what “success” is, it is difficult to say overall if a particular country or individual incubator is “successful”.

7.0 Key to Success

7.1 Clear Mission Statement

The mission statement of a business incubator needs to be clear, so that everyone involved with each aspect of the incubator knows what the purpose of the incubator is and what its long-term goals are. This also aids in the development of intermediate goals, which are very important for business incubators. They are important because they define what the overall goal is intended to be. In addition, once the mission is clear, it will be easier to admit tenant companies that fit into the overall purpose of the business incubator.

Once a clear mission is set, there is a need to develop it into logic, so to say, that others can relate to. This is especially important when it comes to raising funds. It also aids in having the business incubator becoming more accepted in the community it is placed in. An example of this is the Helsinki, Finland Business Incubators. At the time

that business incubators in the region were first starting up, those in charge proclaimed the Finland Business Incubators as vehicles for employment, technology transfer, and exports. They were so successful in selling their points, that fifty percent of their budget was from the government, with forty percent of that coming directly from the European Union (Abetti, 24). The Helsinki business incubators were so successful in using their mission statement that they were able to receive funding from inception until 2006 (Abetti, 34).

7.2 Ties with a University

Having ties to a, preferably local, university is very important and extremely beneficial to any business incubator. This is because being connected to a university allows the business incubator to have access to potential new tenant companies. Also it allows for student workers to participate within the business incubators, and lastly an increased level of credibility for the business incubator. Student workers are important to a business incubator because these students are able gather experience while working within a particular business incubator. The result of this is that ultimately these students, because of their familiarity with the business incubator, may be end up working for the business incubator upon graduation. Also, having university ties can give a business incubator access to laboratory space they may not have had otherwise. This is a positive result and also saves money because then the business incubator does not have to build their own. So, the overall starting costs of the particular business incubator may in effect be lowered. Examples of business incubators associated with local universities are: The Advanced Technology Development Center (ATDC), Georgia, whom is connected to

The Georgia Institute of Technology, and The Austin Technology Incubator (ATI), Austin, Texas, who works in conjunction with the University of Texas, at Austin.

7.3 Tenant Entry Selection and Exit

The most ideal situation for selecting which tenants will enter a business incubator would be the formation of a selection committee which would choose the new tenant companies. Making the choice, of which tenant companies can enter, should be based upon criteria that have already been agreed upon. While a selection committee is important, if an incubator is unable to form one, admission should still be based upon set criteria.

During the process in which business incubators choose their tenants, the following is an ideal situation to be followed. Tenant companies should give both an oral and written showcase of their company to the committee of whoever is making the decision within the particular business incubator. One example of admission criteria is the following from the ATDC, in Georgia: The decision process begins with a staff review of applicants' growth potential, product marketability, quality of management team, and application of new technologies in products, services, or processes. This is then followed with a potential company giving a presentation of a complete development plan to the selection committee (Culp & Shapira, 4). A decision is then made based upon both written and oral materials that the potential company put forth.

Setting a deadline for tenant exit is also very important. This time limit can vary from place to place, but the average time for a tenant company to stay in a business incubator and for that business incubator to be successful is about 2-3 years. In the case of ATDC in Georgia, they expect tenant companies to graduate in 3 years. However it

can be sooner if they meet one or more of the following criteria: 1 million dollars or more in annual sales, more than ten employees, more than 5000 square feet of space needed, and/or constant profitability. Also, some do not graduate from the ATDC in this time period, due to the long term nature of product development process. Generally it is biotechnology companies with products that have lengthy government testing and approval that stay within the ATDC for longer than three years.

7.4 Networking

Networking is as a key to success that a business incubator needs to start as early as possible. There are multiple areas where networking is important. One such area is funding. Funding is especially important because if one does not know the right people, the chance of finding investors is decreased.

A database should also be kept of potential donors. This not only helps the business incubator for funding during start-up phases, but also can help match up tenant companies potential donors. One group of business incubators that has done this type of networking well is the Helsinki, Finland business incubators. The Helsinki business incubators keep a database called KORE that makes experts and donors easily identified and able to be contacted (Abetti, 4).

Networking, in the form of seminars and workshops for the community that a business incubator is in, is another important activity that should be done by business incubators. These seminars and workshops allow for new ideas to be talked about in a “safe” setting. As a result, it can potentially bring in new entrepreneurs, and thus possibly new tenant companies. The reason a “safe” setting is important is because

especially in communities where taking risks is seen in a negative light, personal interaction with those involved in the business incubator community can change people's minds. Going along with this idea, public workshops and seminars also play a role in garnering more acceptance of a business incubator within its respective community.

7.5 Monitoring and Keeping Records

Business incubators need to monitor all of their activities and keep records. Keeping records should not just be limited to finances and contracts, although these two items are very important. Records should also include items such as: the number of tenant companies receiving admission and those exiting. When it comes to exiting, a business incubator should make sure they keep track of if the tenant companies still are a company upon exit or are leaving because they have failed and are no longer a company. The reason record keeping is so important is for receiving feedback – to see if the incubator is doing well or not, and in which areas. One of the only examples from the literature reviewed of successfully keeping records is from the ATDC, in Georgia. In the ATDC, reviews are done annually by the business incubator staff.

7.6 Focus on Services as Opposed to Infrastructure

For a business incubator it is important and necessary to have the appropriate infrastructure in order to succeed. However, being able to offer services is just as, if not more important for the business incubator to be able to offer to their tenant companies than infrastructure. The reason for this is that entrepreneurs coming into the business incubator have a high chance of not having experience in the business world. As a result, they need to be able to have access to the tools and advice that is needed in order for them to succeed. The following are examples of services offered at incubators located in

Helsinki, Finland, Akron, Ohio, and ATDC, Georgia, all of which are business incubators that are highly successful:

- Assistance in locating financial services
- Networking activities
- Business training:
 - o Business basics
- Marketing
- Accounting/financial management
- Investor & strategic partner linkages
- Links to a higher educational institution
- Shared administrative services

These services have successfully aided numerous tenant companies from the previously mentioned business incubators, and are examples of what every business incubator in some form or the other should strive to offer for their tenant companies.

7.7 Strong Manager

From the literature, the idea of a “strong” manager surfaced several times.

However, it was very difficult to figure out just what a “strong” manager was. As a result, the following is a description of what a business incubator manager both needs to have background wise, and needs to be able to do. It is based upon descriptions given by the Philippines, Akron, Ohio, and Austin, Texas:

- Business Experience
- Strong background in operations
- Highly computer literate

- High end financial management
- Marketing skills
- Interpersonal skills
- Highly motivated
- Visionary who wants to see tenant companies succeed
- Can do attitude
- Ability to solve problems
- Willingness to work hard

Needs to be able to:

- Network
- Make these external networks of support available
- Monitor performance
- Able to assess performance
- Be technologically versatile
- Be fully immersed in community affairs
- Be trained at home and abroad

Lastly, all three of the previously mentioned business incubators had different ideas on what it meant to be a “strong” manager and what they needed to be capable of to benefit the particular business incubator. As a result consensus was difficult to find.

8.0 Case Studies

8.1 Austin Technology Incubator, Austin Texas

The Austin Technology Incubator (ATI) was founded in 1989 by the IC². The IC², which stands for Innovation, Creativity, and Capital, was founded by Dr. George

Kozmetsky and was part of the University of Texas, at Austin. The main reason for starting this business incubator was that by 1989, the city of Austin, Texas was in a harsh depression. This depression was caused by two factors, one being a Savings and Loan scandal that led to many of Austin's developers becoming bankrupt, and two, the decline of oil prices. Also, unemployment rates were rising due to the gas and oil industries declining (Gibson & Wiggins, 59). However, what Austin did have that was beneficial was that it was a University town and was home to 50,000 students at the University of Texas at Austin. Also, it had the research facilities of Motorola, Sematech, MCC, and IBM located within it.

ATI was formed by the state government, University, business leaders. It was led by Kozmetsky (Gibson & Wiggins, 60). Originally, ATI was a three-year experiment funded by Kozmetsky, The Chamber of Commerce, the county, and the city of Austin, Texas. Its goals were to generate jobs, fill vacant office spaces, of which Austin had a great deal, build an entrepreneurial infrastructure for the city, create wealth, and diversify Austin's economy. Originally, ATI recruited three "promising" technology startups. Between the time period of 1989-2001 ATI graduated sixty-five companies, created 2,850 jobs, and had 1.205 billion dollars in revenue. They won several awards, including the National Business Incubator Association's (NBIA) "Incubator of the Year Award." Four companies that have graduated from ATI have also won this same NBIA "Incubator Company of the Year Award."

Important lessons concerning successful business incubator practices have come out of ATI. The following are five of the most important factors, or "Best Practices" and a brief description of each one. The first factor is to establish clear metrics of success.

This needs to be at both the industry level, for example reducing failure, and at the local level, for example diversifying the local economy. ATI uses four criteria to measure itself in regards to this factor: value to the university, business creation, innovation, and wealth generation. They also set up programs to ensure success in each of the four areas (Gibson & Wiggins, 60-61).

Providing entrepreneurial leadership, in the form of an entrepreneurial staff, is a second success factor. This aspect is one ATI says is critical in order for the business incubator to succeed. More specifically it is suggested that everyone from receptionist to director within the business incubator should have a willingness to work hard, ability to solve problems, and a “can-do” attitude. Out of all members of the staff, the business incubator’s first director is extremely important, and is an indicator of the future of the incubator. In the case of ATI, Ms. Laura Kilcrease was their first director and aided ATI in becoming a model business incubator program (Gibson & Wiggins, 61)

The third factor is to develop a service delivery system that delivers on behalf of client companies. ATI view is not to have a fancy model, but to have one that is committed to designing services that companies will want, and being able to deliver these services with aptitude and care. ATI provides three different categories of service:

1. Infrastructure Services: By helping out with this aspect, client companies are able to give more attention to business strategies and product development.
Includes: shared services, flexible space, conference space, and internet & telecom
2. Operational Services: By the incubator staff aiding in operational services, day to day issues can be handled.
Includes: 3 major areas – Human resources (ex. benefits), Finance (ex. Accounting), and Marketing and PR (ex. Press contacts).

3. Strategic support services to client companies:
Includes: Business plan development, Advisory Review Panels, Business communications, and CEO mentors.

ATI offers all of these services to their clients and in return receives 1% equity participation in the company and market rate service fees. Lastly, a Guide to Member Services is given to all new companies once they are admitted to ATI (Gibson & Wiggins, 62-63).

The fourth factor is to develop a selection process. This factor is one that can greatly separate business incubators from each other, especially when it comes to success. When selecting tenant companies there are multiple factors that must be considered. The criteria should be appropriate to the context and mission of the particular incubator, should be rational, and flexible in case exceptions arise. There is also a need for high attention to detail and keeping records, especially of contracts, through not only the process of choosing tenants, but overall. ATI's process of selection includes an internal and external process. Internally, it includes the need for oral and written materials from the applicants. The oral materials are generally given in the form of an oral presentation, and usually a PowerPoint presentation. It is a chance to observe and meet the team, and view potential challenges that may lie ahead. The written materials are usually an executive summary and/or a business plan. This is vital because it shows how much knowledge the team has, or in some cases does not have. The external process involves a presentation before a six to fifteen member board that consists of investors, entrepreneurs, and service professionals from the community. This allows for a "fair hearing" of the potential business and is also a way for ATI to connect to the community (Gibson & Wiggins, 63-64).

The last factor is ensuring access to capital on behalf of the companies. This is done by either referrals to outside funding organizations, or an incubator investment fund. Some examples of outside funding are venture capital, angel investment, and government grants. Austin, Texas in 2000 had more than 100 angels, several banks that understood venture investments, and at least thirty venture capital firms (Gibson & Wiggins, 64).

In conclusion, ATI's success has played a massive role in impacting the local economy in a positive manner. It can be said that ATI was a mechanism for the economic recovery in 1990, by performing the following three services:

- Expanding the tax revenues of the region,
- Entrepreneurial infrastructure development, and
- Having increased the demand for commercial office space

8.2 Philippines

The business incubators started within the Philippines during the mid 1990's are an example of a business incubation program with a wide range of problems. These problems include both funding and management. However, the main issue that arose for the Philippines is that in the beginning, it did not matter what was being created in reference to business incubators, just that something was being created (Joseph & MacDonald, 1). As a result, little attention was paid to the definition of a business incubator. Those in charge did take one positive step and decided they should facilitate the contribution of technology to the social and economic "resurgence" of the country, but again how this was going to be done was never established.

Business incubation in the Philippines started in 1990. It is important to keep in mind that the government within the Philippines tends to take an interventionist role

(Joseph & MacDonald, 5), especially regarding business incubators. In the Philippines, the business incubator scheme was a sub-model of a larger program. This larger program was also part of a master plan, which was called the Science and Technology Master Plan (STMP) of 1990. Its goal was outlining the role that science and technology were expected to play in the economic development of the Philippines. The STMP emerged out of the Presidential Task Force for Science and Technology recommendations. Out of STMP came STAND, the Science and Technology Agenda for National Development. STAND would ultimately play a role in what goods and services were to be “incubated” within the business incubators (Joseph & MacDonald, 6). Based upon the literature, during this time period from 1990-1995, the Philippines had five business incubators total; two that were problematic and three that were successful. Due to a lack of information, all that can be said about these incubators internally, in terms of numbers, is that at least seventy-one tenant companies were in the business incubators and thirty-six had graduated from it (Joseph & MacDonald, 10).

There were many problems regarding the Philippine business incubators. Government policies are one of the biggest issues that these business incubators face. These problems in implementation seemingly go unnoticed at the policy level however (Joseph & MacDonald, 24). One of the biggest issues is that the government of the Philippines actively takes an interventionist approach to the economy. This had led to many other issues. In the beginning of the business incubator program little attention was paid to what actually constitutes a business incubator. The business incubators were built in such haste that they did not take into account local infrastructure. The result of this was that the business incubators were supplying the Philippines with goods the industry did not

need. No intermediate goals for success were ever agreed upon either (Joseph & MacDonald, 11). As a result the program lost direction and focus.

Other issues that tie into problems within government policies are funding and tenant entry and exit. Philippine business incubators survive mostly on government subsidies. There is no predetermined limit to these subsidies. As a result, every proposal is considered. This poses two potential problems for them. The first being, that if the government decided to not just put a limit, but take away any funding from the business incubation program, the business incubators could be in serious trouble. The other issue that arises is that someone within the government must go through each and every proposal. This could end up being time-consuming and slow down the process of starting a new business incubator. Another problem that arises is found within the area of tenant entry and exit. In the Philippines, if one is politically well-connected, then one has a much better chance of getting into the business incubator (Joseph & MacDonald, 12).

A fourth problem area is management. There are two different issues that arise here. One is that some managers are very helpful but are under-qualified. This is intensified via the fact that the business incubators do not give their managers job training. As much as managers are willing to be help, they can only go as far as their skill set allows for them to. Someone with a skill set that does not match business incubator's needs will not be successful in aiding the business incubator. The second problem is that some managers will not admit to actually being managers (Joseph & MacDonald, 13). This poses a problem because if a tenant needs help, they will not know who or where to go, to receive aid. The issue of internal services for tenant companies is another large problem within the Philippine business incubators. In practice, few services are actually

offered to the tenant companies. “That was the problem – TBIs [Technology Business Incubators] were always looking for a phone.” (Joseph & MacDonald, 18)

Yet another large problem is that of monitoring. Business incubator staff in the Philippines only monitors financial and administrative matters. As a result there is no way for them to monitor progress, especially because there are no intermediate goals. The fear in the Philippines is that monitoring will result in those that need less technology transfer and incubation will become more successful, which would defeat the purpose of a business incubator (Joseph & MacDonald, 12).

9.0 Conclusion: Lessons Learned

In its first iteration, the research plan for this project attempted to determine whether a universal “best practice” could be identified for creating successful business incubators. As negative findings on this question became apparent, the research needed to be refocused. Ultimately, its central concern became the dynamic of a set of pivotal factors determinative of “success” and “failure.” Drawing on both the evaluative literature and specific case studies, the research was able to infer an “anatomy” of a business incubator, from which conclusions could be drawn concerning the roles that public policy and national culture play in the formation and continuation of business incubators.

The research distilled four major conclusions. Looking first at the available literature, it was found to be biased and/or incomplete. This conclusion holds particular importance for the research in this project, which attempted to make objective comparisons rather than serve promotional or prescriptive goals. Viewed in the aggregate, the literature addressed all aspects of the business incubator environment;

however, examinations of individual business incubators frequently overlooked important aspects. Thus, to be able to progress and learn from the general experience, development of a literature that adequately covers all aspects of business incubators is necessary.

A second set of conclusions pertains to national culture, which represents the social, entrepreneurial, and business attitudes of the populace of the business incubator's particular country. The importance of culture in relation to business incubators is difficult to assess. Examples show that culture can hinder business incubators or aid business incubators. These examples show that culture seems to be a critical determinant for business incubators. The countries that accept entrepreneurship will have successful business incubators. New business incubators would be substantially benefited if the international business incubator community were to do further research on cultural obstacles.

A country's bureaucratic structure can strongly influence the outcome of a business incubator. The stance the government should take in terms of intervention -- forceful or modest -- is difficult to determine. Forceful intervention is when the government plays an active role in the start up and management of the business incubator. Almost all cases show that forceful intervention is destructive to business incubators. A non-interventionist approach can still lead to failure, as in the case of some business incubators in the United States.

Many business incubators focus on the hard infrastructure of the building that will house the tenant companies. The literature shows that a strong physical infrastructure is only a beginning condition, and that appropriate internal and external services available to tenant companies are also necessary. If a business incubator has limited or absent

internal or external services, tenant companies will likely fail due to lack of knowledge about successful business practices.

In summation, it is clear that no universal “best practice for success” exists for business incubators. However, business incubators can learn from both the “successes” and “failures” of previous business incubators to aid themselves for the future. In addition, more research must be done regarding culture and government to find an accurate method that will always lead to success.

Appendices

1.0 Case Studies

1.1 Akron/Summit Industrial Incubator

The Akron Summit Industrial Incubator is a joint effort among Summit County, the City of Akron, and the University of Akron, Ohio. The Akron/Summit Industrial Incubator was created on December 1, 1982. Its first facility was a 42,000 square foot building flanking the University of Akron campus, and was first leased to the University, and then subleased to the City of Akron for seven years. The cost of leasing was only to be the cost of insurance and taxes, while the cost of renovating the building was \$352,000. The renovation costs were however covered by the University of Akron, The County of Summit, and the City of Akron. Eight years later, on November 1, 1990 the incubator moved into a previously abandoned department store building, located in downtown Akron. This new building cost \$200,000 to renovate and was 80,000 square feet. The main reason the Akron/Summit Industrial Incubator was started was to aid new businesses, high growth potential firms, and entrepreneurship, in a period in which Akron, Ohio was “economically depressed.”

One key reason for the Akron/Summit Industrial Incubator’s success was/is its ability to choose tenants wisely. Possible tenant companies are first screened by what is called the Board of Governors. This Board is a combination of Private Industrial Council (PIC), University, City, and County representatives. These representatives use eligibility categories to choose tenants. These categories are: they must be an assembly or manufacturing operation, perform research and development operations, have area wide distribution of products/services, or have a high job growth potential. However they cannot be extremely dusty, dirty, or noisy, and must fulfill common utility and power requirements (Latona & LeHere, 2).

Once accepted into the incubator tenants agree to a first source hiring agreement with the PIC, for all entry level positions. In turn PIC is responsible for placing these employees into job training programs, aiding in tailored performance and training

program contracts, and job training contracts. The management of the Akron/Summit Incubator was given to City Venture Corporation via contract, which was funded with a \$243,000 grant from the state of Ohio. Assistance for the City Venture Corporation comes from three sources: the Small Business Enterprise Center (SBEC), Service Corps of Retired Executives (SCORE), and Student Counselors from the University of Akron's College of Business Administration's Small Business Institute and the Community Technical College.

Out of the Akron/Summit Industrial Incubator has come a four element network or "Best practices," that is designed to "promote entrepreneurship". The first element is entrepreneurial outreach, meaning that individuals need to be identified and be able to explore their ideas in a "non-threatening" manner. Programs such as seminars and presentations allow for discussion in informal settings. A small business assistance center is the second element. The center is composed of small staffs that that works with the entrepreneurs in the early stages, to identify needs, solve problem areas, and help develop business plans. The Akron/Summit Incubator has the Small Business Development Center has three fulltime staff members as well as over one hundred and fifty executives from the community that are part of an advisory staff. The center also helps identify the startups financial needs.

This leads us to the third element: access to sources of capital. These sources include equity and debt (Latona & LeHere, 4). In order for debt funding to occur, close relationships must be developed with commercial loan officers. This responsibility is normally the responsibility of the director of the small business assistance center or could also be the manager of the incubator. The fourth and final element is an incubator facility. Once an entrepreneur has the capital to start their business, they need a location for it. The incubator offers this because of the low cost space and aid in meeting startup and operating costs. Within the facility, the manager is very important. The individual chosen should have a strong background in operations in order to be there for consulting for the incubator on a daily basis.

The Akron/Summit Industrial Incubator from 1983- 1991 had a total of twenty-five tenant companies. Of these 25, four failed and eleven graduated. The rest according to the last given data, were still in the incubator as of March 1991 (Latona & LeHere, 6).

From the time period of 1983-1987, the incubator went from having thirty six employees to having two hundred and fifty five employees, a 600% increase (Latona & LeHere, 7).

Overall, the Akron/Summit Industrial Incubator is said to be successful (Latona & LeHere, 1). The key factors seem to be the four “best practices”: 1) entrepreneurial outreach; 2) small business assistance center; 3) access to sources of capital and an incubation facility, combined with a selective screening process; and 4) available resources.

1.2 Helsinki, Finland

The Helsinki region of The Republic of Finland is home to 1.4 million people or 27% of the Finnish population, and 16 business incubators. Thus, the Helsinki region has one of the highest densities of incubators in the world (Abetti, 21). The country itself is located in Northern Europe, between Sweden and Russia. Its key economic sector is manufacturing and is skilled in high technology exports, especially mobile phones. One of the main reasons Finland has pursued business incubators has been to address the issue of high unemployment rates.

The first business incubator and science park in Finland was created in Oulu, Finland in 1982. This incubator was not located in the Helsinki region however. The second incubator and the first for Helsinki, was the Ontaniemi Science Park and Incubator in Espoo in 1986. This incubator was the only one in the Helsinki region until 1996. Its startup costs were 30 million Finnish markka's (7 million USD). The cost of this startup was covered 19% by share capital from the Industrialization Fund of Finland, and the rest from banks, insurance companies and the city of Espoo.

The main reason for the creation of incubators was that the unemployment rate of Finland in 1994 reached 19%. As a result, in 1995 the three ministries of Trade and Industry, Labor, and Agriculture and Forestry, merged and created the *Työvoima-ja Elinkeinokeskus* (Employment and Economic Development Center), or TE-Center for employment and economic development. The TE-Center was/is directed by Esa Sahlman, also known as the "godfather" of incubators. Through his efforts, 50% of financing for new incubators is covered for each startup, until the end of 2006. The other half comes from sponsors, universities, operations, and grants. Sahlman also had a hand in helping with a program of networking, an area the Finn's now excel in today. From 1996-1998, 15 new incubators were established, and in the year 2002 all were prospering.

When discussing the success of incubators located in the Helsinki region of Finland, the first point of discussion should be culture. Finland's national characteristics are said to include honesty, frugality, and low tolerance for showmanship. Socially, their attitude is one of cooperation. As a result of this, it leads to the Finns being more concerned with the success of incubators as whole rather than individual tenants (Abetti, 22).

Besides culture, one of the reasons that led to the success of the incubators of the Helsinki region is the constant backing from the government – 50% for eleven years, thanks in great part to Esa Sahlman. Sahlman also played a role in another factor that has led to success: networking. The Finland system of networking is not just between individual incubators within the Helsinki region, but also with those outside of the region, and among the partners and sponsoring organizations of the incubators. Also, the incubators are able to draw from a database called KORE, which is a network of experts who are leaders in specific areas (consultants, entrepreneurs, etc.). The database allows for easy identification and contact.

The TE-Center in Helsinki, Finland has aided the incubator startups in numerous ways other than financially. The center offers programs and initiatives to promote entrepreneurship. One such example is a program for management and staff called “Incubators 2002.” The outcome of this educational program has been the creation of four groups working on developing incubators, cooperation among incubators, benchmarking, and incubator activities (Abetti, 24). Another service the TE-Center performs is that they keep statistics on companies and their employees. However, they only do this while the businesses are in the incubators.

A typical incubator in Finland starts out with about one to two employees and exits the incubator at the end of the second year with about seven employees. Within a period of five years from inception, the incubator will usually have about forty employees. Usually incubators stay between fifty and one hundred employees for multiple reasons. Mainly, this is done because it limits risk, but also because of the scarcity of venture capital. The tenant companies leave the incubator in the first place as soon as they grow, because of limited space due to long waiting lists. If a company does

not leave after two years, the management of the incubator may raise rent in order to encourage the tenant company to exit.

The incubators of Helsinki, Finland are viewed as successful. In 2000, 501 companies were located within all incubators, with a total of 859 employees. On average there were thirty companies and fifty-one employees per incubator. The following year in 2001, it was recorded that the cumulative total of companies were 1,949 and total number of employees jumped up to 3,352 (Abetti, 25).

Out of the incubators in Helsinki, Finland has come some best practice examples at both the regional level and individual business incubator level. At the regional level rather than on a national level, they suggest to first setup an organization to evaluate new incubator proposals. Their second suggestion region-wise is to guarantee long term funding by the government by showing why funding is important and should be high priority. In the case of Finland, it was because of the high unemployment rate. By creating incubators, it would lead to new jobs which would then lead to decreased levels of unemployment. Going along with this, joint support is ideal from more than one government organization.

Once all of this is completed, the Finns suggest that the organization in charge, in their case the TE-Center, mainly aids in upgrading the services of the incubators and improving their contributions to the Helsinki region of Finland, and ultimately Finland as a whole. This includes training staff, especially when it comes to cooperation. The suggestion coming out of the Helsinki Incubators is that this cooperation and learning should not just be among incubators in Helsinki, but also among all those in Finland and international incubators. In the case of Finland, it was cooperation and visits from the Rensselaer Polytechnic Institute, USA, and from Ireland. There are also six phases on the individual incubators in Helsinki that can be described as best practices: Incubator marketing and public relations, customer contacts and company selection, check in and contracts, starting procedures and customer guidance, company development, growth, and support, and exit follow up and feedback. Each phase exemplifies the idea of having common procedures across all of the Helsinki incubators (Abetti, 36).

While the Helsinki, Finland incubators are successful, they do not have a perfect system. The main problem is that come 2006, 50% of the present funding will end. They will then have to make up for that money in order to continue being successful. Secondly, Finland has not had a high level of investment by foreign companies because it believes that they would have “added few complementary competencies and learning capabilities to the existing regional base” (Abetti , 38). Overall, the Helsinki incubators show that cooperation on various levels can help business incubators to succeed.

1.3 The Advanced Development Center (ATDC), at Georgia Institute of Technology

The Advanced Technology Center (ATDC) at Georgia Institute of Technology, a non profit organization was formed in 1980. It was developed in order to strengthen Georgia Tech's ability to promote high technology business and to stimulate growth in the technology business base. The idea behind the ATDC came out of the "Technology Business Development Project," which was led by a group of Georgia Tech alumni, known as the Community of Twenty, who in 1979, the advocated a "Technology Business Development Center." The idea for this Center was further pushed along by then Governor George Busbee. Busbee started off by authorizing a study of the State's technology, science, and engineering programs. A year later, the State Legislature decided to give funds for an Advanced Technology Development Center, in order to encourage business-university ties.

The ATDC has moved multiple times since its inception. Their first location was an old high school building. Six years later they relocated to the Georgia Institute of Technology Campus. Besides this location, The ATDC has also expanded to other areas in Georgia which includes the Georgia Centers for Advanced Telecommunications Technology (GCATT), and the Middle Georgia technology Development Center, in Warner Robins, which promotes aerospace and defense related spin-offs, among others (Culp & Shapira, 2).

In the beginning, ATDC hired four professional staff members whose focus was on four key programs: venture capital, education, industrial recruitment, and

entrepreneurship development. Currently, the ATDC central services can also be broken down into four divisions: Centre: Facilities Designed for Startups, Connections: Credibility and the “Right” Connections, Consulting: Advice from Experienced Entrepreneurs, and Community: Environment for Entrepreneurs. ATDC also has the FAST TRAC Venture Program, which is a business training program whose goal is to enable entrepreneurs to develop an elevator pitch, presentations that will be given to potential investors, and an effective business plan (ATDC₁, 1)

Before an entrepreneur can become members of ATD, a completed form and development strategy plan, must be presented and approved by a review committee. This review committee is made up of ATDC staff members. If the entrepreneur(s) pass this first stage, they then move onto a second review stage in which a presentation of a completed development plan is put before the committee. The applicants are judged based upon their product marketability, growth potential, application of new technologies in services, products, and processes, and the quality of the management team. The applicant’s technology also has to be protected by a patent or copyright, and should have a Research and Development emphasis. If an applicant gets through both reviews, a contract is negotiated and they become a member. About one out of every five applicants is approved for ATDC membership.

After becoming a member of ATDC, all companies are reviewed by the ATDC staff annually. Each is also assigned an ATDC Business Management Consultant, who in turn works with the company to address problems that arise. Graduation from ATDC is expected by the third year. It is achieved when firms reach one or more of the following: constant profitability, more than 5000 square feet is needed, more than 10 employees,

acquisition by a larger company, or one million dollars or more in annual sales.

Occasionally companies such as biomedical companies do not graduate within this period. They usually take six to seven years to do so, because of the long-term nature of their process to develop products (Culp & Shapira, 4).

The ATDC is viewed as an extremely accomplished incubator. Since its beginnings, it has generated over 9.3 billion dollars in revenue, and since 1995 until the present, it has graduated 106 companies, with a rate of seventy-five percent still being in business (or were acquired). The incubator has also won numerous awards, including the Randal M. Whaley Award (Outstanding Business of the Year), in 1996, and was named in Inc. Magazine, as one of the nations eight most admired non-profit business incubators, by its peers, in November, 2000 (ATDC₂, 1).

1.4 Case Study: Virtuelles IZET Innovationszentrum Itzehoe (vIZET Innovationszentrum Itzehoe), Czech Republic

Virtuelles IZET Innovationszentrum Itzehoe (vIZET) is a non-profit virtual business incubator based in the Czech Republic. It is owned by IZET Innovationszentrum Itzehoe, and has two major shareholders: the City of Itzehoe and the County of Steinberg. Each holds 47% stock in the incubator (Hausner, 1).

VIZET Innovationszentrum Itzehoe learned about creating virtual enterprises from the state funded project BtoB-Markt Schleswig-Holstein. This program was co founded by the State of Schleswig-Holstein and Deutsche Telekom AG. Its goal was to create virtual enterprises, and implement and promote a new virtual market for the trade of industrial goods. The program included more than 25 “Virtual Mondays” – lectures and workshops that served as a research and communication forum. The outcome of the project included the identification of five main barriers to the creation of virtual enterprises, which are the following:

1. Problem of trust: Reluctance to share information with co-operation partners within a flexible business network
2. Problem of Security: Resistance towards using Information and Communication Technology (ICT) for supporting control and monitoring.
3. Problem of Financing: The cost of investing in hardware and software communication and information infrastructure.
4. Problem of Technical Skills: Lack of suitable technical skill and reluctance to use web based tools.
5. Problem of Virtual Organization & Decentralized Management: The issue of creating a business understanding that stimulates a decentralized management culture (Hausner, 2).

The plan was for vIZET to be able to offer an internet-based platform and offline resources, which will be devoted to starting, growing, and accelerating virtual enterprises. The goal of the incubator is to support the transfer of technology, innovations, business ideas, and start ups, into competitiveness, jobs, profit, and wealth.

The following is an outline of the main elements that make up the IZET incubator program.

1. Services
 - a. Business plan
 - i. Online learning and coaching tools for all stages of writing up a business plan.
 1. Business idea
 2. Marketing & sales
 3. IPR
 4. HRM
 - ii. All business plans are subject to expert evaluation
 - b. Online information & Offline training modules
 - i. In the topic of decentralized management
 - c. 6 day training course with a 9 month follow up to go over business plan drafts
 - i. Includes long distance support
 - d. Network of experts
 - i. Help with the 6 day training course & with coaching sessions
2. Resources/Tools
 - a. Groupware Systems – Support work in virtual teams
 - i. Via software tools for:
 1. Communication
 - a. Email, Internet Rely Chat, etc.
 2. Coordination
 - a. Group calendars, internal electronic marketplaces
 3. Co-Operation
 - a. Management of documents, information on PC based conferencing
3. Matching/Trust
 - a. Offers a virtual market for the matching of virtual collaborators
 - i. Efforts should be supplemented by face-to-face measures
4. Links/Communication
 - a. Virtual enterprises are categorized two ways
 - i. Degree of collaboration (unilateral or reciprocal)
 - ii. Homogeneity
 - b. Other links

- i. Supply business news & statistics
 - ii. Innovative e-business platforms
 - iii. Expert networks & professional communities
- 5. Business Model: Customer Care package
 - a. Mix of both free and chargeable services
 - i. Free
 - 1. Online information, actual topics & news, book reviews, studies, tutorials (downloadable)
 - ii. Chargeable (micro payment system used via a partner organization)
 - 1. IVZET software applications
 - 2. Online & offline coaching, training, and one-to-one support
 - a. On the basis of competitive fees, price wise

*Also plan on developing digital handshakes and signatures

The overall focus of vIZET it to focus on entrepreneurial and business accelerating services in the fields of information society technology (Hausner, 7).

2.0 Data

2.1 Specific Actions of Business Incubators that Played a Role in their “Failure.”

Country	Funding	Government Policies	Tenant Entry & Exit	Management	Culture	Monitoring	Services	Other
Argentina	Lack of funding: Once initial funding by the government has ended, there is no new support. Also, there is no venture capital, credit lines for SME's, lack of social capital, and difficulties with red tape in starting companies.	Slow in building up system (didn't start until 1995); Policies change frequently, are uncoordinated, and are not officially ended. The Gov. institutions are an unfriendly environment, with a lack of structure network wise. S&T policies are strongly supply sided, are very weak, and don't take into account the needs of the private sector. Can be highly political. Most were not born out of a need or because of local initiatives, but because programs offered grants and because it had been proven useful elsewhere. Examples: With almost every change in government prior policies are discarded, public officials are changed, and programs aren't terminated. City of Buenos Aires: 4 public institutions: UBATEC, BAITEC, INCUBA & FADU - no cooperation; FADU & INCUBA both specialize in the field of design; INCUBA & BAITEC - both partially belong to the Secretariat of Economic Development	Low quantity of potential incubatees: missions are kept vague in order not to exclude anyone. Tenants stay in incubator too long: because space is unavailable elsewhere	N/A	Setting up of incubators without demand for services. An aversion to entrepreneurs and individuality.	N/A	N/A	Can't forge ties that would create demand for services. Research is not produced for industry, so they do not form strong links with market and don't want success other than publications. Also, some are based on Bolton's book, and Italian incubators.

Brazil	They will have problems if Gov. stops funding programs. Ex. SEBRAE gives 40% of overall funding. There is limited access to financing - no established venture capital fund.	N/A	N/A	Inadequate management & marketing experience (entreprs.) due to no prior business manager training most of the time.	Lack of it in Brazil.	N/A	N/A	N/A
Biominas	Lack of money in early stages of construction. FINEP loan is hindering how much money the make. No venture or seed capital for tenants	N/A	Need to find growth potential biotech entreps. Overall low occupancy rate.	Managers are trained at other incubators in Brazil.	N/A	N/A	N/A	No formal internal rules and operation procedures for tenants.
ParqTec	Need to attract seed and venture capital.	N/A	N/A	N/A	N/A	N/A	N/A	Had no original business plan. Was based on experiences in Europe and the U.S.
Canada	N/A	Can't integrate key parts: funding, industrial, scientific, technical, and educational	N/A	N/A	N/A	No independent studies of financial performances or any measures of success have been done	N/A	N/A

China	Limited access to venture capital (linked to gov. "coffers") few companies can profit during incubation phase.	Government is too involved.	N/A	Bad management practices: most managers have a background in gov. work and offer little practical help/experience. Ex. Jinghai Hi-Tech Business Incubator Co., Ltd. In Beijing: the manager devotes her time mainly to helping 5/32 of the incubatees (they are deemed the most profitable). She also has 50% equity hold in them.	Very against failure, so much so they avoid it. Could become target of gov. criticism if they fail.	N/A	N/A	Looks at foreign models in North America.
Egypt	N/A	Initial phase had wanted 9 incubators, however only 3 are operational, because 6 are still under construction	N/A	N/A	N/A	Lack of overall information	N/A	N/A
Germany	Rely heavily on local government funding. Out of the 130 incubators, 75.3% of their host towns hold equity in them. 45.1% of them receive money from their local town banks.	Started in 1983. Great differences between East and West Incubators: East has 103 total, West has 27 total out 19/27 are located in just one area of the West. Authorities above the regional level are pulling out.	Rentable space exceeds more then what is in demand.	N/A	N/A	N/A	Put more emphasis on physical infrastructure & office services rather than actual consulting. There is also a concern about rent rates. Few incubators offer in house financial facilities.	N/A

India	N/A	Need to work on getting the institutional framework right when starting up incubators. Too many government institutions: NSTEDB, DST, TEPP, DSIR, STEP. Also need to protect intellectual property rights (currently only done for computer scientists)	N/A	N/A	Generally innovative people are ignored until recognized by foreign nations. Education system only leads students on rigid education tracks. Social environment is suppressive, cannot deviate from traditional paths.	Lack of data. Need for feedback system for training and developing facilities.	N/A	N/A
Nigeria	Not one is run on a commercial basis- they are not self financing and depend entirely on gov. money.	Inconsistent policies.	Admission: lack of objectivity and can be based on political connections. Most tenants will not leave: tenants tend to stay in incubators for 20 years - say the Gov. has not provided suitable alternative locations.	Are run by the gov. which results in weak management	N/A	N/A	Few to no support services.	Only 7 incubators - said to be too few for the countries SME needs. They also have failed to turn out a steady flow of enterprises.
Philippines	No predetermined limit to funding, so every proposal is considered.	No/little attention to what TBI & S&T Park means/constitutes. Gov. takes interventionist approach to economy. Program is losing direction & focus. Problems and implementation are unnoticed at the policy level. They were built too hastily- it didn't take into account local infrastructure and it didn't matter WHAT was being created, but just that something was.	Trouble attracting tenants. Those who are well connected have a better chance of getting in.	Managers- some are very helpful but are under qualified, others won't even admit they are managers.	Salary differences between public and private (private pays more).	Only monitors financial and administrative matters. No way to measure progress (no intermediate goals). The fear is that monitoring will result in those needing less technology transfer and incubation, will become more successful, which defeats the purpose of an incubator	In practice, few services were available inside the incubator - "That was the problem - TBIs were always looking for a phone."	N/A

2.2 Specific Actions of Business Incubators that Played a Role in their “Success.”

Country	Needs to have a Purpose others can Relate to	Mission Statement	Ties to a University	Selection Committee	Networking	Manager	Exit Criteria	Focus more on Service as opposed to Infrastructure	Monitoring	Financial
Brazil	N/A	Clear mission statement aided them in getting sponsors	N/A	N/A	N/A	Those with: Business experience, who are able to network, trained at home & abroad, make external networks of support available, monitor performance & assessing impact plan for the future (future business trends), technologically versatile, totally computer literate, high end financial management, marketing & interpersonal skills, full immersion in community affairs	N/A	N/A	N/A	N/A
Canada	N/A	N/A	N/A	N/A	N/A	Highly motivated, visionary, one whose goal is to see Tenant companies succeed.	N/A	N/A	N/A	N/A

Finland	High unemployment rate. Had EU give 40% of its funds via selling incubators as vehicles for employment, technology transfer, and exports	N/A	Yes	N/A	Cooperation between public & private institutions (incubators & entreps.) KORE database: experts are easily identified & contacted	N/A	N/A	Feel incubators should offer: intensive monitoring by managers & staff, specialization, expert assistance, proximity of premises after graduation, assistance in locating financing sources.	N/A	funded 50% by the TE center, other half comes from operations, sponsors, municipalities, universities, grants, and other sources
Germany	N/A	N/A		N/A	N/A	N/A	N/A	Operate at a level of 80% to allow for flexibility for existing tenants to expand	N/A	Have no financial support: provision of cheap land and buildings. Also, rental income and "other" revenue cover operating costs
Israel	Done to increase exports and innovation	N/A	N/A	Steering Committee: supervise, guides, and controls	N/A	N/A	N/A	N/A		State is reimbursed up to the amount of its grant, via royalties on sales. If it never makes it off the ground, they are not required to pay it back.

USA										
Akron, Ohio	N/A	N/A	Yes	N/A	Identifies entreprs. By presenting seminars to the public (informal setting)	Strong background in operations	N/A	Has a small business center: fulltime staff of 3. Also has a staff of over 150 for advisory purposes.	N/A	N/A
ATDC, Georgia	N/A	N/A	Ties with Georgia Tech	Via: staff review of applicants growth potential, product marketability, quality of management team, and application of new technologies in products, services, or processes. Then follows with a presentation of complete development plan	N/A	N/A	Expected to graduate in 3 years. However it can be before if they meet one or more of the following criteria: 1 mil dollars or more in annual sales, more than 10 employees, more than 5000 square feet of space needed, and/or constant profitability. Also, Some do not graduate due to long term nature of product development process: biotech products with lengthy gov. testing and approval	N/A	Reviews are done annually by staff	N/A

Austin, Texas	Severe depression	Need to have a clear mission statement: each incubator must have its own objectives	N/A	Need a workable selection process	Must have networking activities	Must provide entrepreneurial leadership: Manager must have: can do attitude, ability to solve problems, clear focus on results, willingness to work hard.	N/A	Types of assistance include: business basics, marketing, accounting/financial management, investor & strategic partner linkages, networking activities, links to higher educational institution, conference rooms and other shared facilities, and shared administrative services	N/A	Ensure access to capital on behalf of the companies. Take 1% equity in each company
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2.3 Data on Individual Business Incubators

2.31 Basic Information on Individual Business Incubators

Country	Is it Successful	Yr. Program Started	Yr. of Info	Affiliat.	Type(s) of Industry	#Bus Incub Total	Bus. Incub Succ.	Bus. Incub Fail.	# Tenant Comp.	#Ten. Comp. Succes	#Ten. Comp. Failed	# Grads	% Grads	Survive Rate	Revenue Gen.	# Ten. Com. Jobs	# Grad. Comp Jobs	Total Jobs	Biggest Issue
Argentina	No	1992	2003	U, G, NP	T	15	N/A	N/A	75	N/A	N/A	10	13.30	N/A	N/A	<500	very few	N/A	Instability within the government
Brazil	Yes	Mid 1980's	1999/2003	U, P, NP	T	74/200	N/A	N/A	614/1200	N/A	N/A	226/400	36.81/33.33	N/A	N/A	N/A	6000	2,700	Needs greater responsibility put on Incubator Managers
Biominas	Yes	1197	1997	U, G, P	T	1	1	0	35	N/A	N/A	1	28.6	100%	2,558,300	N/A	N/A	92	
ParqTec	Yes	1990	1997	U, G, P	T	1	1	0	48	N/A	N/A	21	43.75	82%	9,846,990	N/A	N/A	237	
Canada	In the middle	N/A	1995	U, G, P	T	25	N/A	N/A	Largest had 69/Av is 12	N/A	N/A	N/A	N/A	54%	N/A	N/A	N/A	N/A	Can't Integrate all the factors for success
China	Yes	1987	2002	U, NP, P	T	131	N/A	N/A	7693	N/A	N/A	836	10.86	N/A	17.88 Bill.	N/A	N/A	128,776	Gov-Risk aversion
Czech Republic	N/A	N/A	N/A	NP,G	T (Virtual)	41	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	It's virtual, so not a lot of numbers available

Egypt	No	1995	N/A	P, NP, NGO's, Gov	N/A	9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Very weak program, not a lot of data available. Lots of "planning"
Finland	Yes	1982	2001	NP,G, U	T	16	16	0	1949	N/A	N/A	N/A	N/A	37-70% after 4 years	N/A	N/A	N/A	3352	N/A	
Germany	No	1983	1999	G, U	T, M	130	N/A	N/A	5,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	10,000	Weak program, press called the program a "flop", considered by some just to be office facilities/ most consulting is done by outside services	
Technologie Centrum Chemnitz (TCC)	Yes	1990	2002	G, U	Productio n Tech's.	1	1	0	50-83	50-83	0	0	40-66	N/A	N/A	N/A	N/A	N/A	A lot of information wasn't given about the specifics of the incubator	
India	Hard to say	N/A	200-2001	U, G	T	35	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Still developing	

Ireland	Yes	1997	2005	U, G	T, M	46	N/A	As seen there is a giant lack of statistical data concerning Ireland incubators												
Israel	Yes	1991	2000	G, NP, P, U	T	26	N/A	N/A	N/A	N/A	N/A	582	N/A	52%	N/A	N/A	N/A	N/A	1,900	Financing
Nigeria	No	N/A	2001	G	T, I	7	N/A	Very small, weak program. See below.												
Industrial	No	Oldest: 1958	2001	G	I	4	N/A	Networking needs to be improved, Management board needs to be created, land for graduating tenants												
Tech.	No	Oldest: 1993	2001	G	T	3	N/A	N/A	30	N/A	N/A	9	N/A	Inconsistent S&T Policies						

Philippines	No	1990	1994/1995	G	M	5	3	2	at least 71	N/A	N/A	36	50.70 %	N/A	N/A	N/A	N/A	N/A	What they are supplying isn't what the Industries need/More money in private companies/ lack of knowledgeable management /lack of records
Taiwan	Hard to say	1995	2001	U, G, NP	N/A	50	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Weak, underperforming, lack of industry-university connections
USA																			
Akron, Ohio	Yes	1983	1992	U	I, M	1	1	0	25	N/A	4	11	44%	N/A	\$22,156,400			311	Not the most current info, not specific year wise
Austin, Texas	Yes	1989	2003	U, G,	T	1	1	0	N/A	N/A	N/A	65	N/A	80%	<\$1.4 Billion	N/A	N/A	2,850	N/A
ATDC, Georgia	Yes	1979	1997/2006	U, NP	T	6	5	1	1997-49	N/A	N/A	2006-106	N/A	1997-76%	9.3 Billion	1997-227	1997-1,910	1997-2,137	Note: 1997-# & 2006-# = year of info-#

2.32 Attributes of Individual Business Incubators

Country	S&T Program	IP System	Risk Culture	Autonomy Needed From Gov	Cooperation Among Incubators	Process to pick Tenants	Set Stay Period	Rent Increase	Do Tenants Leave
Argentina	Not Solid	Yes	No	Yes	No	Yes/Not Strong	No	No	Not Always
Brazil	Yes	Yes	Working on	No	N/A	Yes	Yes	No	Yes
Biominas	Yes	Yes	Working on	No	N/A	Yes	Yes	No	Yes
ParqTec	Yes	Yes	Working on	No	N/A	Yes	Yes	No	Yes
Canada	Yes	Yes	Yes	No	Some	Yes	N/A	N/A	Yes
China	Yes	N/A	No	Yes	N/A	Yes	Yes	Yes	Yes
Czech Republic	N/A	Yes	N/A	No	Some	N/A	No	No	Its virtual
Egypt	Attempting/Not Solid	N/A	N/A	No	N/A	Yes	Yes	N/A	N/A
Finland	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Some
Germany	Not Solid	Yes	No	No	Yes	N/A	N/A	Some areas	Yes
Technologie Centrum Chemnitz (TCC)	Not Solid	Yes	No	No	Yes	Yes	Yes	Yes	Yes
India	Developing	Yes	No	No	N/A	Yes	N/A	N/A	N/A
Ireland	Yes	Yes		No	No	Yes	Yes	Yes	Yes
Israel	Yes	N/A	Yes	No	N/A	Yes	Yes	N/A	Yes
Nigeria	Not Solid	N/A	N/A	Yes	N/A	Varies	Varies	Varies	Varies
Industrial	Not Solid	N/A	N/A	Yes	N/A	No	No	No	No
Technology	Not Solid	N/A	N/A	Yes	N/A	Yes	Yes	Yes	Yes
Philippines	Not Solid	N/A	N/A	Yes	N/A	Partially	No	Yes	Not Always
Taiwan	Need to work on	Need to work on	N/A	In the middle	N/A	N/A	N/A	No	Yes
USA									
Akron, Ohio	Yes/Solid	Yes	Yes	N/A	No	Yes/Strong	N/A	N/A	Yes
Austin, Texas	Yes/Solid	Yes	Yes	N/A	No	Yes	N/A	N/A	Yes
ATDC, Georgia	Yes/Solid	Yes	Yes	No	Yes	Yes	varies	N/A	Yes

2.33 What Individual Business Incubators have Access to.

<u>Country</u>	<u>Strong/ Skilled Manager</u>	<u>Admin.</u>	<u>Networking</u>	<u>Facil.</u>	<u>Funding: Source</u>	<u>Funding: Type</u>	<u>Funding: What Needs Funding Addresses</u>	<u>Funding: Other</u>	<u>Tech. Infrastruc.</u>	<u>Entrep. Culture</u>	<u>Inter Tenant Comm.</u>	<u>Lab Facil.</u>	<u>Job Train.</u>	<u>Advisory Staff/Board</u>	<u>Keeps Records</u>
Argentina	No	Yes/Size-NA	Yes	Yes	U, NP, G, Combo	Gov. grants	Infrastructure, subsidized rent	No venture capitalist or legal framework	Yes	No	Yes	Yes	Yes	Yes	Attempting
Brazil	No	Yes/Size-NA	Yes	Yes	U, Gov, NP, P, Combo, Entrep's personal finance, seed capital	Gov. gives loans and grants, subsidies	Infrastructure	Sponsors may take an active role in management and operations/no venture capitalists	Yes	No	Yes	N/A	Yes	Yes	Yes
Biominas	Yes	Yes/Small	Starting to	Yes	Public and Private sponsors	loans, rebate from social security taxes	Equipment /infrastructure	lack of funding overall	Some	No	No	Some	Some	N/A	N/A
ParqTec	Yes	Yes	Yes	Yes	Foundation, U, P	subsidies	for Tenant Companies (reduced fees for services)	working on venture capital fund/loan fund from banks	Yes	Yes	N/A	N/A	Yes	Yes	Yes
Canada	Yes	Yes/Small	Yes	Yes	G, P	Fees from rental services/donated services/Funding-equity shares are taken	Building structure/ technology	N/A	Yes	No	Some	Yes	Yes	Yes	Yes

China	No	Not Strong	N/A	Yes	U, G, NP, P	Equity stakes in TC's/some venture capitalist investments-take equity/foreign investment/subsidies	Subsidies are for telecommunications network/Vent. Capitalist investments are Ten. Companies	Equity usually ranges from 30-60% of the Tenant Companies/Incubators take equity in Ten. Companies	Yes	No	N/A	Yes	Yes	Yes	N/A
Czech Republic	Yes	Yes	Yes	Yes	NP, G	Chargeable services to Ten. Companies	N/A	N/A	Some	N/A	Yes	N/A	Yes	No	N/A
Egypt	N/A	Yes/Attempting	Attempting	Yes	G	Loans	Soft loans to Ten. Companies/also for technology support services	lack of funding overall	Yes	N/A	N/A	Yes	Yes	Yes	Attempting
Finland	Yes	Yes	Yes	Yes	G	Subsidies/helps Ten. Companies "find" finance/grants	Operations	get 50% of needed money from the Gov./not attracting foreign investors	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Germany	No	Yes/Not Strong	Yes/still working on it	Yes	G, U	subsidies from centre's host town	structural, rental, services	given indirect subsidies such as cheap land/sponsors have been pulling out/towns centers are located in are pressured from the gov./need private contracts	Yes	No	Not always	Some	Yes	N/A	N/A
Technologie Centrum Chemnitz (TCC)	N/A	N/A	Yes	Yes	G, U	Seed capitals, gov grants	set up costs, rental costs	N/A	Yes	No	N/A	Yes	No	Yes	Planning on
Ireland	Yes	Yes/Small	Yes	Yes	G, U	Grants, subsidies, venture capital, equity, seed capital angel databases, royalty agreements	Infrastructure	Royalty agreements are another source of income for incubators	Yes	Working on	No	Yes	Yes	Yes	Some, but not statistics
India	No	Yes/Small	Yes/Not strong	Yes	G, U, venture capital	grants	infrastructure/ "reoccurring expenses"	Profits are shared by host institutions	Yes	No	N/A	Yes	Yes	Yes	N/A

Israel	Yes	Yes	N/A	Yes	G, NP, U, P	grants, venture capital funds/ private equity	infrastructure/ NP,U,P- directors salary, admin expenses, org expenses	G-supervise, guides, & controls for incubator and Ten. Companies/only pay back grant if you are successful	Yes	Yes	N/A	Yes	Yes	Yes	Attempting
Nigeria	No	Weak	No	Yes	G	subsidies	infrastructure/ rent	Too dependant on Gov. for funding	Varies	No	N/A	Varies	Varies	N/A	N/A
Industrial	No	Weak	No	Yes	G	subsidies	infrastructure/ rent	Too dependant on Gov. for funding	Limited	No	N/A	Limited	Limited	N/A	N/A
Technology	No	Weak	No	Yes	G	subsidies	infrastructure/ rent	Too dependant on Gov. for funding	Yes	No	N/A	Yes	Yes	N/A	N/A
Philippines	Varies	Yes	No	Yes	G, U	subsidies	incubator start ups/ rent for tenant companies	N/A	Minimal	No	N/A	Minimal	No	No	No
Taiwan	In the middle	Yes	Attempting	Yes	G, U	grants	operations	N/A	Yes	Yes	N/A	N/A	Yes	N/A	Working on it
USA															
Akron, Ohio	N/A	Yes/Small	Yes	Yes	G, informal seed and venture capital funds	loans, equity,	management	seed and venture capital funds take active roles in management	Yes	Yes	N/A	N/A	Yes	Yes	N/A

Austin, Texas	No	Yes/Size-NA	Yes	Yes	G, U, Industry, angel investments, venture capitalists	incubator gets 1% equity in each tenant company/ grants	infrastructure	N/A	Yes						
ATDC, Georgia	Yes	Yes	Yes	Yes	U, G, Some public & private sources	grants, loans	equipment/ fees for services	N/A	Yes						

3. 0 Business Incubators: Explanation of Excel Categories

The following are explanations of the categories in the excel spreadsheets pertaining to incubators in various countries. All information is based out of the literature that was reviewed. The literature citations can be found in Sheet 5 of the excel spreadsheets. An N/R in any category field represents that the data pertaining to that specific category for that country/incubator could not be found *within* the literature.

3.1 Data

Is it “Successful?”

Is it “Successful” refers to if either the individual incubator or a country’s incubator program is successful or not. A “yes” in the category shows that the incubator/program is successful and a “no” means it is not.

There are however, no clear markers of what “Success” actually is. This is due mainly to the fact that most incubators do not keep records and thus there is a lack of data available.

The following is one way to measure success:

1. Surviving and growing profitably
2. Surviving, growing, and on a path to productivity
3. Surviving, but is not growing and is not profitable, or is only marginally profitable
4. Operations were terminated while still in the incubator but losses were minimized
5. Operations were terminated while still in incubator and losses were large

Of these five, numbers 1-2 are clearer measures of success, while 3-4 are debatable and 5 is a definite measure of failure.

Year Program Started

The year the program started refers to the year either the specific town/Business Incubator first opened or the year in which a country opened the doors of its first Business Incubator(s).

Year of Info

The year of info, or year of information is the year that the data comes from. In the cases where a year was not given, the year the literature was written was put in its place.

Affiliation

Affiliation defines what agencies play a role in the ultimate success or failure of the Business Incubator. The potential agencies are: University (U), government (G), Non Profit Agencies (NP), Non-Governmental Organization (NGO) and businesses in the private sector (P).

Type(s) of Industry

Type(s) of Industry represents the predominant type of Business Incubator located within a country, or in the case of singular incubators, what type of incubator it is; meaning what type of goods the incubators produce. The “type” can be one of the following: technology (T), manufacturing (M), service (S), mixed use (MU), or other (O).

#Bus. Incub. Total

#Bus. Incub. Total stands for the total number of Business Incubators present in a given country. In the cases where it is 1, it is relative to the fact that it is just talking about a specific incubator.

Bus. Incub. Success & Bus. Incub. Failure

Bus. Incub. Success is the number of Business Incubators that are successful. While *Bus. Incub. Failure* is the number of Business Incubators that have failed.

#Tenant Comp.

The #Tenant Comp. stands for the total number of Tenant companies an Incubator has within its walls.

#Tenant Companies Successful & #Tenant Companies Failed

#Tenant Companies Successful and *#Tenant Companies Failed* are the number of Tenant companies within the Business Incubators broken down into successes and failures number wise.

#Grads

The #Grads is the number of tenant companies that have graduated from the Business Incubator and can function and do on their own.

%Grads

This is the percent of those tenant companies that have graduated from Business Incubators. It is the ratio of tenant companies that have left the Incubator and are on their own, over the total number of tenant companies that have Business Incubator have had (including current tenant companies).

Survival Rate

This is the percentage of tenant companies that graduate from the business incubator and have formed into companies that are successful. The difference between this and the %Grads is that these companies survive financially on their own for a significant period of time (or still are).

Revenue Generated

This is how much revenue a Business Incubator has generated over time. The majority of the numbers are just their gains and do not take into account how much money was put towards the incubator when it was starting up (loans, etc).

Tenant Company Jobs & # Grad. Company Jobs

Tenant Company Jobs represents the number of new jobs that have been produced from within the Business Incubators current tenant companies. The *#Grad. Company Jobs* or number of graduated jobs stands for the number of new jobs the tenant companies that have graduated have produced.

Total Jobs

This is the total number of jobs the Business Incubator has added to the area it is located in.

Biggest Issue

This category is to briefly mention the main problem(s) associated/within with the specific Business Incubator.

3.2 Attributes

S&T Program

S & T Program or Science and Technology Program refer to if a country has a strong program within the government pertaining to science and technology. It is also based upon if the literature used mentioned it and what its status was. No outside sources were consulted on this topic. The following are the replies that are seen followed by their meaning. A “Yes/Solid” answer represents a country with a strong program, while a “Yes” answer represents a country with an S & T Program that functions well. “Not Solid” means that they do have one in place, but it still has some issues that need to be worked out. Likewise, a reply of “Needs to work on” or “Attempting” represents that the country still has quite the ways to go with their S & T program so that it can be effective.

IP System

The IP system or Intellectual Property System is in reference to if within the literature used, a country has an intellectual property system. Outside sources were not consulted. A “yes” means they have an IP System and a “no” means they do not.

Risk Culture

A country’s or incubators risk culture represents, if within the country the incubator is located in, it is deemed OK to take risks or not. A “yes” answer means that if the incubator fails it will be seen as a learning experience. If a “no” is present, it means that if the incubator fails to be successful it will be seen in just a negative light and will follow those who started the incubators throughout the rest of their lives.

Autonomy Needed From Gov

Autonomy needed from gov or government concerns, if a specific country or incubator should cut or decrease ties with the government when it comes to money and management of the incubators. A “yes” answer represents that a country/incubator would benefit from cutting/decreasing ties. A “no” answer means that incubator program is positively benefiting from their relationship with the government.

Cooperation among Incubators

This category is in relation to, if among the incubators in a given country, if there is communication and/or cooperation. In some countries incubators are arranged into clusters and separated by region. A “yes” answer means there is cooperation/communication, and a “no” means there is not.

Process to pick Tenants

This category is in regards to whether or not the Business Incubators have a set process and requirements for entry into the Business Incubator. If it does, it receives a yes, if not a no.

Set Stay Period & Rent Increase

This category is if the management of the Business Incubator has come up with a plan to set a specific period of time a tenant company can stay in an incubator before the tenant company is seen as a failure and must leave. A “yes” answer means that there is a set period and a “no” reply means there is no set period. *Rent increase* refers to if a Business Incubator will increase the price of rent to tenant companies depending on how long they have been in the incubator. The goal of doing this is to help push along companies so that they do not stay in the incubator when they can be successful on their own outside of it. A “yes” answer means that a country and their incubators practice this method and a “no” means they do not. A reply of “varies” means that within the country some incubators do, and some do not.

Do Tenants Leave

Do tenants leave represents if tenant companies residing in Business Incubators are graduating and leaving the incubator. A yes answer means that they do leave, and no means they do not. An answer of not always implies that the incubators in that given country have a problem getting tenant companies to graduate and move out to be successful on their own.

3.3 What Business Incubators Have Access to.

Strong/Skilled Manager

Strong/Skilled Manager is whether or not the Business Incubators has a knowledgeable manager in relation to management and business, and is able to run both the facilities of the Business Incubator and help out their tenant companies. A “yes” answer means the Business Incubator has this type of person, and a “no” answer means they do not.

Administration

Administration pertains to the Business Incubator administration, not the tenant companies’ individual administrations. A “yes” answer means that the country or incubator does have an administration within the building that helps out on day to day activities and is effective. A “no” answer means they do not, while a weak answer shows that while they do have an administration, the administration is lacking.

Networking

Networking is if the Business Incubator has connections outside of the Incubator (Industry, University, etc) and helps tenant companies form their own connections/relationships. A “yes” means they do help tenant companies form these relationships, a “no” means they do not.

Facilities

Facilities refer to if the Business Incubator offers facilities to its tenant companies such as building space. A “yes” means they do a “no” means they do not.

Funding: Source

Funding Source is which actors’ money for funding is coming from. This includes, but not limited to the following: University (U), government (G), Non Profit Organizations (NP), Private companies (P), Combination of actors (combo).

Funding: Type

The funding type is the scheme being used when dealing with funding. These can range from government banks to equity stakes, to bank loans.

Funding: What Needs Funding Addresses

This category refers to what the funding is being used for, whether it be for the incubators actual start up, not including tenant company start-ups, daily activities, or funding for tenant company start ups.

Funding: Other

Funding: Other refers to any other pertinent information in regards to issues related to funding.

Technology Infrastructure

Technology Infrastructure is if whether or not a Business Incubator actually provides the tenant companies with the technology needed to be successful in daily activities. This includes, but not limited to telephones and internet.

Entrep. Culture

Entrep. Culture or Entrepreneur culture represents if within a given country, if it is deemed socially acceptable to become an Entrepreneur or not. This is different then the risk culture. A “yes” answer means it is socially acceptable to go into business for oneself, and a “no” means that it is not.

Inter Tenant Comm.

Inter Tenant Comm. or Inter Tenant Communication is if whether or not tenants within a business incubator are able to communicate with each A “yes” answer means that their is communication among its tenants and a “no” means that there is not.

Lab Facilities

Lab facilities refer to if the Business Incubators have laboratory facilities available for its tenants. A “yes” reply means that they do, a “no” means there are none available.

Job Training

Job training pertains to if the Business Incubator gives workshops/classes/aids in management training for each of the tenant companies. A “yes” answer means that they do, and a “no” means they do not.

Advisory Staff/Board

The Advisory Staff/Board is in relation to the Business Incubator itself, not the specific tenant companies. A “yes” answer means that there is a specific advisory staff/board that helps in the tenant selection and/or gives advice to the tenant companies and a “no” means there is not. Usually they are from the communities that the incubators are located in.

Keeps Records

This is if a Business Incubator keeps records, not of finance but pertaining to the tenant companies within the incubator. Types of information that would be included would be for example, how many tenant companies fail each year or overall. A “yes” answer means they have kept records while a “no” means they have not.

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