THE KEY SUCCESS FACTORS FOR BUSINESS INCUBATION IN SOUTH AFRICA: THE GODISA CASE STUDY.

by

PATIENCE NOKULUNGA MBEWANA

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DISSERTATION SUMMARY

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PATIENCE NOKULUNGA MBEWANA

Supervisor: Prof. A.J. Buys

Department: Department of Engineering and Technology Management
(Institute of Technological Innovation)

Degree: M Sc (Technology Management)

This dissertation is about the development of a set of key success factors for business incubation in South Africa and testing them on the Godisa case. It contains background information regarding the historical development and current state of business incubation in the world and in South Africa. A review of published literature provided a list of many different success factors that have been identified by researchers in other countries. These success factors were considered in terms of the current state of the business environment in South Africa and a group of twelve success factors were identified that are key for business incubation in South Africa.

These success factors were then tested on the Godisa initiative. Godisa is a Sotho word, which means "nurturing and growing", which is the main aim of Godisa for technology-intensive start-up businesses. Godisa is an initiative of the Department of Science and Technology (DST), the Department of Trade and Industry (DTI) and the European Union (EU). Initially there were eight centers under Godisa. The Department of Trade and Industry also decided that four of the incubators that were initiated under DTI should fall under Godisa. Godisa is an independent trust, which does not exercise direct control over the incubator centers, its role is to give them support (financial and non-financial) and advice. Most of these centers are registered either as section 21 companies or as trusts and have their own board of directors. In most cases there are other partners besides the government, which are also giving support (mostly in-kind).

The research was conducted in twelve centers located in different provinces and focusing on different technological sectors. Ten of these centers are already incorporated into Godisa. The other two are still in the process of being incorporated. One of the centers is a demonstration center, another an innovation support center. Eight of the centers are pure incubators. The remaining two centers fall into the category of hybrid incubators, which means they do a combination of incubation, technology transfer, demonstration and research and development.

Three sets of questionnaires were formulated in accordance with the study model. The first questionnaire was for the Godisa Manager, whose responses were of a qualitative nature to provide information about the overall programme. The second questionnaire was for the incubator managers, which required a combination of qualitative and quantitative responses. The third questionnaire was for the entrepreneurs: a combination of incubatees and graduates from the incubators, which also required both qualitative and quantitative responses.

Descriptive statistics was utilized to analyse the results from the questionnaires. Furthermore bivariate statistics was used to test the relationship between success and the success factors. Each of the twelve success factors represented independent variables and success was the dependent variable. Success was measured in by sales per investment in the case of incubator centers and by sales per entrepreneur for entrepreneurs. Mann-Whitney and Kruskal Wallis tests were used to test the significance of the relationships.

The final discovery was that seven of the twelve success factors also applied to the Godisa case study. Relevant conclusions and recommendations for policy makers were made.

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CHAPTER 1: INTRODUCTION AND BACKGROUND

1.1. Introduction

1.1.1. Definitions

The Oxford dictionary, defines an incubator as an apparatus providing warmth for hatching eggs, rearing premature babies or developing bacteria. To incubate is to cause the development of (babies, bacteria) by creating suitable conditions.

According to Gissy (1984:20), a new method for developing new businesses is the industrial incubator. Business incubation systems are generally oriented towards addressing problems of economic development through improving entrepreneurial base with regard to either or both quantity and quality (Lalkaka 1990:19).

In its generic sense, the term incubation system is often used to describe a wide range of organisations that, in one way or another, help entrepreneurs develop their ideas from inception through commercialisation. A business incubator is an organisation that systematises the process of creating successful new enterprises by providing them with a comprehensive and integrated range of services, which include: incubator space which is made available on a flexible, affordable and temporary basis; common services including secretarial support and shared use of office equipment; hands-on business counselling and access to specialised assistance such as R&D and venture capital; and networking activities operating as a reference point inside the premises among entrepreneurs and outside of it to the local community (Lalkaka 1990:25).

Allen and Rahman (1985:12) state that a small business incubator is a facility that aids the early-stage growth of companies by providing rental space, shared office services, and business consulting assistance.

Schuyler (1997:11) states that a business incubator is an organisation of services designed to nurture young business. A wide range of services can be offered within an incubator,

including management support, access to financing, business or technical support services or shared office services such as access to equipment, flexible and affordable leases and expandable space.

Allen & Rahman (1985:13) claim that small business incubators are private, public, or education-sponsored facilities that provide rental space, shared office services and business consulting assistance to young growing companies.

The UK Business incubation web site states that the incubator is usually a property with small work units, which provides an instructive and supportive environment to entrepreneurs at start up and during the early-stage of business. They assert that incubators offer three main ingredients that contribute to the growth of successful business namely;

- An entrepreneurial learning environment;
- ready access to mentors and investors; and
- visibility in the market place.

In essence, incubators offer facilities and services that help entrepreneurs leverage off an established organisation. In addition to incubators offering a safer heaven for business start-up with the reduced risk of failure, incubation also offers an opportunity to businesses that may not otherwise be able to initiate a business on their own. Business incubation is a means by which to turn vision into reality with reduced risks (Cassim 2001:3).

Incubators focus on how to assist entrepreneurs who are creating and managing new companies (Barrow 2001:13). It is the entrepreneur who is taking the risk and starting a business in order to create new wealth and fulfil a vision. The very essence of the entrepreneurial venture is growing a company (i.e. decreasing the risk associated with new business formation, accelerating the speed with which the start-up grows, and the necessary capital for all those early stages of growth). These are all the tasks the good incubators address as part of their efforts to assist start-ups. Proper use of these resources can greatly enhance the chances for start-up success.

Harley (2001:2) defines a business incubator as a facility and set of activities through which entrepreneurs can receive essential information and assistance, value-added shared

services and equipment that may otherwise be unaffordable, inaccessible or unknown to the entrepreneur. Incubators are facilities designed to meet needs of business (offices, labs, manufacturing); proactive support and advice to accelerate growth; access to tools, information and contacts; assistance from business experts; relationships with other entrepreneurs; access to investors and staffing.

As defined by the National Business Incubation Association (NBIA), the purpose of incubators is to promote the growth and development of new enterprises by providing flexible space at affordable rates; a variety of support services; access to management, technical and financial assistance; and opportunities to interact with other entrepreneurs and business experts.

Incubators comprise business assistance programmes targeted at start-up and fledgling firms. They offer access to business and technical assistance provided through in-house expertise and a network of community resources; shared offices; research or manufacturing space; basic business support such as telephone answering and clerical services; and access to common office equipment including copy and fax machines. They support emerging businesses at their early, most vulnerable stages. They promote new firm growth, technology transfer, neighbourhood revitalisation and economic development and diversification.

Business incubation catalyses the process of starting and growing companies. As a proven model, it provides entrepreneurs with the expertise, network and tools they need to make their ventures successful. Incubation programmes diversify economies, commercialise technologies, create jobs and create wealth.

The term “business incubator” embraces a wide range of institutions, all of which are fostering the creation and development of SME’s wherever this has not happened spontaneously. Deliberate efforts are made to ensure that the services needed by the entrepreneurs are provided in a comprehensive and integrated fashion. The primary goal of a business incubator is to facilitate economic development by improving entrepreneurial base. For this reason, most of the incubators are directly operated by national or local government. Others, however, are established by universities or private non-profit

organisations and links with government can vary greatly, from strong to nearly non-existent. The development of business incubators calls for a national strategy and interaction between government authorities, the private sector and local institutions, universities and research centres.

An incubator is an environment and programme with certain important characteristics:

- it offers a full array of business assistance services tailored to the client companies
- it has an incubator manager on site who co-ordinates staff and outside professionals and organisations to deliver those services;
- it graduates companies out of the programme once they benefit (Barrow 2001:12).

Lalkaka (1990:20), points out that, while the recent globalisation of markets might also broaden the opportunities for SMEs in developing countries, it is also signalling that entrepreneurship in those countries urgently needs encouragement and strengthening. Management and technological systems need to be promoted so that product and process technologies of existing SME's can be upgraded and rationalised and new ventures can flourish. To do this, local Human Resources will have to be developed, particularly in countries where economic development has so far been largely based on foreign investment or on government intervention through state-owned enterprises or where recession has led to high unemployment. In addition, business services must be provided in order to create a favourable environment for entrepreneurship and the expansion of SMEs. Such services would give access to financing, market information, suitable technology, training support, quality standardisation, and certification. They would also bring into being inter-firm linkages and more concretely, provide office space. This is where a business incubator comes in. Such a system can nurture start-ups and newly established firms by providing the above-mentioned services on a shared, affordable basis. However, its core is the financial, marketing and design support and the managerial training given to the emerging entrepreneur. Another by-product of a business incubator is the internal dynamics that result from working together in a shared physical space: the joint and cross-disciplinary learning taking place and the opportunity to form the business networks and contacts are also critical to the launch of successful ventures.

1.1.2. The most distinguishing features

The distinguishing characteristics of the incubator can be summarised as follows:

- A managed work space providing shared facilities focused advisory services and interaction among tenants, available frequently at short notice and with the requirement for neither demonstrated financial resources nor a long time commitment.
- A small management team with core competencies to provide early diagnosis and treatment or referral for business threats and opportunities through a wide network of professionals and friends in the local community.
- Careful selection of start-up groups entering the incubator, the nurturing, growth and graduation after two to three years. The selection and focused help, of course, account for the greater survival rate (two or three times greater compared to those not incubated).
- The business incubator in itself runs as a business, with the perspective of becoming self-supporting when operations are fully established.
- Initial support, however, almost always provided by the central or state government in the form of a low (or no) rent vacant building and operating subsidy, until rents and fees from tenants match operating expenses.
- In addition to nurturing tenants within the incubator, outreach assistance may also be provided to businesses in their own premises.
- But if it has no tenant within its walls to benefit by interaction and focused attention, then it is like a traditional small business development centre and lacks the defining features of an incubator.

Many incubators provide targeted support for technology-based businesses. While common in developed countries, many industrialising countries also adopt such a "technology" theme. This orientation provides self-generated employment in firms led by local scientists and engineers while enabling the society to reap the rewards from investment in local universities and research institutes. Moreover, the environment of an incubator provides a supportive business culture for the technologically oriented enterprises, helping them focus on markets and other business operations. There is every

reason to expect industrialising countries to maintain and expand their focus on the support for such technology-based enterprises.

The incubator then offers the promise of creating new businesses and more than trebling their chances of survival. Such flourishing businesses stimulate economic activity, with collateral growth and employment at both suppliers and customers. Significant tertiary effects come from the incubator playing a catalytic role in developing entrepreneurial skills, modifying the culture of university-research-industry relations, and influencing national policies toward private small businesses.

1.1.3 Incubators and economic development

The topic of small business incubators is receiving attention from state and local development organisations, universities and firms that commercially promote new enterprises. It is generally recognised that few businesses make it through their early years. Management problems and under-capitulation are frequently cited as general reasons for small business failure. Small firms are often created to exploit a market segment not catered for by other firms. Entrepreneurs may have considerable knowledge about such market niches because their previous experience in larger firms usually involves related products, technologies, or markets. Although the entrepreneurs may have specialised knowledge, they often lack a full array of business skills. This is where the incubator facility plays a key role. Incubators provide assistance that fills knowledge gaps; reduces early stage operational costs such as rent and service fees; and establishes entrepreneurs in a local enterprise support network. Sponsors of incubator facilities are quite diverse, and their objectives often differ, as do their organisational arrangements. Private sector sponsors such as corporations and investor groups are primarily interested in property development, transferring innovative technology and invested opportunities in tenant firms. Public sector sponsors, such as non-profit development organisations and local governments, are primarily interested in job creation and economic diversification. Education sector organizations such as universities and vocational-technical schools are primarily interested in training opportunities for students and commercial outlets for faculty research. To achieve these objects, sponsoring groups pursue different management policies for example in admitting tenants, for instance publicly owned

incubator facilities are more likely than others to consider job creation potential and local ownership. Private facilities are often more concerned with obtaining full occupancy than with selecting a particular type of tenant. To avoid challenges of undue benefit to private entities, universities and public facilities are more likely than private ones to place a time limit on tenant residency. Although sponsor objectives and management orientation may differ, the universal purpose of an incubator is to increase the chances of a firm surviving its formative years. An incubator, strictly speaking, has taken an active role in providing assistance for start-up firms by ensuring that needed services and assistance are readily available to tenants. Fees for service may be included in the rent, assessed directly, or contributed by the incubator sponsor or a local service producer (Cooper 1985:78).

Cassim (2001:2) points out that business incubation is well documented as a tool for economic development the world over, and is currently past growing as an industry. It is a concept that was originally developed in the United States and is regarded as a cost effective way of promoting innovation and creating sustainable entrepreneurial ventures. In a bid to minimize start-up failures, the trend in the U.S., Europe, China and Japan is to protect infant firms by placing them in incubators. Incubators give substance to the technology venturing process by leveraging the entrepreneurial talent. Research has established the extremely high rate of failure of new business. Business incubators have a greater than 80% chance of survival.

Everyone agrees with the role incubators play in economic development through enterprise development and job creation. Tornatzy (1996:22) suggests that business incubation is an effective business development tool requiring modest investment and providing an excellent return on investment. Bisseker (2001:10) indicates that incubators play an active economic development effort on the entrepreneurial environment of neighbourhoods.

In a rapidly changing global economy, SME's are increasingly a force for enhancing national economic growth. Many national planning regimes contain policies & programmes addressing SMEs. New structures & strategies are being explored that will help the SMEs growth and provide a promising future in the global market place. In this quest, technology and business incubators have emerged as a recent innovation as useful instruments in economic development. Creating and developing innovative products;

processes and technologies, is often a long and expensive process. Sophisticated facilities, substantial financial investments, risks of failure and the long duration needed to translate ideas into marketable products are some of the challenges facing new start-up business.

Incubators play an important educational role. It is believed that incubation is a valuable mechanism for technology transfer through interaction with mentors and advisors (Cassim 2001:13). Through the process of action learning, incubatees are educated. Incubatees create an environment that is hugely conducive to learning, teaching, sharing knowledge and growing in understanding within the scope of a given business or industry. This is particularly true of educational institution-linked incubators as these institutions house intellectual capital. Higher Education Institutions (HEI's) by their very nature have an abundance of literacy material, research facilities, experimental laboratories, intellectual capital, cheap labour, study equipment and a variety of technical know-how (Cassim 2001:13).

A new direction in industrialising countries is to promote innovation by co-operative arrangements whereby clusters of units in the same sector can be provided with affordable consultancy and research services. Such approaches have been effective in Europe through the work of the Federation of European Co-operative Research Organisations. The trends are towards co-operatising the small enterprise service organisations and creating the synergy of clusters of similar businesses which both co-operate and compete (Lalkaka 1997:5).

Starting a new business anytime anywhere is a hazardous task. Problems are compounded for developing countries in knowledge-based ventures as follows:

- Appropriate workspaces are difficult to find and require long-term leases and demonstrated ability to pay that increase the financial pressure on early-stage businesses.
- Capital requirements are generally large, while traditional banks are ill equipped to deal with the perceived risk. Venture Capital generally only becomes an option once the venture has documented the merits of its management, market and innovation.

- Technology-based ventures can benefit from linkages to sources of knowledge, which is the technical university or research laboratory. Such mentoring needs to be cultivated.
- Entrepreneurs often have technical skills, but usually lack the business management and marketing skills necessary for success. They often lack credibility and contacts with business networks.
- In fields where technology is changing rapidly, it is often advantageous to make technology acquisition arrangements. Sourcing such innovations, negotiating technology licensing agreements and protecting the intellectual property itself require special skills.
- Knowledge-based innovations are inherently more risky than others. The management of this unique risk requires assessment techniques and vision.
- Technology-based ventures often have social and environmental implications, which need to be managed carefully.
- Penetrating a competitive niche market requires market intelligence, a sound strategic plan and good luck (Lalkaka 1997:5-6).

1.2 Historical developments and current state

1.2.1 International developments

Lalkaka (1990:25) claims that the origins of the business incubator concept can be traced back to the recession in Western industrialised countries of the late 1970's and early 80's. Faced with the rapid rise in unemployment resulting from the collapse of traditional industries, it was recognised that in both the European community and the U.S., fresh strategies for the promotion of new economic activities were needed to create alternative job opportunities in crisis regions. Strategies pursued in the 1980's were broadly characterised by a switch from a top-down approach relying on exogenous factors and involving state intervention to transfer mobile capital and jobs from developed to underdeveloped or declining regions to a bottom-up approach, focusing on maximising the indigenous potential for economic development and helping depressed economies helping themselves. Attempts to establish business incubators in other parts of the world have necessarily meant adapting the concept to suit more diverse local conditions.

The early business incubators had three historical roots, namely:

- Efforts that aimed at developing inner-city blighted areas
- To offer entrepreneurship and innovation at major universities
- Initiatives by successful individual entrepreneur or groups of investors that sought to transfer their own new venture experiences to new companies in an environment conducive to successful technological innovation and commercialisation.

As the concept evolved in the early 1980's, two broad strategies emerged:

- The one approach focused on renovating vacant buildings. This strategy, however focused more on leasing space at inexpensive rates, than on building companies, and was therefore rather a property development scheme.
- The other approach focused more on helping companies grow. This strategy also provided space, but the focus was on providing support services for business development.

According to Barrow (2001:6), incubators, science parks, innovation centres and technology parks have been around for years. The serious attempts at incubation in 1959, is credited to a near-derelict building near New York. One of the incubator's first tenants was involved in incubating real chickens. Several waves of accelerators followed this start, and by the 1980's several hundred facilities were scattered around the US, Canada, Europe and Australia. Later incubation progressions took in the developing economies and the Internet Variations, which came into being in the mid '90s, swept across the US, Europe, India, China, Malaysia, Singapore, and the Philippines bringing the total to about four thousand worldwide. In the US, of the 950 incubators some 300 fall into the for profit category.

In Korea, in 1997, there were 12 incubators in operation but by 2000, they had increased to 135. Universities operate about 95% of the incubators and the rest are distributed between local government and other operators. In year 2000 there were about 1,900 entrepreneurs incubated, employing about 8,300 employees (Harley 2001: 4).

In Germany, there were ten innovation centres in 1983 but they grew to 360 in 2001. About 27% in industrial areas, 28% in rural areas and 45% in science and research areas (Bose 2001:44-45).

In China the concept of business incubators was introduced by Science & Technology Ministry. In 1987, the first incubator was established. In 1999, the total number had increased to 110, ranking third in the world (Zuping 2001:2).

The first incubators germinated at a time when the term "incubator" had not yet been in use in connection with business development (Wagner 1997:48). These incubation programmes followed a totally evolutionary process, since they had no models to be tested against. One of the earliest incubators started in 1964 when the University City Science Centre (UCSC) in the USA began to redevelop cleared land in an urban renewal area adjacent to two major Philadelphian universities for large research and development corporations and private businesses (Campbell 1988:10). UCSC housed small businesses in space "as available" in its building. They also provided office services and equipment to start-up companies. This environment also ensured that UCSC resources drew small companies. The first incubator, in its modern form started in the United Kingdom in 1972 at Covent Garden (Campbell 1988:12).

According to Barrow (2001:31), there are over 4,000 business incubators in operation throughout the world today. From a handful of facilities (forty) identified by the NBIA in its 1984 Quarterly Report of Incubators, there are ± 800 members in US alone. There are also hundreds of the newer for profit incubators set up either as standalone ventures or consortia led by major accountancy practices, management consultancies, venture capital providers or major firms such as Microsoft, Cisco Systems, Nokia and Oracle that donate to the high-tech world. The number of new incubators increased by 6 per month between January and August 1999. After September 1999, growth rates skyrocketed to about 25 per month to December 2000 in the US alone. In the former soviet Union 80, 600 in Western Europe; 50 in Australia, 200 in China, 100 in India. Two closely related factors have triggered the exponential growth of business incubation and both were discovered, or perhaps confirmed by Professor David Birch, 1979 in his landmark work emphasising the importance of new business, where he demonstrated that it was these fledgling enterprises,

employing fewer than 20 workers that were responsible for over two thirds of the increase in employment in the US between 1969 and 1976. This statistics was seized upon as the signal for governments to step up their efforts to stimulate and encourage enterprises. Birch also recognised their fragility. He estimated that roughly 8million enterprises in the US closed down every year. From these twin findings that new firms are both vital and fragile arose a plethora of government initiatives to both foster and protect small firms during their formative years (Barrow 2001:31).

In general, developing countries' incubators are younger than those in the US, but they have similar graduation and discontinued business ratios. About 80% graduates stay in business (Campbell 1988:20).

According to Richards (2002:5), although incubation can be tracked to the 1800's, basically it started around the early '80s when it was used to spearhead economically depressed areas. It has gone in and out of style and only a small percentage of those incubators were dedicated to technology. Many companies had research labs inside the companies where technologists could research new ideas. Universities have always been a source for early innovations because of the freedom to choose research projects and the resources available to them. Universities and corporations are now leveraging technology developed into licenses to distribute to start-ups in the hope that the licenses can sustain a company. In some cases, they are doing this by working hand-in-hand with incubators and accelerators. Resources are the missing link between companies that make it and those that crash and burn (Richards 2002:5).

Korea has upward of 300 technology incubators, most are connected with the Korean government and in co-operation with the universities and schools throughout the country. The asserts those good incubators offer are as follows: giving entrepreneurs mentoring, helping them cultivate resources, and in some instances giving them funding. Technology incubators have become an intricate part of investing in technologies and leveraging their assets and resources to build empires of the people who come to them. Aligning themselves with a corporate venture arm that gives technology, resources and licensing opportunities and incubators or accelerators that arm them with the common sense of staff mentors, resources and introductions to funding are key elements of success.

The first phase of incubation was traditionally focused on economic development initiatives just as with real incubators, a focus on survival. The second phase of incubators, which is still underway, has focus on acceleration.

In the early days, incubation had to do with economic development and its charity to a community. There were empty buildings and unemployed people then somebody had this idea to help start-up companies by putting them in these empty buildings. In those early days really incubation was about bricks and mortar. These days incubation is about mentoring; the just-in-time business development; the support and the selectivity in the front-end (Richards 2002:42).

According to Barrow (2001:7), one of the stories behind the history of incubation is: In 1959, the heirs of a prominent New York family business, Charles Manusco and Son had just bought another building. The Manusco's owned a wide range of local businesses in western New York State, where they regularly increased their real estate holdings and investments. Joseph Munisco, the family member assigned to look after the project concluded that the property would be impossible to rent to a single tenant. He decided on a revolutionary strategy to partition the building and lease it in small pieces, hoping to find enough tenants to turn a potential white elephant into a moneymaking proposition. His first tenant was a sign painter and one of the early tenants actually incubated chickens. Of late the incubator is known as Batavia Industrial Centre, with 1,000 people working in the building. In the 1970's in the UK, beehive units were fostered, being small factory units built in clusters on the edge of factory towns, with all services laid on an easy in and out lease agreements. Established in 1975, the British Steel Industry (BSI) invented the concept of shared managed workspace in the UK. The BSI concept was set up to help create employment in areas affected by the scaling down of steel production in Europe. BSI went on to add venture and loan capital as well as training and advice to its initiatives to stimulate employment. In 1980, the first modern incubator was formed in the city of Troy, about 250 miles east of the Batavia Centre.

Most of Troy's businesses date from the 1700's and 1800's; they are the fine homes of former industrial tycoons, worker and factory housing, and homes of the emerging middle class. They are still used and lived in today, many retaining their original character and

features. In keeping with the city's industrial heritage such buildings became home to the Rensselaer Polytechnic Institute (RPI), the first degree-granting technological university in the English-speaking world. Over the last 150 years, the Rensselaer Alumni have been the originators of the technologies, products and events that have changed the world e.g. the Apollo project, e-mail and the first pocket calculator. The Institute provided at least the hint of future industries; of where wealth might be created in a second industrial revolution. In 1980, George Louw, who became president of RPI after successfully launching NASA's Apollo space missions, was searching for ways to expose his students to the business experience, but in a laboratory setting so the Institute could retain a measure of control and direction. The institute began a networking programme that linked student and faculty entrepreneurs to investors. Business people came to speak about what was required to launch a business. Students were paired with businesses in their areas of technological expertise so that they could gain first-hand knowledge of how businesses function. These students and professors began to launch their own companies and RPI's incubator project grew in leaps and bounds. Troy's town fathers soon recognized the potential value of the RPI incubator and the role it could play in helping them tackle their own problems in reinvigorating a once vital economy. In many ways the RPI incubator's history mirrors the involvement of local and national government with technological universities in the birth and development of many other incubators all over the USA and worldwide.

At first in RPI, several early incubator companies operated out of informal incubator space of a campus academic building. The first permanent incubator building was a 3500 square foot single storey building then used for storage. The building was renovated using a $50 000 grant from the US Economic Development Administration (EDA), which RPI matched with its own $50 000. In 1982, this building was filled with incubator companies immediately following the completion of renovation. It soon became apparent that there was sufficient demand for incubator space to support a much larger facility. Other buildings were then renovated using funds from the city budget and other development agencies. Since 1992, the incubator has expanded in stages occupying 32,000 net square kilometres. The statistics of companies housed there is as follows:

- Greater than 80% survival rate for participating companies

- Over 150 companies served since 1980. Most have remained in New York.
- Twenty current tenants (2001); 230 jobs
- Occupancy in the incubator typically exceeds 95%.
- Over 2000 jobs created
- Annual sales of the incubator graduates exceed $200 million
- Hundreds of RPI students employed.

The above points also give a clear indication of the purpose and mission of most state/local government and university incubators: business birth, survival, and that business stay and grow close to where they were born (Barrow 2001:20).

The mission of the incubation and innovation centre of the University of Antwerp in Belgium captures the essence of the goal of university and government goals in forming an alliance to start and run a business incubator:

- To promote, support and enhance the creation of small and medium-sized enterprises in new technologies and related services in the Antwerp region.
- To offer to its tenant firms an affordable infrastructure, qualitative service and easy access to research centres.
- To facilitate more effective interaction between university, industry and institutes for higher technical education in the province of Antwerp
- To build and sustain the image of the University of Antwerp as the interactive university in Flanders.
- To create new sustainable employment in the region.

In the two decades since RPI's incubator was started, there have been a myriad of different business models. Other institutions, corporations, and town governments had already recognized the benefits to be gained from the commercialisation of high and not so high technology developments by encouraging start-ups.

Linked to the development of the incubator model has been what is referred to as the life cycle of the incubator itself. The focus of incubator management during the start-up stage is sorting out the physical facility, either through renovation of an existing building or the construction of purpose-built accommodation. Incubator cash-flow requirements mean

that early tenants are likely to be chosen on their ability to pay rent rather than their growth potential. This stage ends around the time that the facility breaks even financially.

During the second or business development phase, attention is directed towards nurturing new businesses. More importance is placed on developing a business advisory function and business networks. The incubator manager now starts working to build synergies through discussion and trading between tenants. When demand for space is appreciably greater than space available for tenants, and sophisticated, responsive business advisory arrangements are functioning well, the incubator is ready to move into the maturity phase.

Maturity is when the incubator spreads its span of influence throughout its region or business sector, becoming a focus for entrepreneurial endeavour. Once demand for tenancy exceeds available space or other scarce resources such as investment capital, the incubator can become more discerning with its entrance criteria and accelerate the graduation of firms. At this stage, the programme may consider expansion to accommodate the demand for its services. This usually means finding more space and buildings. As the incubator moves through the three phases of its cycle, it is expected that the quality and quantity of development outcomes would get higher. The incubator management has to serve several masters and the balance of responsibility to each shifts as the incubator matures and moves through its lifecycle. The incubator stakeholders have to be kept happy, whether they are shareholders, venture capital firms, universities or government departments. The physical premises and or/other resources have to be managed and developed. The tenants or client businesses have to be serviced. The patience and understanding of the stakeholders plays an important role in whether or not an incubator can survive long enough to become mature and function properly.

The Fraunhofer Institute of Innovation had the following classification of incubators according to the catholic range of enterprise:

- Handcraft-orientated incubators, without cooperation and services.
- Industrial parks with limited company status and technological orientation and limited provision for co-operation and services
- Technology-based incubators with extensive co-operation and services.

- Incubators that as well as offering services offer space to research departments, institutions and divisions of established firms.
- Research park-like locations for new and established firms, without the provision of services and co-operation possibilities.

1.2.2. The South African perspective

Cassim (2001:6-10) also gives an account of the South African incubation as follows: Incubators are a feature of the South African business environment too. Major strides are appearing in the private sector arena as private and technology-based incubators mushroom. DTI has a comprehensive SMME support framework. Ntsika has planned a number of pre-incubator cocoons to provide temporary protective environment to incubate new start up SME's. Seven of these were planned for the year 2000. The other initiatives include the following:

- The LBSC Programme is a support programme of Ntsika. There are a number of LBSC'S that provide incubators. A new initiative of the LBSC Programme has been the development of incubators for small business in Kwa-Zulu/Natal.
- Enterprise Development Centres of South African Breweries in Isando and in Bloemfontein operating in the traditional method.
- The Technikon Free State Science Park acts as a catalyst in innovation, providing fledgling SME's networking opportunities and other administrative and managerial facilities at reduced rates. Incubatees graduate into the Science Park.
- DST GTZ Technology Stations Programme (for technology-based SMME's based at three technikons:- Technikon Pretoria (electronics) Technikon Free Sate (metals), Technikon North West and Mangosuthu (chemicals)
- EU/TABEISA Project which is a partnership of the EU, Universities of Coventry & Greenwich (of the UK) and four historically disadvantaged Technikons:- Technikon Northern Gauteng, ML Sultan Technikon, Eastern Cape Tech and Peninsula Technikon to establish Enterprise Development at these institutions.
- CSIR Automotive Industry Development Centre (AIDC) with the University of Pretoria and Technikon Pretoria through the University of Pretoria's Department of Industrial Engineering and Engineering Management and the Technikon Pretoria's

Department of Mechanical Engineering make up the Automotive Cluster. The focus is on component manufacturing enterprise sector

- Centre for Polymer Technology to develop business in a protected environment
- Cape Information Technology Initiative (CITI) housed in premises called Bandwidth Barn, giving start-ups access to subsidised infrastructure, seed capital and advice on legal, marketing and business matters. Start-up and support companies such as technical consultants share facilities and a sense of community (Bisseker 2001:22). CITI has supported several successful companies such as Future Perfect Corp, South Easter and Ideosphere.
- The Innovation Hub is an initiative of the Gauteng Provincial Government's (GPG's) Blue 1Q project in partnership with SERA, which is creating a physical and virtual space to enhance and support the growth of technology-led business through best practices, technology transfer from both local and international expertise. The Business Incubator is one of the core activities of the Hub. It specialises in providing support to hi-tech start-up business in the area of ICT, software development, wireless technology and mobile applications.
- Stellenbosh Technikon started as a Science Park in 1987. It is an undertaking of the Stellenbosh Municipality to attract hi-tech R&D companies from anywhere to the Western Cape. Within the techno park is an IDC erected incubator, the Innovation Centre, where small spin-off companies from five HEI's in the Western Cape can be accommodated.
- Pricewater house coopers incubator was formally launched in June 2001, which focuses on the B2B sector, offering a wide variety of services during various stages of growth and development with appropriate mentoring.
- Health Bridge, an interesting development of Internet solutions, Medscheme and Discovery Health, which leveraged off the corporate and landed on its own within a year, Rock IT, which operates as a Business Angel was established in 1999 and is Technology focused, takes equity stake in incubatees and offers a variety of services in return. Incubatees are generally inexperienced and skilled.
- Innovation capital operating as Venture Capital Online focussing on the telecommunications and wireless technologies to target Life Science and Engineering industries and invests capital and management know how to fast track commercialisation of research.

- Unistel and the office for Intellectual Property of the US, which operates as a virtual incubator to commercialise research of staff and students.
- Catalyst Incubator which targets life science & engineering industries investing capital and management know how to fast track commercialisation of research.

The study by the Institute of Technological Innovation (ITI) (Wagner 1997:170-184) provides an insight into the history of incubation in South Africa. The concept of incubation in South Africa was first practised in 1995 when the Small Business Development Corporation (SBDC) established the "hives of industry". The hives are a number of independent workstations that are grouped together to form a cluster of workshops and they were an attempt to bridge the first and third world economies in South Africa. The majority of the hives were developed inside redundant factories, warehouses and other buildings the SBDC bought, upgraded and remodelled at minimal cost, to suit the necessities of the hives. There were also some buildings that were built from scratch and there are also combinations of the two. Apart from providing basic accommodation at minimal rates, tenants were also provided with the SBDC's collective support services including loans, business and legal advice, marketing assistance and bulk buying facilities. Prospective tenants were trained after demonstrating their skills. Tools, machinery and other equipment were also available for hire. Services such as bookkeeping, typing and telephone facilities were available to tenants at a small cost. The hives were also playing an important role in facilitating sub-contracting partnerships between large and small enterprises (Wagner 1997:174-176). Hives were not really incubators in their modern form because there was no set period for the company to move out of the hive.

From 1996, other initiatives followed including the CSIR, University of Pretoria, University of Stellensbosch, the Capricorn Foundation and other universities and recently technikons.

1.2.3 DTI-funded centres

1.2.3.1 Furniture Technology Centre (Furntech)

In 1998, meetings were held between DTI and the Swedish Industrial Development Agency (SIDA) to discuss plans to improve the quality and quantity of furniture in South Africa. This resulted in SIDA committing to partially contribute to a project that will upgrade the standard of the furniture industry in South Africa. In the early stages of the project, it was proposed that the establishment of a training centre could assist the furniture industry in upgrading its output and increasing productivity. Contact was established with the Port Elizabeth Technikon, George Campus specialising in Wood Technology and other related courses in Higher Education. In 2000, DTI approved funds to establish the Furniture Technology Centre (Furntech), payable over 5 years after which the centre should be self-sustainable. These funds were granted in order for Furntech to establish a state of the art furniture training and demonstration centre, plus a technology incubator and technology transfer centre. The facility was established on the Saasveld Campus of the PE Technikon with objectives being the following:

- Development of the skills level of industry employees and new entrants from assistant to management level; development and equipment of a centre of furniture manufacturing excellence that can facilitate international benchmark expertise on a national level;
- Development of a pool of trainers/facilitators/experts in order to increase access to new technology methods and systems;
- Provision of technology auditing and advice services to the furniture industry and, by way of technology transfer, introduction of new manufacturing technology to the industry; use of Swedish expertise as stated in the SA/Swedish agreement;
- Demonstration and incubation of new technology so as to create new businesses and to expand existing businesses;
- Enhancement of the industry to become competitive;
- Creation of job opportunities, encouragement of entrepreneurial activities, and assistance in addressing unemployment; and
- Co-operation with national and provincial government agencies, the industry and other role-players in the furtherance of its objectives.

Currently, Furntech has trained a number of employed and unemployed individuals and has incubated a number of companies and individuals, and has also demonstrated world-class technology to existing companies. The greatest need for furniture incubation around the country created a need for other branches of Furntech. Furntech's head office has now moved from George to Cape Town, with George campus being the biggest incubation centre. A process is underway to have other satellite centres in KZN, Mpumalanga and the Eastern Cape.

1.2.3.2. National Fibre Centre (NFC)

The National Fibre Centre (NFC) initiative is a joint venture between DTI, Department of Agriculture, the private sector and the CSIR with the following objectives:

- To establish and provide world-class technical services in the areas of plant fibre processing, fibre quality assessment, technology incubation and product development, technology transfer to industry, assistance in establishment of new SMME's, training and human resource development;
- To network with industry partners, technical service providers, relevant international organisations and other stakeholders;
- To develop a value-chain strategy linked to the integrated manufacturing platform; and to develop high quality value-added products and to exploit the whole spectrum of manufacturing based on natural fibres.

1.2.3.3 Mpumalanga Stainless Steel Initiative (MSI)

The Mpumalanga Stainless Steel Initiative (MSI): Situated in Middleburg, this initiative aims at incubating entrepreneurs with capabilities in the stainless steel industry. The technologies being developed concentrate on beneficiating stainless steel and supplying products to local industries, which have been depending on imports of these products. The local council donated land and some infrastructure. There are financial commitments from private sector companies, which will benefit directly from the project. A feasibility study was conducted which indicated that the project is viable. The incubator functions as a Section 21 company. DTI has committed R2,5m per annum for a period of five years. Currently, MSI has incubated a lot of individuals and companies.

1.2.3.4 Downstream Aluminium Centre for Technology (DACT)

Richards Bay Aluminium Incubator (Downstream Aluminium Centre for Technology) (DACT): DACT aims at incubating entrepreneurs with capabilities in the aluminium sector. The technologies being developed concentrate on beneficiating aluminium and creating various products. The local council and other private sector funders provided funding for the first phase of the project which is training of entrepreneurs before incubation. The second phase, which is funded by DTI deals with the actual incubation. The incubator functions as a Section 21 company. DTI has committed R2, 5m per annum for a period of five years. Currently, DACT has trained a number of individuals in Aluminium Casting.

1.2.4. The Godisa Initiative

In December 2000 the Department of Science and Technology (DST) approved the establishment of the GODISA Technology Incubator Programme in conjunction with the Department of Trade and Industry (DTI). The main aim of the GODISA Programme is to create technology intensive Small, medium and Micro Enterprises (SMMEs). Two important outputs of this Programme are to create new businesses and new employment opportunities. GODISA Programme enjoys funding from EU, DST and DTI. GODISA also aims for growth and employment creation through the enhancement of technological innovation, improvement in productivity and accelerated international competitiveness of South African Small, Medium and Micro Enterprises (SMME's). The EU is funding the Project Management Unit (PMU) and the establishment of three pilot centres – an Innovation Support Centre (ISC); a Technology Demonstration Centre (TDC) and a Technology incubator (TI). The aim was to learn from the pilot projects before a decision could be made which of the models to be replicated. A delay in the establishment of the pilots, led DTI and DST into deciding to set up other incubators. To date, five other incubators have been approved and are operational. All of the above-mentioned incubators and other like centres have different technology focuses as follows:

1.2.4.1. The Innovation Support Centre (ISC)

The ISC, a pilot situated in Cator Manor, Kwa-Zulu/Natal endeavours to optimise and commercialise developed technologies through the identification of technologies being developed in Kwa-Zulu/Natal Province. The focus of the activities includes core physical infrastructure, and embedded systems, technology commercialisation and optimisation services, skills development services and business development services. The source of entrepreneurs for the ISC innovators are students and lecturers from both universities and technikons wishing to venture into high technology embedded systems or Information Technology in Kwa-Zulu/Natal. ISC delivery and services involve technology innovation testing, specific coaching or advisory support, software services, quality assurance, business development, pre-qualification verification of the innovation by technology experts for further support, aiming to commercialise the product with potential markets. All the services occur on an advisory or consultancy basis.

1.2.4.2 Zenzele Technology Demonstration Centre (TDC)

The TDC is a pilot situated in Mintek in Randburg and has the function of demonstrating applied and appropriate technologies to the small-scale mining sector throughout South Africa. The main purpose is to encourage and support small-scale miners to upgrade their technologies. The TDC has access to a wide range of equipment to demonstrate in that sector. It also provides access to technologies, which help the small-scale miners to become more efficient and to “add-value” to existing products and expand markets.

1.2.4.3 Softstart Technology Incubator (TI)

Softstart (TI) is a pilot situated at the CSIR with the founding organisations being the CSIR, the University of Pretoria and the Pretoria Technikon. The aim of Softstart is to be an invaluable resource for early-stage, innovative software entrepreneurs in Gauteng and it provides the following value-added services: office facilities, IT infrastructure, limited angel funding, marketing and administrative assistance, expert coaching in software entrepreneurship and networking with funding sources, service providers and other entrepreneurs.

The other five incubators that have been established under the GODISA initiative include the following:

1.2.4.4. Timbali Technology Incubator

Timbali Technology Incubator focuses on a financially feasible export based netriceutical (floriculture) industry in the Mbombela region in Mpumalanga. Most tenants are from previously marginalized communities. The founding members are the Agricultural Research Council (ARC) and Mbombela Flower Grower's Association.

1.2.4.5. Acorn Technology Incubator

Acorn Technology incubator is a not for profit life-sciences incubator based in Cape Town with the aim of assisting entrepreneurs with innovative life science technologies in establishing successful and profitable businesses. The services include laboratory and office space; business mentoring and support services and access to seed capital.

1.2.4.6. Bodibeng Technology Incubator (previously Brainworks) (BTI)

BTI focuses on the needs of early phase entrepreneurs in the Information, Communications and Electronics sectors providing hands-on business mentoring and by connecting them to a global network. Key academic partners include the University of Potchefstroom, Rand Afrikaans University (RAU), Wits University and Technikon and the Holland TSM Business School. The Incubator is situated in Sunninghill, Johannesburg and is a virtual incubator.

1.2.4.7 The South African Chemical Technology Incubator (Chemin)

Chemin is situated in Summerstrand, Port Elizabeth, with the main partners being the Port Elizabeth Technikon, CSIR- Bio/Chemtek, Chemcity, Merisol, Chemical Marketing and Consulting Services and CHP Associates. The Incubator specialises in the incubation of downstream chemical manufacturing SMME's.

1.2.4.8. Egoli-Bio

The Egoli Biotechnology Incubator (Egoli-Bio) is situated in Modderfontein and is a joint venture between the CSIR Bio/Chemtek, the Innovation Hub and Africa Bio. The aim is to create a critical mass of biotechnologists and biotechnology organisations to stimulate economic development of the biotechnology industry in South Africa.

The DST and DTI have decided that GODISA should be managed as a separate Trust, which has been established. DTI incubators will also form part of the GODISA programme and be managed through the GODISA Trust.

1.3 Research problem

The broad issue to be investigated is whether the GODISA case competencies and capabilities required for success compare with international studies. Under the Godisa initiative there are three types of centres: the technology incubators, the innovation centre and the demonstration centre. It appears that of these three types some are more successful than others. The problem that has to be investigated is the underlying cause of the failure and success of these centres.

The reasons for failure or success of the Godisa incubation centres are unknown. By the end of this study, it is expected that these will have been established.

1.4 Rationale for the study

The rationale for the study is to determine the best solution in terms of incubation, specifically for the South African conditions. The Godisa programme implemented three types of centres namely the Technology Demonstration Centre, the Technology Incubator and the Innovation Support Centre as pilots. The aim was to learn from the three models in order to duplicate the best. Due to the delay in the set up of the three centres the two departments decided to duplicate the Technology Incubator concept even though it was not yet established if it was the most successful. The reason for the study is to establish the success factors associated with incubation and apply these to the Godisa initiative so as to

decide which the best model to duplicate in SA conditions is. The Departments of Trade and Industry and Science and Technology will gain a lot, while academia will also benefit, as there is not a lot of information documented on South African incubation.

1.5 Research objectives and research questions

The research objectives will be:

- Identifying the set of success factors that apply to the incubator set-up;
- Finding a suitable model;
- Testing the model in South African conditions; and
- Making recommendations on a model that will be suitable for South African conditions.

The research questions will be:

- What are the relevant success factors associated with incubation internationally?
- Are these factors applicable to South African conditions?
- What are the main similarities and differences between the local and international models?

CHAPTER II: THEORY AND RESEARCH REVIEW

2.1 Theory and research review

The type of literature that was consulted is a combination of journals, conference proceedings and books. It is interesting to note that the views that were held as early as the 1980's are still valid even for recent studies.

In terms of the key success factors there are no conflicting ideas, and authors have identified several factors:

Smilor (1989:22) identified proximity to universities as one of the key success factors for incubators. Later studies by Tornatzy (1996:25) Wagner (1997:164) and Autio and Klofsten (1998:3) held the same view.

Wagner (1997:96) and Richards (2002:41) identified feasibility as another success factor to incubation.

Tornatzy (1996:12) identified that the availability of adequate early-stage funding to entrepreneurs as the key to transforming good ideas into successful businesses. Barrow (2001:35) and Harwit (2002:4) also concurred with the finding, while Richards (2002:169) also emphasised that incubators themselves should be able to raise capital for their clients in order to ensure success.

Cooper (1985:75) recognised that the success of a small business is dependant on the quality of the entrepreneur. In later studies, Gartner and Bhat (1990:219); Baron and Baron and Markhan (1990:60); and Finer and Holberton (2002:25) shared the same view. Smilor (1989:15) was supported by Lalkaka (1990:25) in viewing government supportive policies as one of the success factors.

Nathan (1998:5) indicated that the lack of Venture Capital can hinder innovation, while Hickman and Raia (2002:18) indicated that innovation is likely to happen in an environment like an incubator.

Barrow (2001:36) and Richards (2002:45) concur that the only true measure of success of an incubator is the success of companies that come out of their pipeline and how well they do after graduation.

Smilor (1989:46); Lalkaka (1997:9, 17); Autio and Klofsten (1998:3), Lalkaka (1990:25); Barrow (2001:12) and Richards (2002:21), all concur that properly qualified, competent, highly networked, experienced and properly remunerated incubator management is the key to success.

Lalkaka (1997:14) and Richards (2002:45) are of the view that sustainability of the incubator is an important measure of success.

Unido (1990:26) cites a positive entrepreneurial culture as one of the success factors. Lalkaka (1997:16-17) also identified a comprehensive list of success determinants during the different stages of the incubation process. The factors are a combination of what the other authors have mentioned, starting from Smilor (1989:45) to Richards (2002:31) and Harwit (2002:2).

Recent authors have also identified some critical success factors, which are not in conflict with those identified by earlier authors. These include Sheahan (2005:1) who emphasises the importance of proximity to university as one of the key success factors for incubation. Hackett and Dilts (2004:41) believe that networking plays a vital role in any incubation programme. Pena (2004:226) also agrees that networking is of vital importance to incubation success. Peters, Rice and Sundarajan (2004:87) believe that proximity to a university and networking are key to incubator success. Lee and Osteryoung (2004:419) identified a set of fourteen critical success factors for university business incubators.

The main instruments that have been utilised in conducting incubator studies are a combination of interviews; questionnaires; observations; case studies; and surveys.

2.2 Current theories

2.2.1 Proximity to university or research park

Early studies focused largely on identifying configuration parameters considered to be important for the science parks namely:

- proximity to a major university of technology;
- on-site manufacturing facilities, competent science park managers; and
- careful tenant selection (Autio and Klofsten 1998:3).

Smilor (1989:10) indicated that key success factors in incubation include proximity to a research university, continuity in government policies, the catalytic role of large technology companies, the importance of indigenous company development and the need for consensus on the sustained development, co-ordinated approach to high-technology company development and the importance of a network of influencers or executive champions.

The study on China's incubators by Harwit (2002:2) also emphasised that proximity to a university is important due to ready sources of facilities and students. Professors in specialised fields such as business school faculty regularly hold sessions for tenant companies and lecture on accounting, tax rules and management practices.

Access to science and technology expertise and facilities is built in as part of a more comprehensive, inter-organisational relationship (Tornatzy 1996:16). It is best to locate an incubator where supporting infrastructure and access to technical services is readily available in order to improve the chances of success of the incubator as well as businesses it is nurturing (Wagner 1997:159).

The good reputation of the incubator constitutes an asset that the participating entrepreneurs can use in their interaction with such contacts as financing institutions and potential industrial partners (Autio and Klofsten 1998:3).

VC's are attracted to university incubators for a number of reasons, including: lower burn rates and less risk due to investment; and vetting by groups familiar with technology

(Sheahan 2005:1). Sheahan (2005:1) continues to cite that universities enjoy the special advantage of being on the cutting edge of technology, conducting top-notch laboratories by experts in their field. The ability to access research capital from grants and other sources has also been cited as one of the advantages of a university incubator (Sheahan 2005:2). Pena (2004:224) cited that the quality of entrepreneurs is a determinant of success.

In a study conducted by Peters, Rice and Sundarajan (2004:87), it became clear that incubators with access to unique government and university resources, like research labs, seminars on campus, academic knowledge and co-ordinated networks with other incubators become more successful that otherwise.

2.2.2. Feasibility study

Success is crucial to the image of an incubator and it depends on a number of divergent factors. A feasibility study is probably one of the most critical determinants of incubator's success. A feasibility exercise should typically include the following:

- a site selection study,
- a marketing analysis,
- a financing plan, and a mission statement,
- measures by which to judge the project,
- identification of an appropriate project champion and incubator manager.
- A decision on the type of incubator and type of tenants and
- development of appropriate selection criteria are critical for success

(Wagner 1997:97).

Richards (2002:41) cites that feasibility is the key to successful incubation because before establishing an incubator it is crucial to look what your needs and resources are and looking at the feasibility of doing so. A feasibility study allows sponsors to understand the climate for business incubation in their community; the market for services the incubator proposes to provide; and the commitments necessary to develop a viable programme. The wrong building can lead to failure and this is one of the reasons why incubators have not met expectations.

One of the biggest reasons incubators fail is because incubator managers do not develop a business plan, something they will require everyone of their companies to do (Richards 2002:11).

2.2.3 Availability of funding for entrepreneurs

The availability of venture capital for start-ups was also identified as one of the success factors. (Harwit 2002:3). Some successful incubators in the UK also offer government grants and loans, equity and debt financing arrangements, and business tax and risk management, (Barrow 2001:36). An incubator has to have the ability to help raise capital for its clients be it a low interest lending source, grant funding, angel or venture capital funding (Richards 2002:46). Without adequate early-stage funding, even technology start-ups with the best ideas cannot transform them into successful businesses (Tornatzy 1996:20).

2.2.4 Quality of entrepreneurs

The success of the incubator also depends on the quality of entrepreneurs being incubated. The entrepreneurs must have the following characteristics:

- Experience – knowing what it takes to get the job done so they avoid time-tested issues and can make better decisions; Drive- They should have the desire to succeed;
- Belief-Putting their own financial ease on the line, having the ability to ask for what they want, take rejection and try again (Finer and Holberton 2002:25). Gartner and Bhat (1999:215) indicated that the chances of venture survival are improved if entrepreneurs had substantial knowledge and ability at the beginning of the incubation, gained substantial knowledge and ability during the process and continued to demonstrate substantial knowledge and ability after the process. Cooper (1985:86) indicates that the success of a small business is influenced by three sets of factors at work on the entrepreneur's background namely:
- family, education and previous work experience
- previous incubator experience e.g. Geographic location, motivation or contact with possible fellow founders and

- environmental factors e.g. Economic conditions &examples of entrepreneurial action

The incubator phenomenon plays an important role in entrepreneurial success. Various implications for prospective entrepreneurs are:

- A growth-oriented technical firm is unlikely to be started in a geographical area in which there are few people with experience in the industry;
- Regional programmes to attract entrepreneurs are unlikely to succeed without the proximity of other businesses of the same nature to act as incubators;
- Local and regional programmes to attract branch facilities of large corporations are more likely to succeed if they focus on those companies more likely to function as incubators;
- Universities play less of a direct role in the process than is often assumed;
- A more proactive management approach and integration of various infrastructure services;
- A growing involvement by private sector investors;
- The presence of nursery or incubator units to encourage small firms' growth and;
- Greater planning.

Nelton (1985:5) gives a list of advices to entrepreneurs who would like to see their businesses succeed as follows:

- Serve on the board of another company;
- Hire smart people;
- Socialise with people and learn from their experiences;
- Watch Management Courses offered on television;
- Listen to audiocassette tapes aimed at business people;
- Affiliate with small business associations and other government agencies;
- Learn by trial and error;
- Create a board of directors;
- Set an advisory board;
- Work with top employees over lunch;
- Use an incubator for consultation;

- Listen to family members;
- Acquire a Personal Computer;
- Read;
- Bring in experts;
- Heed customer complaints;
- Acquire a Master of Business Administration.

Kodithwakk and Rosa (1999:20) indicate that entrepreneurship route to success is not just creative, but also opportunity-driven. It is a complex and holistic fit and balance of several factors. Most researchers concur that at its core, the entrepreneurial process is opportunity driven, creative, resource-efficient and driven by a lead entrepreneur or entrepreneurial team. The entrepreneurs always find an alternative way to efficiency manage resources than just following conventional or orthodox good management and is more creative and effective in finding and accessing new opportunities and resources especially when they are hard to come by. It is more flexible and adaptive and hence can lead to more sustainable growth, particularly in unfriendly environment. Entrepreneurs are characteristically people who go beyond the limits of resources over which they have direct control. Entrepreneurs also find ways of controlling critical resources without owning them. It is often argued that small-scale entrepreneurs, because they are ignorant or untrained, at the adoption of more efficient products and management techniques would best improve their business through education and training, particularly management training. Management skills and entrepreneurial skills are complimentary and interdependent.

Research indicates that a high level of social capital (e.g. favourable reputation, extensive social networks etc) assists entrepreneur's social competence influences the outcomes they experience. A number of cognitive factors and processes that influence the entrepreneur's success include overconfidence in their own judgements, greater use of the representative ness, heuristics and a reduced tendency to engage in counterfactual thinking (Baron and Markman 1999:21).

Most innovations result from divergent thinking environments that thrive on disorder, imagination and ambiguity. The solution is a systematic approach to innovation that

integrates convergent implementation with divergent incubation. Nokia's new venturing network, based on the idea that innovation includes anything from incremental to revolutionary derives its innovations from a variety of venturing and incubation (Hickman and Raia 2002:14).

A lack of innovative ideas and new technologies has been blamed on poor industry-university collaboration, an aversion to risk taking by conservative-minded researchers and no access to venture capital (Nathan 1998: 4).

Knowledge acquired through education is expected to enrich entrepreneur's human capital, and therefore to enhance new firm life endurance (Pena 2004:224).

2.2.5. Successful incubatees and graduates

All of the incubator models are dependant on the success of companies they have within their portfolios (Barrow 2001:33). In many cases the success of both is tied in how well the companies do after they graduate. Traditionally, true incubators have yielded to the fact that the only true measure of success are the companies that come out of their pipelines. Incubators should contribute to their companies so that they are stronger, better and faster than those who are not in the incubators (Richards 2002:45).

2.2.6. Supportive government policy

The success of services directed to entrepreneurship promotion depends largely on a broad-based consensus on economic and industrial policy. Hence it must be emphasised that initiatives such as business incubators make sense only if the relationship between entrepreneurship and economic growth has been acknowledged (Lalkaka 1990:12).

In centrally planned economies the entrepreneurial culture has been discouraged for decades and is weak. Business incubator promoters in these regions have the task of actually helping to create the culture. The absence of entrepreneurial culture and infrastructure indicates certain common needs:

- Entrepreneurial training

- Innovation: Training is an important factor in encouraging the transition from employee mentality to an entrepreneurial mentality. Established training methods should be established for generating ideas should be adopted & included in business incubator training services.
- Skills: -formalizing the planning & training in specific disciplines such as bookkeeping personnel, management etc.
- Marketing advice: - Initial research needed to identify a market for products or services or sales & advertising techniques.
- Finance: Incubators in developing countries have a critical role to play in persuading banks to assist their tenants on favourable terms once a track record of incubating successful new enterprises is established (Lalkaka 1990: 95).

Initiatives such as business incubators make sense only if the relationship between entrepreneurs and economic development has been acknowledged. The chance of succeeding exists only if the proposed projects are consistent with the country's overall economic goals and strategies and with the socio-cultural environment (Lalkaka 1990:26).

The success of business incubation in the USA can be attributed to a facilitative entrepreneurial environment, an expressed demand for infrastructure and advisory service and generally, a profit aim (Lalkaka 1990:45).

Established training methods for generating ideas should be adapted and included in business incubator training services. These components can be supported by local or foreign experts as appropriate (Lalkaka 1990:46).

2.2.7 Stakeholder consensus

The most important factors for a successful incubator strategy are clarity, consistency and co-operation. The strategy must be consistent with the needs and capacities of the locality it is aiming to serve. The role each partner is to play must be as clearly defined as the objectives to be reached. Conflict in these areas could mean trouble for the incubator. Lalkaka (1990:25) advises that incubator models and or their individual components should be considered as modules to be selected according to objectives, particularly the

needs of the target area and groups and resources available to create tailor-made sets of services. The study on European business incubators indicates that the involvement and information of stakeholders is vital for success (Autio and Klofsten 1998:10).

In general, incubators work through the relationships of a number of stakeholders including sponsors drawn from the local business community, government and the broader community, including venture capital providers, up and coming entrepreneurs and professional incubator management. These all blend their talents to produce sustainable graduate businesses, the benefits of increased income, employment and economic development of local community and, where applicable, a return of shareholder investment.

2.2.8. Competent and properly incentivised management team

The best returns are expected from those incubators that provide a highly networked but lean management team (Richards 2002:21) Those incubators that provide valuable network connections for their stat-ups, while providing the opportunity for incubated CEO's to develop expertise in how to grow a company could be best positioned for sustainability and growth. Who you really need to run an incubator is a very experienced person who has a business background and is well networked in the community (Richards 2002:21). Properly incentivised incubator managers stay for a long time (Barrow 2001:36). The success of business incubators in developing economies, as with other regions will ultimately depend on the quality of the management teams appointed to operate them. Personal qualities are clearly critical and the person chosen to lead the team needs to possess entrepreneurial skills and a flair for leadership and organisation (Tornartzky 1996:25)

Lalkaka (1990:21) advises the following general success indicators:

- the owners of business incubators should be separate from their management;
- the management team should be contracted for a limited period, be given measurable objectives against which performance can be monitored and evaluated; incentives should be offered to managers to encourage and award outstanding performance.

- being able to generate income from diverse sources is an indication of success in fulfilling the broader and more comprehensive role.

2.2.9. A willing advisory board

The advisory boards of incubators should have people with a wide range of disciplines and should be available to assist companies at no charge as long as the request is reasonable (Richards 2002:25).

It is important for the advisory board to be willing to share their experiences with both the management of the incubator and the entrepreneurs. This adds to the value of entrepreneurs to be produced and the proper running of the incubator.

2.2.10. Financial sustainability

The incubators themselves must also be viable. Some of them are taking equity, and some are taking royalties and they are operating the incubator as a business and have their own source of sustainability even if it is ongoing subsidies (Richards 2002:45).

Incubators also require support from the communities they are in to be successful. The success of the incubator is also accelerated by strategic partnerships with companies that graduate from them (Richards 2002:102).

The ultimate test of success will normally be whether the incubator can be self-sustaining. The incubator should be managed like a business regardless of its legal status. Quality management is the key to success (Wagner 1997:161).

Suggestions for potential developers of business incubators include (Campbell 1984:33):
Evaluation of potential entrepreneurs;

- Compare the cost of a renovating an existing structure with the cost a new structure;
- Have qualified people manage the incubator;
- Select both new & established businesses;

- Avoid wasting money on unnecessary services; and
- Develop explicit but flexible agreements

Gissy, (1984:22) outlines the process for implementing a business incubator namely;

- Select a staff with strong management capacity;
- Select a central location and an impressive physical plant;
- Design the lease and screening process to conform to the selection criteria;
- Design the building space to be flexible; and
- Keep asking questions.

2.2.11. Stringent selection criteria

Various authors agree that incubators should have some form of entry and exit criteria. The entry criteria may include feasibility of the product/process of the entrepreneur or company; ability to self-fund; a good business plan; technology focus and others as may be decided by the incubator. This process enables the incubator to have a certain niche of clients so as to better serve their needs.

It is also strongly advisable and may add to the success of the incubator to also have exit criteria. Normally these take the form of market-related rentals on the side of the incubator. The existence of such criteria encourages tenants to set milestones and adhere strictly to them.

Lalkaka (1997:16) believes that screening of the technical, business and market potential of tenants is one of the critical success factors of incubation.

2.2.12. Networking

The importance of a network of influencers or executive champions has been cited as one of the success factors for incubators. This is so because networking partners share experiences of both successes and failures such that incubators can learn.

Networking is also important in opening up and widening market opportunities for incubatees and graduates. It is ideal to have networking partners from a wide range of countries. Networking in incubation is usually enhanced by joining local or international incubator associations.

Hackett and Dilts (2004:41) indicate that it is important to recognise the key role that the entire incubator network plays in incubating new ventures. This network typically includes the includes the incubator manager and staff, incubator advisory board, fellow incubatee companies and employees, local universities and university community members, industry contacts, professional service providers such as lawyers, accountants, marketing specialists, venture capitalists, angel investors, and volunteers.

Pena (2004:226) assets that the establishment of inter-organisational arrangements helps companies in overcoming survival barriers by benefiting venture companies from tangible and intangible assets of partners firms.

2.2.13. Principles and Best Practices of Successful Business Incubation

In their book, Rice and Matthews (1997:2-5) describe three principles and ten best practices of successful business incubation. Some of these complement the other success factors that have been identified by other authors. These can be summarised as follows:

2.2.13.1 Principles

- Focus the energy and resources of the incubator on developing companies: This means that the incubator mission should be primarily to develop companies. All other things like job creation, economic development, etc should flow from that.
- Manage the incubator as a business i.e. minimize overhead and develop a self-sustainable, efficient business operation: The argument is that an incubator, is in itself a new venture that will undergo the trials and tribulations of a start-up company.
- Develop a sophisticated array of services and programmes that can be targeted to companies, depending on their needs and stage of development: It is believed that

successful incubation programmes do not use the "one size fits all" strategy but they develop a flexible approach to service provision.

2.2.13.2 Best practices

- Commit to the core principles of business incubation as the first step in developing a best practice incubator.
- Collect and assess key information that will help decide whether the incubator is feasible: With sufficient due diligence, sponsors can decide whether to continue with the incubator or not. If they decide to continue, the feasibility study provides a basis for making subsequent decisions required for a successful programme launch.
- Structure the incubator to be financially self-sustainable: The incubator needs to reach a break-even stage. The length of time needed to reach such a stage must be explicitly stated in the business plan. Sources of revenue vary but may include the following: rental from companies, fees charged for business services, fees (royalties and equities) from incubator companies for management assistance, and financial support from one or more sponsors.
- Structure the incubator to minimize governance and maximise assistance to incubator companies.
- Engage stakeholders to help companies and to support incubator operations
- Recruit staff who will manage the incubator like a business and a president who has the capacity to help companies grow.
- Choose a building that will enable the incubator to generate sufficient revenue and also support business incubation
- Recruit and select client companies that provide revenue required in the financial model and have the potential to grow and create jobs.
- Customise the delivery of assistance and deliver the developmental needs of each company.
- Engage in continual evaluation and improvement as the incubator progresses through various stages of development and as the needs of client companies change over time.

2.2.14. General assessment of incubator success factors

On the assessment of incubator performance, Lalkaka (1997:11) advises that incubators are a study in contrasts, each catering to its own potential entrepreneurs, in a given cultural milieu, conditioned by the available infrastructure and policy framework.

A variety of criteria were identified for the assessment of an incubator program during the UNDP/UNIDO/OA – sponsored Assessment of the role of Business Incubators in Enterprise Creation and Economic Development that was conducted in 1995 (Lalkaka 1997:12-14). It is however, pointed out that the task is even more difficult in industrialising countries given the recent implementation of incubators and the apparent lack either of local will or resources to mount the required systematic data collection and activity.

Incubator performance can be assessed against its specific mission and objectives. A quantifiable and non-quantifiable process can be reviewed in terms of different loops as follows:

Loop 1 Enterprises created by the incubator and increased success rate through incubation process, measured by numbers of firms incubated and number of discontinued businesses.
Loop 2 Jobs generated in the incubator, measured by employment years (one job lasting one year = one employment year) through the end of year 3
Loop 3 Jobs and economic activity created by companies after leaving the incubator (graduates) measured by employment years and value added or sales through the end of year 6.
Loop 4 Public (subsidy) investments in incubator establishment and initial operations, measured in total investment per year.
Loop 5 Research commercialised through development work (by firms) at the incubator, measured in numbers of projects and economic activity (employment years, total cumulative revenues)
Loop 6 Surveys of tenant assessment of assistance received, measured in response rate and evaluation of specific activities

Loop 7 Sustainability of the incubator, measured by revenue and cost performance to plan, including break-even as appropriate

Loop 8 Taxes and other social contribution by incubator tenants and graduates, measured by property, income, employment and other direct tax revenues attributable to incubator, tenants, and graduates.

Loop 9 Capacity building and changes in mindset, enhanced culture of research – industry linkages and entrepreneurship development, measured by public opinion surveys, numbers of collaborative research contracts between industry and universities (value, number of faculty and staff involved)

Loop 10 Changes in state policies to enhance support for private entrepreneurial activity, measured by numbers of policies and financial commitment to their design and implementation. Incubator Assessment Overview can be represented with the following figure:

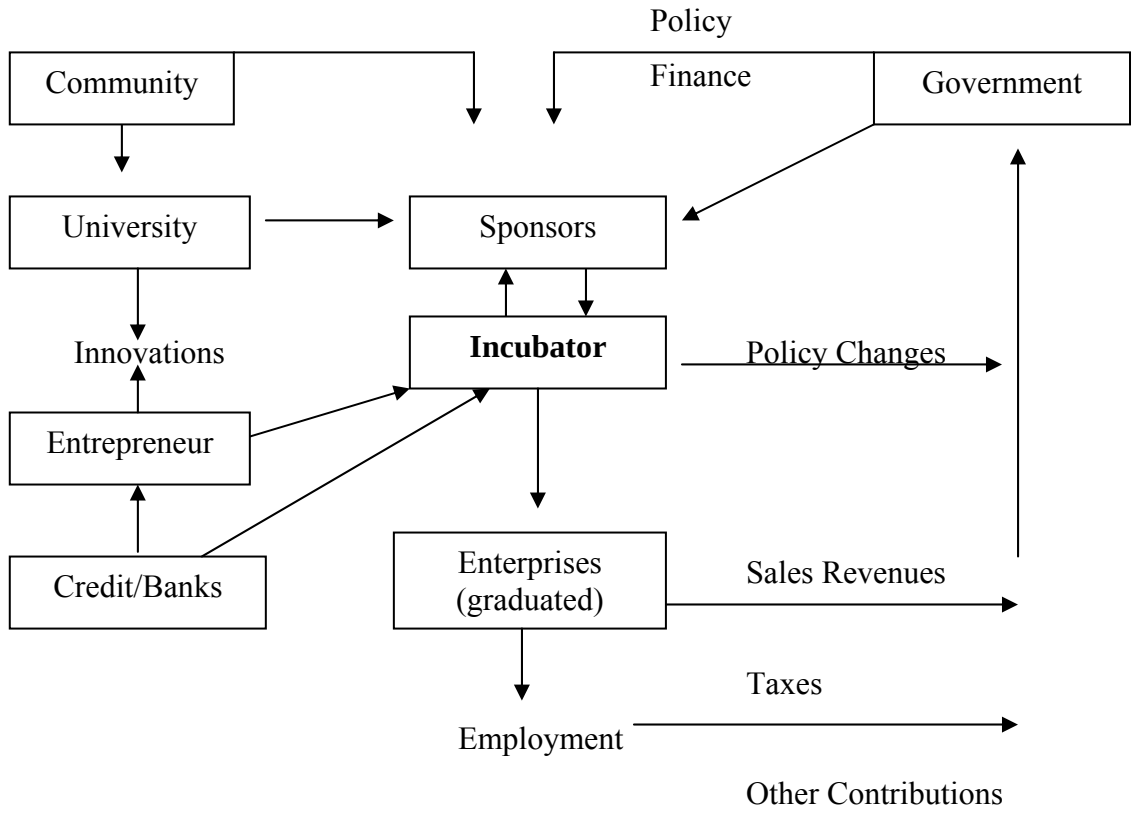


Figure 1: Incubator Assessment Overview (R Lalkaka: International Learning (1997:14))

Assessments carried out in Brazil, Czeck Republic, Peoples' Republic of China, Mexico, Nigeria, Poland and Turkey provides good evidence of the potential of incubators in

creating innovative enterprises, greatly increasing their chances of survivors and success, generating direct job while firms are still within the incubator and even larger employment when they graduate and grow; at the same time promoting the commercialisation of research, fostering skills for entrepreneurship and influencing national policies for small enterprise development (Lalkaka 1997:16-17).

From the above-mentioned study, Lalkaka identified determinants of success during various stages of incubator development as follows:

A. The preparatory process:

- Local consultants who are familiar with local conditions, careful identification of a strong (existing) sponsor group to take local implementation and responsibility including a champion;
- Issues concerning feasibility, particularly analyses of the entrepreneurial pool of tenants, linkages to universities, the support services network, the availability of suitable building space and financial cash flow estimates;
- Commitment by state policy and financial support for investment as well as initial operational expenses.

B. The implementation process:

- Forming a strong managing board with advisory structure and enabling them to observe incubator operations;
- Appropriate legal persona for the incubator;
- Careful selection, training at home and abroad and proper remuneration of the manager and team;
- Screening of the technical, business and market potential of tenants;
- Prudent capital expenditures on building, renovation and furnishing;
- Promotion campaign to mobilize community support.

C. The start of initial operations requires:

- Access to equity, credit and royalty facilities by tenants, so that they in turn can pay for incubator services and for their developmental needs;
- Involvement of private sector, through subcontracting and other arrangement skills of the incubator staff and tenants;
- Links to other SME programs in the country;
- Exchanges of information and experience through national incubator associations and international networks.

D. The sustainability of incubator operations calls for:

- Pro-active pursuit of business opportunities at home and abroad;
- Imaginative ways of raising income through corporate membership, appropriate fees for securing finance, equity /royalty in tenant companies;
- An objective evaluation of the incubator experience and replication as warranted;
- Political stability, macro-economic policy structure and regulatory framework that encourage entrepreneurial activity and stimulate the market for new goods and services.

Experience confirms that in countries with a generally supportive environment, the preparatory and implementation steps take about six months each and a further 2 or 3 years may be needed to establish self-sustaining successful incubator. Without patient and continuing support from the state and communities over the whole program cycle of three to four years, the incubator may find that developing sustainable performance and having positive economic development are difficult.

Success or failure is determined by the national and international environment as well as by the micro-environment of the incubator. While good international technical assistance is only one of the success factors, it can help enhance effectiveness of business planning preparation and incubator operating practices.

Successful entrepreneurial development requires a synergy among

- entrepreneurship,
- business know-how,

- technology and
- capital.

Business incubators provide a framework for focussing and binding the critical elements of the entrepreneurial process for new ventures in a congenial supporting environment that is designed to provide the four corners stones of an incubator, namely business assistance, financial assistance, flexible space and shared services to increase the survival and growth rates of small businesses (Wagner 1997:156).

According to Barrow (2001:32), some of the critical elements of a successful incubation programme are as follows:

- A broad range of supporting stakeholders (Financial and in-kind), state and local governments and business and community-based groups such as regional development organisations.
- Local demand from entrepreneurs with early stage small businesses: Incubators should service on demand from local entrepreneurs looking to improve the survival and growth prospects of their early stage small businesses.
- An effective incubator needs to maintain adequate tenant occupancy to replace the regular graduation of existing tenants. A ready supply of emerging local businesses is essential to the long-term sustainability of any incubator programme.
- Provision of a range of facilities and services to tenant businesses: While the range of facilities and services differ from incubator to incubator, in all cases incubators seek to nurture the survival of tenant businesses and enhance their growth prospects rather than passively providing shared office or workplace facilities. Not all incubators will offer a full range of services to tenants. Facilities need to be adequate for the business requirements of prospective small business tenants.
- Effective incubator management: The role of incubator management is crucial in ensuring continuing local support and sponsorship, attracting and evaluating prospective tenants and facilitating the smooth transition of leaving tenants (successful graduates and sponsorship and others).
- Regular turnover of graduate businesses: The long-term success of any incubator has to be judged against its ability to promote and develop successful graduate businesses. Any incubator programme must balance the needs of continued

tenancy occupancy against the long-term business requirements of tenants and graduates.

- Economic and community impacts: The incubator has to deliver results against the outcomes that the stakeholders want. This may be economic development in the form of new jobs, or it may be valued experience for university students or profitable investment opportunities for the providers of capital.

Many brilliant ideas have died in the garage because technologists did not have the know-how to find resources to assure their survival in a competitive landscape. Incubators are dependent on the success of the companies they have in their portfolios. And the success of both is tied to how well the companies do after they graduate from the programmes. Incubators have proved to be more important in bad economic times than good. It is very important that start-ups are able to depend on money and resources from entities for value-add services that they would not be able to get elsewhere.

Richards (2002:23) summarises the success factors as follows:
You have the right money, have reasonable and obtainable goals, align yourself with right partners, and take on the right companies and the right people in your organization to support both you and your start-ups through the milestones you will have to make. All over the world, technology entrepreneurs are facing similar issues: how to find resources if you have no connections. What lead to failure or success of the incubator is the focus and the people the incubator aligns itself with.

Those incubators that best add value, by occupying a "structural-hole" in the network of connections for their start-ups, while providing for incubated Chief Executive Officers to develop expertise in how to grow a company, should be best positioned for sustainability and growth. Some incubators get confused in terms of the services they provide, whether space, advice, internet access. This is the dilemma of many technology incubators and often the deciding factor in an incubator that survives and that which goes down in flames. It is important for an incubator to understand its long-term plan as it should not rely on government or grants, it has to be self-sufficient. The success rates of the start-ups that have been through incubators have seen much higher degree of success because they are less likely to make a fatal mistake when they are at the most fragile part of their growth. It

is easy for small companies to make mistakes as they do not have enough resources to fall back on. Incubators have the potential to house some of the most dynamic and exciting companies of the future.

The heart of incubation has always been and always will be that mentoring, business assistance and assistance with marketing and finance. In incubation there is a mentoring process, selectivity, resources and bringing the right partners to the table. The start-up's responsibility is that of being accountable for making their own milestones and graduating into the real world.

Traditionally, true incubators have yielded to the fact that the only true measures of success are the companies that come out of their pipelines. Incubators should contribute to their companies such that they are stronger, better and faster than those that are not in incubators.

Growing businesses is a complex process and not everybody is successful in growing their own business. What happens in an incubator is that the odds of success are exponentially increased. That happens for a number of reasons: The people who go into incubators do that because they know there is something they need to know. So there is a self-selection process with entrepreneurs who recognize that they need something and are attracted to an incubator. If indeed that incubator fills that need, then some great stories will come out of the pipeline whether jobs, sustained growth or companies coming out and paying taxes, that depends on the goal of the incubator. A successfully run incubator will naturally fill the needs of its community. The incubator also needs to fill its own need- as a company, sustainability is about generating wealth. An incubator, must in this day and age, have a way to help its clients get money, whether they are hooked into a low interest alternative lending source, or whether they have experience in helping people get grant funding and managing grants or whether they have relationships with angel or venture capital or they are capital providers, it is imperative that if you are working with early stage companies you have sources of capital closely tied to you that respect your selection process and appropriately target the type of companies you are working with. Otherwise a lot of companies in the portfolio of the incubator will struggle their entire lives to raise capital and stay in business and they cannot pay their rent and will get thrown out and the

incubator itself will not be able to pay its rent. A need is stressed for funding outside-resources to develop capital for the incubator and for its companies. Even if the incubator has to pay for that help. This has to be built into the cost of the budget. Also there is a certain critical mass of staff and certain level of expertise that need to be paid for: leveraging grant money, community resources or communities hooking up with small business associations or manufacturing programmes. If the incubator is aiming at growing healthy sustainable companies, the wealth factor has to be secondary to growing companies. If the incubator takes excessive equity, this results in a really bad deal because it is a risk to the incubator while it also hurts companies.

Drawing on The State of the Incubator Market space, June 2000, the following information is critical to any individual or organization staring an incubator:

- Selectivity: Although the missions of various incubators differ substantially and selectivity is relative to those objectives, most will only accept clients with a viable business concept and some necessary characteristics for success.
- Accountability: Most incubators require that companies meet their milestones for development, and have instituted a process for holding companies accountable for progress.
- Access to capital: Whether providing direct investment and access to growth capital or establishing channels for financing, it is currently recognized that this critical component for enterprise growth is an essential component of successful incubation, regardless of whether the incubator as a non-profit or equity/profit-based model.
- Access to Growth-Level-Specific (Scalable) Resources on a Just-In-Time Basis: The resources may include facilities, internet access and e-commerce support; office equipment; legal and accounting services; management and staff recruiting or industry-specific resources such as prototyping, packaging, alliance development or distribution assistance. The incubator can pre-screen vendors for quality and appropriateness, thereby assisting the entrepreneurs in what can be a complex selection process.
- Assistance in Developing Non-core Business Components of the Enterprise: By supplying resources, either in-house or through extended network, incubators

enable their client firms to focus on their core business and product development objectives while gaining access to the most appropriate assistance.

- Qualified Mentoring, Coaching or Training: Entrepreneurs in incubators are offered the value of wisdom and experience, either by individual mentors, advisory groups, training programmes, board creation, or direct staffing by experts in various business functions.
- Create Synergy and Reduce the Loneliness of the Entrepreneur: Incubated entrepreneurs benefit by informal peer-level relationships, and some incubators actively develop an ecosystem model of attracting companies, with alliance creation as an objective, in order to strengthen their collective ventures.
- Industry Knowledge: A sufficient depth of understanding of the entrepreneur's specific industry.
- Business and Management Skills: The incubator can help the company fill critical gaps.
- Previous Success: A successful launch record, and successful people on the management team.
- The Intangibles:
  - The synergy with other incubator clients
  - The chemistry with key service providers, mentors, and incubator management.
  - The image or buzz surrounding the incubator itself.
  - The ability of the incubator to add value, champion the client, and support successful execution of the company's business model.

The first decision that has to be made is if the incubator is a commercial or a non-profit incubator. A structure that should be selected is the one that will allow the incubator to be able to access grants and other sources of funds, while it should be allowed to do business. Incentivise the incubator manager according to performance.

Another important success factors is to find partners to share risk; not only capital, but also time and reputation. Start-ups should be introduced to VCs angels, venture arms & potential partners otherwise failure is inevitable and the incubator will be sabotaging its own success without realizing it. Some of those who get strong funding & support from

the communities they are in may receive a 3year grant and have to raise funding while trying to nurture start-ups. Strong partnerships create strong serial entrepreneurs.

What makes entrepreneurs successful is the value added to them by their incubators. Incubators should recognize that entrepreneurs are not their customers investors are:- those people who can buy the companies incubated. Successful incubators - triangulated with great people, good backing and a single vision and it is of a hybrid nature most support from the communities organization, people and business it comes into contact with. The community of entrepreneurs is found to be an enriching experience where they can learn from each other and find value in the relationship:- Informal hallway collaboration. More visibility leads to a better chance of success. Whether it be from informal collaboration or formal mentoring, entrepreneurs sharing areas have always been at the heart of building strong companies. They learn from each others mistakes and successes. Most experienced incubators have as serious due diligence process as venture capitalists testing out the start-ups on everything from their team, their technology and their strategies. Investors and partners want to know all about the success rate of the incubator.

Barrow (2001:7) describes an incubator as follows:
An incubator is an environment and programme with certain characteristics: It offers a full array of business assistance tailored to the client companies; it has an incubator manager on site who co-ordinates staff and outside professionals & organizations to deliver those services, it graduates companies out of the programme once they meet the programme goals. However, definitions do not give the full picture of the array of services, motivations and facilities provided by business incubators. The concept goes beyond the simple provision of a shared office or workplace facility for small business client. Value adds include strengthened business skills, access to business services, improved operating environment and opportunities for business networking to nurture early-stage business survival and growth of the situation outside the incubator.

Lee and Osteryoung (2004:419) cite that fourteen factors have emerged as important for effective operation of the incubator system as follows: Goal (clarity and achievement); operational strategy (concreteness and realisation); easy access to facility and equipment; common access to service space and office equipments; networking of entrepreneurial

support; expert organisation; technology transfer and research and development (R&D); business and law consulting; financial support and consulting; entrepreneurial education programme; institutional networking; networking of tenants/off-line firm; networking of financing/business consulting firm; and government/local community support.

2.2.15 Summary of the success factors

A total of thirty-nine factors were identified from several literature and can be summarised as indicated in the following table:

Table 1: A summary of all success factors from the literature review.

	Factor	Short summary
1	*Proximity to a university/research park*	Various authors feel that this factor is critical for the success in incubation. This is mostly due to readily sources of facilities and students. Incubators can take advantage of the services of both students and the professors. Universities or research parks normally have first class equipment that can be utilised by incubators and incubatees.
2	*Access to science and technology expertise and facilities*	Various authors believe that it is best to locate an incubator where supporting infrastructure and access to technical services is readily available in order to improve the chances of success of the incubator as well as businesses it is nurturing.
3	*Feasibility Study*	Various authors believe that a feasibility study assists in identifying the needs and the resources required before the incubator is established, this therefore assists the founders in making the right decisions before the operations begin.
4	*Business plan development*	Richards (2002:11) believes that a business plan is very critical for the success of the incubator as this document contains targets by which the incubator can be measured and will also aid the management in managing the incubator as a business.

5	*Access to funding*	Various authors have cited the availability of funding as one of the most important success factors both for the incubator and for its clients. This is because no business can be run successfully without funds.
6	*Involvement of private sector*	(Lalkaka 1997:16) cited that private sector especially in the form of large companies has an important role to play in incubation through subcontracting incubatees and other arrangements like skills of the incubator staff and tenants
7	*Links to other SME programs in the country*	Various authors believe that in any country, incubator initiatives must be linked to other programmes in place and complement one another.
8	*Networking*	Networking has been cited as one of the most important factors for both incubators and incubatees because it allows them the opportunity to exchange information and experience through national incubator associations and international networks.
9	*A willing advisory board*	Various authors have identified the role of the advisory board as one of the most critical. The experienced board members can add value to the work of the incubator management and that of incubatees.
10	*Appropriate legal persona for the incubator*	Lalkaka 1997: 17 believes that an appropriate legal persona will lead to the success of the incubator. The normally acceptable personal is one that allows the incubator to obtain funds from government while it also allows it to make income.
11	*Competent and properly incentivised Management*	Various authors agree that the quality of management of the incubator determines the success of such an incubator. In order for such management to stay for a long time in the incubator, it is important for them to be properly remunerated.
12	*Screening of the technical, business and*	In order to be successful, an incubator must conduct a proper due diligence of all prospective clients.

	market potential of tenants.	
13	*Prudent capital expenditures on building, renovation and furnishing*	If an incubator is conducted as a business, it is critical for all capital expenditure to be conducted in such a way that it will cater for the needs of the clients and the targets set by the incubator while also ensuring financial sustainability.
14	*Promotion campaign to mobilize community support.*	Support by the communities surrounding the incubator is important for its success. Authors therefore feel that the incubator should conduct a promotion campaign to communities around it.
15	*Local consultants who are familiar with local conditions, careful identification of a strong (existing) sponsor group to take local implementation and responsibility including a champion.*	While incubators are normally initiated by sponsors from other countries (mostly developed), it is critical for the success to employ local consultants who understand the local environment. It is also of advantage to identify a local champion and a local sponsor who will stay with the project even after international support is withdrawn.
16	*Commitment by state policy and financial support for investment as well as initial operational expenses.*	In most developed countries the state supports the incubators financially for the first few years for the infrastructure and early operational costs. This has contributed to their success.
17	*Collect and assess key information that will help decide whether the incubator is feasible*	With sufficient due diligence, sponsors can decide whether to continue with the incubator or not. If they decide to continue, the feasibility study provides a basis for making subsequent decisions required for a successful programme launch
18	*Structure the incubator to be financially self-sustainable*	Like any company an incubator first operates at a loss. It is critical for it to reach break-even and then start making profits/surplus depending on their legal structure and purpose for which they were established.

19	*Structure the incubator to minimize governance and maximise assistance to incubator companies.*	Much as governance is important for any business, Rice believes that the incubator should focus its resources more at assisting companies than on good governance.
20	*Engage stakeholders to help companies and to support incubator operations*	It is imperative for the incubator to have a wide range of stakeholders who are contributing in various ways like assisting incubatees, management and assisting in achieving some of the goals of the incubator.
21	*Recruit staff who will manage the incubator like a business and a president who has the capacity to help companies grow.*	The importance of the quality of staff and management in an incubator cannot be over-emphasised. The overall manager should be a person who has a lot of experience which can be utilised by incubatees and other staff.
22	*Choose a building that will enable the incubator to generate sufficient revenue and also support business incubation.*	A wrong building can have adverse effects to the success of any incubator. If created well and in a good place, the building can assist the incubator in achieving financial sustainability.
23	*Recruit and select client companies that provide revenue required in the financial model and have the potential to grow and create jobs.*	The choice of companies that will reside in the incubator is critical for its success and the achievement of its goals. It is therefore critical for the incubator to have some screening procedure for the companies that apply.
24	*Customise the delivery of assistance and deliver the developmental needs of each company.*	Each company in an incubator has its own needs. There is no one size fits all when it comes to incubation. Incubators that customise services to suit their clients have more chances of survival.
25	*Engage in continual evaluation and improvement as the incubator progresses through various stages of*	An incubator that keeps up with changes in the business environment has more chances of success that the one which does not. It is critical to have a continuous evaluation process while also scanning the outside environment to keep up with the services required.

	development and as the needs of client companies change over time.	
26	*The good reputation of the incubator*	If an incubator has a good reputation with financial institutions and others which are of importance to the incubatees, this helps them when they need assistance from such institutions.
27	*Stringent selection criteria*	Lalkaka (1997:17) believes that an incubator should have very strict selection criteria for incubatees in order to be successful.
28	*Evaluation of potential entrepreneurs*	Any entrepreneur that applies to the incubator should be evaluated against set criteria.
29	*Select both new & established businesses*	Established businesses can act as anchor tenants, which will boost the revenues of the incubator in the short term. Most incubators are established for the purpose of assisting new companies.
30	*Develop explicit but flexible agreements*	It is important for an incubator to have agreements with the incubatees. These also assist incubatees to set milestones for themselves within particular periods of time.
31	*Design the lease and screening process to conform to the selection criteria*	An incubator should have lease and screening procedures to complement the selection criteria.
32	*Have exit criteria*	An incubator must graduate some of the companies it assists after a certain agreed period. In order to do this, there must be set exit criteria. Normally these take the form of market-related rentals on the side of the incubator. The existence of such criteria encourages tenants to set milestones and adhere strictly to them.
33	*Quality of entrepreneurs*	Various authors believe that the quality of an entrepreneur before being incubated counts for the success of such an entrepreneur. This takes into

		account amongst others the background of the entrepreneur, the level of education and previous relevant experience
34	*Stakeholder Consensus*	It is of utmost importance for an incubator to have a wide range of stakeholders which can assist in various ways.
35	*Clarity, consistency and strategy*	In order to be successful, an incubator should be clear in terms of services it is offering, the role of each stakeholders and the goals it is pursuing.
36	*A positive entrepreneurial culture*	It is believed that incubators in developing countries are successful because of a general culture of entrepreneurship starting with the government, the private sector, the general public and various other role players.
37	*Successful incubatees and graduates*	The tenants in the incubator must be able to produce products and sell or have certain customers they satisfy and who would prefer to be their customers. Successful tenants create jobs even while they are in the incubator. Even more important is the availability of such customers even after they graduate and also creation of more jobs.
38	*Strategic partnerships*	The success of the incubator is also accelerated by strategic partnerships with companies that graduate from them. (Richards 2002:102). Other strategic partnerships may be created with local and international private companies and other bodies.
39	*Personal qualities are clearly critical*	The person chosen to lead the team in an incubator needs to possess entrepreneurial skills and a flair for leadership and organisation.

CHAPTER III: THEORETICAL FRAMEWORK

3.1 Theories, models and methods used for this study

From the list of thirty-nine success factors that has been identified in the previous chapter, a list of twelve factors which are more relevant to South African conditions was selected. The list includes the following key success factors:

- Proximity to a university/research park
- Feasibility study
- Stringent selection criteria
- Availability of funding to entrepreneurs and incubators
- Quality of entrepreneurs
- Stakeholder consensus
- Supportive government policies
- Successful incubatees and graduates
- Competent and properly incentivised incubator management
- Sustainability
- A willing advisory board.
- Networking

3.2 Logic for the selection of the success factors

The arrival to the figure of twelve was due to several logics:

1. Some of the factors were combined into one because of their similarities and that the same type of questions could be asked to answer them.
2. Due to the situation in South Africa (the age of incubation, the culture of entrepreneurship etc), some of the factors were ruled out as irrelevant to the conditions.
3. For some factors, it was a given that they already apply to all situations, therefore there was no need for testing (i.e. they applied by default)

The logic for these factors was as follows:

1. Proximity to a university/research park
   a. This factor was taken from a combination of two factors:
      - *Proximity to a university/research park*
      - *Access to science and technology expertise and facilities*: Universities and research parks are the institutions that normally provide access to science and technology expertise and facilities that can be useful and will lead to success for incubation.
2. Feasibility study
   a. This factor was a combination of four factors from those listed in the previous chapter:
      i. *Feasibility Study*
      ii. *Appropriate legal persona for the incubator*: As part of the feasibility study, a decision is taken as to which legal persona the incubator is going to take.
      iii. *Collect and assess key information that will help decide whether the incubator is feasible*: Collection and assessment of key information forms part of the feasibility study.
      iv. *Choose a building that will enable the incubator to generate sufficient revenue and also support business incubation*: Selecting a building also forms part of the feasibility study.
3. Stringent selection criteria
   a. This factor was a combination of six factors from the list as follows:
      - *Stringent selection criteria*
      - *Evaluation of potential entrepreneurs:* Evaluation takes place using the criteria.
      - *Select both new & established businesses:* The criteria will also dictate the type of businesses to be selected.
      - *Develop explicit but flexible agreements*: What gets included in the agreements is generated from the selection criteria, and then a specific strategy as to how a particular entrepreneurs/client will achieve its goals is included.
      - *Design the lease and screening process to conform to the selection criteria*: Lease and screening procedures emanate from the selection criteria
      - *Have exit criteria*: Exit criteria form part of the selection criteria

4. Availability of funding to entrepreneurs and incubators
5. Quality of entrepreneurs
6. Stakeholder consensus

a. This factor is a combination of six others as follows:
   i. *Strategic partnerships*
   ii. *Clarity, consistency and strategy*: If stakeholders have consensus, there is bound to be clarity, consistency and good strategy.
   iii. *Stakeholder Consensus*
   iv. *Engage stakeholders to help companies and to support incubator operations*
   v. *Local consultants who are familiar with local conditions, careful identification of a strong (existing) sponsor group to take local implementation and responsibility including a champion:* Local consultants and local sponsors also form part of stakeholders.
   vi. *Involvement of private sector*: Private sector also forms part of stakeholders.

7. Supportive government policies

This factor is a combination of three others as follows:

   i. *A positive entrepreneurial culture*: If government policies are supportive, there is bound to be a positive entrepreneurial culture in the country.
   ii. *Commitment by state policy and financial support for investment as well as initial operational expenses:* This forms part of supportive government policies
   iii. *Links to other SME programs in the country:* This forms part of supportive government policies

8. Successful incubatees and graduates
9. Competent and properly incentivised incubator management
   a. This factor is a combination of three others as follows:
      i. *Recruit staff who will manage the incubator like a business and a president who has the capacity to help companies grow.*
      ii. *Personal qualities are clearly critical and the person chosen to lead the team needs to possess entrepreneurial skills and a flair for leadership and organisation.*
      iii. *Competent and properly incentivised Management*
10. Sustainability

a. This factor is a combination of five others as more:
   i. *Recruit and select client companies that provide revenue required in the financial model and have the potential to grow and create jobs.*
   ii. *Structure the incubator to minimize governance and maximise assistance to incubator companies.*
   iii. *Structure the incubator to be financially self-sustainable*
   iv. *Prudent capital expenditures on building, renovation and furnishing*

11. A willing advisory board.
12. Networking

These twelve factors were tested in the Godisa initiative using the three questionnaires (Appendices A, B and C)

3.3 Key attributes of the desired theory and derived models or methods

There are a few theories that have been gathered concerning incubation in the South African context. There are a lot of initiatives that have been started in different parts of the country but there is lack of information available on these initiatives. As a result it is difficult for initiators of incubators to learn from the successes and failures of the others. While international learning is also useful for SA initiators, the conditions in other countries are not similar to the local ones therefore learning should be adapted to local conditions. The key attribute of this study is to bring the learning from Godisa to the surface thus helping other initiatives, government for policy-making and academia to add new knowledge. Wagner (1997:56) has identified a functional model of a business incubator to be consisting of several inputs and possible outcomes as follows:

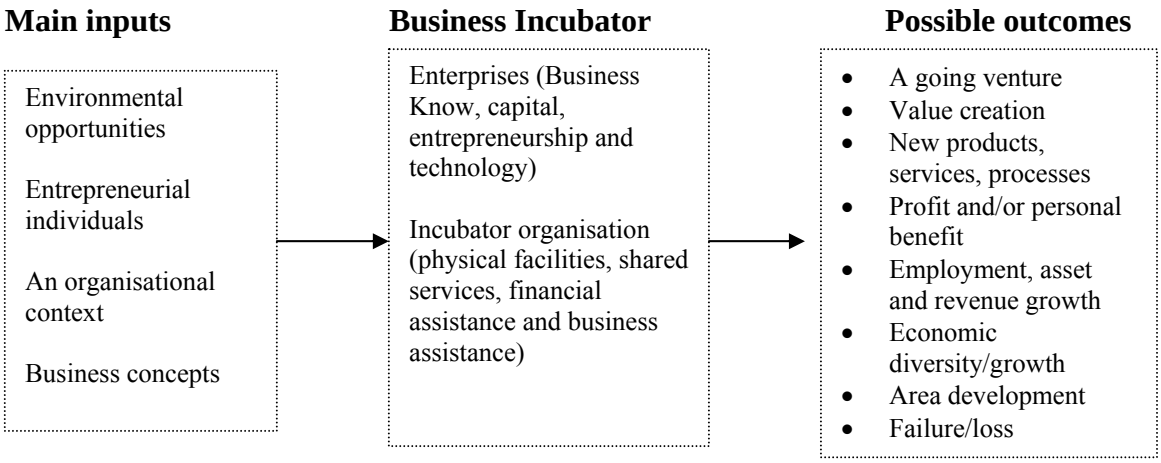


Fig. 2: Functional Model of the Incubator (Wagner (1997: 55-56))

Universities, colleges, venture capital providers, business angels, corporate ventures and for-profit corporations have all played a part in providing new incubator models with various goals. Barrow (2001:31) has given a summary of the different models and goals and services as follows:

	For profit property development incubators	Non-profit development corporation incubators	University incubators	For-profit investment incubators	Corporate venture incubators
Main goals	Property appreciation, Maximise occupancy Sell services to clients	Job creation Encourage entrepreneurship Diversify economic base	Faculty-industry collaboration Commercialise university research	Make substantial capital gain, quickly	Get into related markets quickly and inexpensively Have a window on related technologies
Subsidiary goals	Create investment opportunities for more property	Generate sustainable income to break-even point. Use vacant premises	Exploit investment opportunities Create goodwill in local community	Develop synergies in investment portfolio	Provide entrepreneurial opportunities for staff Make money.

Fig. 3: Different models, goals and services of incubators (Barrow (2001:31))

Full service business incubators offer space to tenant businesses, meet the entrepreneur's technical needs with regard to marketing, business organisation, production and finance.

Business incubators reduce start-up fixed costs by providing access to affordable space and shared services and offer valuable business assistance. In addition, the incubator set-up provides the opportunity to discuss problems and share experiences and to form the business networks necessary to entrepreneurial existence. The business incubator model has coherence that many other enterprises support mechanisms lack. This is partly a consequence of deliberate efforts to overcome the problems many entrepreneurs face by ensuring that services they need are offered in a comprehensive and integrated fashion.

By providing entrepreneurs with services on a one-stop basis and enabling tenants to reduce their overhead costs by sharing facilities, business incubators are able to significantly improve the survival and growth prospects of new start-ups. Studies undertaken to evaluate the performance of incubators in Western Europe & USA suggest that they can reduce the failure rate among start-ups to below 10% (as compared to the normal failure rate 60-80% generally).

Business incubators may be divided into two groups:
Those, which are multipurpose and admit any type of business satisfying basic commercial criteria

Specialised incubators that focus on particular activities for example development of specific types of technology.

Incubators are a higher form of managed workspaces. Incubation embraces a range of facilities that provide entrepreneurs with business premises on a managed basis. Types of managed workspaces can be categorised according to the extent to which management adopts hands-on approach and the type of business admitted to the facility, in particular the degree of technology sophistication. Business incubators vary considerably in terms of their physical characteristics, the range of services provided, operating procedures and target markets. They also share certain features in common that distinguish them from organisations, including closely related operations such as Science Parks, Innovation Centres and Managed workshops.

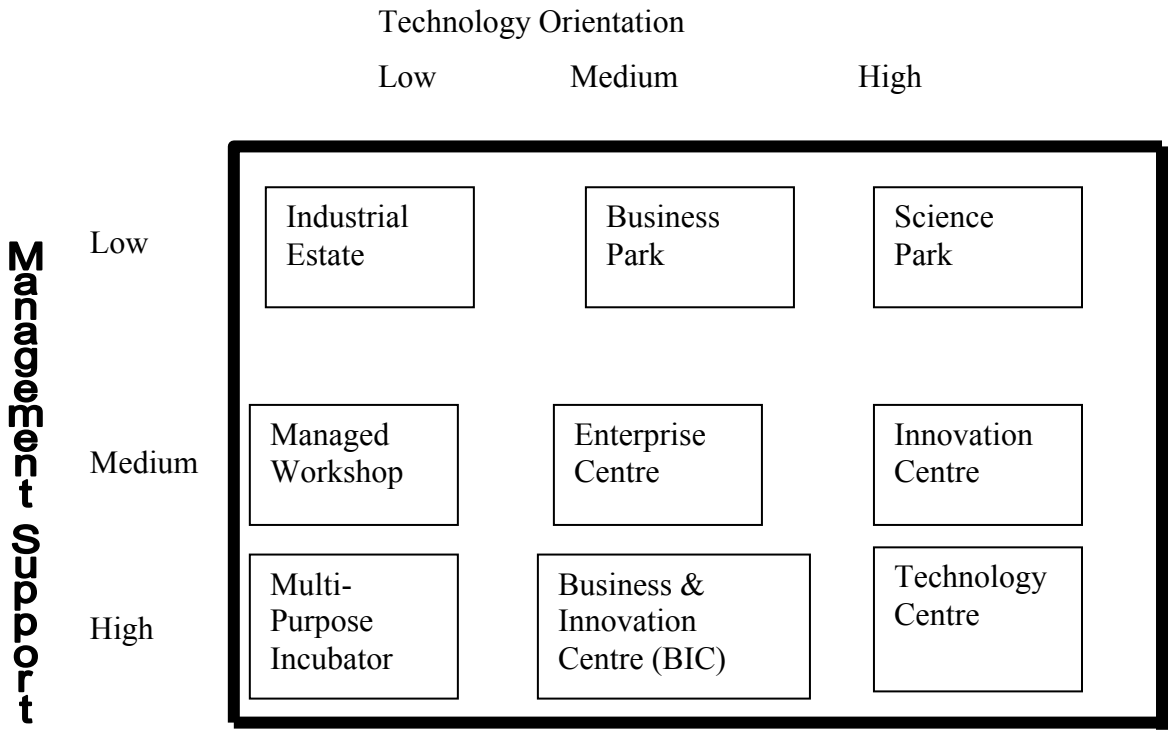


Fig. 4: Level of Technology Orientation vs. Management Support in different models (Lalkaka (1990:11))

Lalkaka (1997:10-12) asserts that the incubation system is remarkably flexible and serves a variety of purposes and clientele. Depending on the predilections of the leading sponsors, it can be designed to meet specific needs and conditions thus:

- Public sector/government – regional development: Such an incubator would seem appropriate in many developing country situations, particularly if it can focus on local resources, such as agri-business, light engineering, and special artisan skills primarily for regional markets. In practise, it has often been difficult to find good institutional bases or the entrepreneurial framework for successful regional or rural development incubators.
- Research/university – technology-based business: In many developing countries the university-linked technology-business incubator is predominant. There is also a trend towards siting technology incubators as the first building block of a future research park.
- Public/private partnerships – industrial development: Given the technical infrastructure of an urban environment or an industrial estate, large enterprises can

be linked to development of small businesses as vendors for components and services. Generally, the private sector will participate in the incubation process only after the state has financed the establishment and initial operations. The potential exists to create innovative partnerships that meet large enterprise needs for new growth opportunities and suppliers with the needs of small enterprises for customers and financing.

- Foreign sponsor- international trade and technology: Such a facility focuses on international collaboration, both financial and technological, to facilitate the entry of small foreign businesses, including returned expatriates, into local markets. A complementary program may support the export of local manufacturers.
- Other variants of incubator design: special purpose incubators may support the empowerment of targeted groups, for example minorities, new immigrants, women or other disadvantaged communities.
- Single business incubators may focus on a special sub-sector, such as biotechnology, or informatics.
- Local conditions may call for a hub incubator, with satellites or a virtual incubator, where new ventures are nurtured in an existing university laboratory or even a seed venture capital incubator.

Campbell, Kendrick, and Samuelson (1985:10) have identified four types of incubators:

- industrial
- university-related
- private office space
- private sector.

Second generation incubator systems provide services not only to selected tenants within its walls but increasingly on an outreach basis to small existing business graduated from the incubator (Lalkaka 1997:28).

Future trends in business incubator systems identified by Lalkaka (1997:28) include the following:

- A better model is needed for addressing early-stage entrepreneurs in smaller town and rural settings, in innovative products.
- A bottom-up regional development focus will call for appropriate choice and blending of technology, better designs, packaging and quality, higher value-added in agri-business; environment and energy-conversion, light engineering and chemicals; higher-end garments; artisan goods for both domestic export markets.
- Special purpose incubator designs for women entrepreneurs and for international business.
- Enhanced professionalism in the incubator design and operation, including development of sustainability, benchmarking and monitoring of performance. More concerted efforts will be needed on pre-incubation of potential entrepreneurs. While ideally most entrepreneurs start their own innovative concepts, the need has been expressed for project files from which they may choose and develop a business.
- Implementation of hub and satellite systems to provide economies of scale in incubator operations and including the developing of franchise arrangements to provide enhanced professionalism in management and operation.
- The business Incubator/business Park provides a good platform for the conveyance of support mechanisms towards a synergistic 'third generation' system. It de-emphasises low rentals and focuses on enhanced services to knowledge-based enterprises, both before and after their incubation, and both within and outside the incubator. This purpose fully integrates the key support agencies within the community as well as looking outwards to the globalised market for imports of capital and technology and export of goods, services and know-how.
- The pre-requisite for a one-stop system is a management team with superior businesses, networking, technical and management skills. It must be carefully selected, fully trained and properly remunerated.

Various attempts have been made to cluster incubators into categories in order to better understand their aim and objectives. One study (Barrow 2001: 41) identified four main types:

- Techno poles: - Within techno poles an incubator is part of an integrated project involving educational and or research institutions and a range of other organisations interested in creating regional growth.
- Sector- specific incubators: -These aim to exploit specific local resources to develop new business in a specific sector and so become a focus or nucleus of growth locally, perhaps giving rise to what has become known as the 'cluster effect'
- General incubators: These cater for a broad range of business with no specialisation, although there is often a general emphasis on innovation.
- Building business: These aim to create businesses by building appropriate teams to exploit specific commercial opportunities as well as trying to select winners and nurture them.

A later study by Pricewaterhouse Coopers in 1999 came up with four different categories:

- Standalone incubator: An independently owned and operated incubator, which does not function as a separate business unit within a larger entity.
- Embedded incubator: An incubator, which operates as a business unit within a larger entity, such as a technology park, regional development organisation or business enterprise centre.
- Network incubator: An incubator which operates in formal co-operation with other incubators, either under common ownership or management or through the common provision of services or sharing of information
- Virtual incubator: An incubator, which provides a substantial proportion of support and services to clients through a network of communications from a remote location. Business clients are typically dispersed over a wide geographic area, perhaps over several continents.

There are five generic forms of business incubators that have emerged over the past 40 years. These were described by Campbell et al (1985:11) as follows:

- Industrial incubators: quasi-governments and non-profit group of Sponsors: Their objectives are to create jobs by creating employers usually in response to job closures or general unemployment. Industrial incubators are most often found in

rehabilitated factories, warehouses, schools, and office buildings and similar redundant and often run down properties.

- University-related incubators: These set out to commercialise the science, technology and Intellectual Property coming out of university research. The university incubator offers new companies access to laboratories, computers, libraries and the expertise and assistance of its faculty and students. Universities directly sponsor some of these, but more usually they are partnership involving a number of other interested players.
- For profit property development incubators: These incubators provide shared office and workshop /products space, together with shared services. Some property firms have gone in for upmarket developments aimed at image-conscious start-up in the software, Internet and professional services sectors, for example, where a good address is seen as one of the keys to success. Property developers are primarily interested in rental income and real estate value growth.
- For profit investment incubators: These are often little more than a neat way for Venture Capital firms and business angels to have firms in their portfolios, rather as old-fashioned conglomerates sought to do, with somewhat limited success.
- Corporate venture incubators: This is one of the fastest growing and most successful of the incubator models. Big firms take in small firms and offer money, facilities and expertise and perhaps sales resources in return for a stake in the firm.

Schuyler (1997:11-12) indicated that incubators could be categorised according to primary sponsors as follows:

- Universities and colleges
- Collaboration between government, non-profit agencies and private developers (Public Private Partnerships (PPPs))
- Privately-run investment groups or real estate developments partnerships
- A variety of non-conventional sources such as art organizations, Indian tribes, church groups, chambers of commerce and others.

Incubators may also be categorised by the nature of their core business. Typology includes

- Mixed use;
- Manufacturing;

- Technology;
- Service; and
- Micro enterprise /empowerment

These different types of incubators have certain common services or activities; however each has distinct services that cater to its own Clientele (Sherman & Campbell 1998:10).

Martin (1997:15) defines three types of incubators:

- Technology incubators foster the growth of companies involved in emerging technology such as software, medical and biotechnologies, robotics and instrumentation.
- Mixed Use incubators foster the growth of all kinds of companies including service, distribution, light manufacturing and other types of firms.
- The 3rd noted type is empowerment /micro enterprise Incubators focussed on alleviating unemployment or revitalising local economies.

Lalkaka & Bishop (1996:25) define eight types that emerged from their seven-country study:

- Targeted population incubator: - which targets specific population & have an empowerment objective.
- An international incubator with the motive of encouraging foreign investment both financial and technological.
- An industrial subcontracting orientation that is built on linkages. These help new businesses become vendors. The services here include: - quality control, products control programmes, national and international standards (1S0 9000 certification).
- Single business incubators focusing on a particulars class of industrial products.
- University incubators: - support development of business by faculty. They may focus on high technology, development of processes, instruments or computer software by university personnel.
- A hub incubator that has a full management team operating satellite incubators.
- A virtual incubator and incubator without walls focusing on the provision of services rather than on the provision of space.
- The regional or rural incubator serving particular geographic areas.

Hansen (2000:15) adds that a networked incubator represents a fundamentally new and enduring organisational model uniquely suited to growing business in the Internet economy. It shares certain features with other incubators: mainly, it fosters a spirit of entrepreneurship and offers economies of scale. Its distinguishing feature is its ability to give start-ups preferential access to a network of potential partners. The incubators create a portfolio of companies and advisers that their incubatees can leverage. This can be done by strategically investing in portfolio firms and by enlisting a large set of allies. The distinguishing feature of a networked incubator is that it has mechanisms to foster partnerships among start-up teams and other internet-oriented firms, thus facilitating the flow of knowledge and talent across companies and the forging of marketing and technology relationships between them.

The success of Chinese incubator programmes can be attributed to its model, which can be indicated as follows:

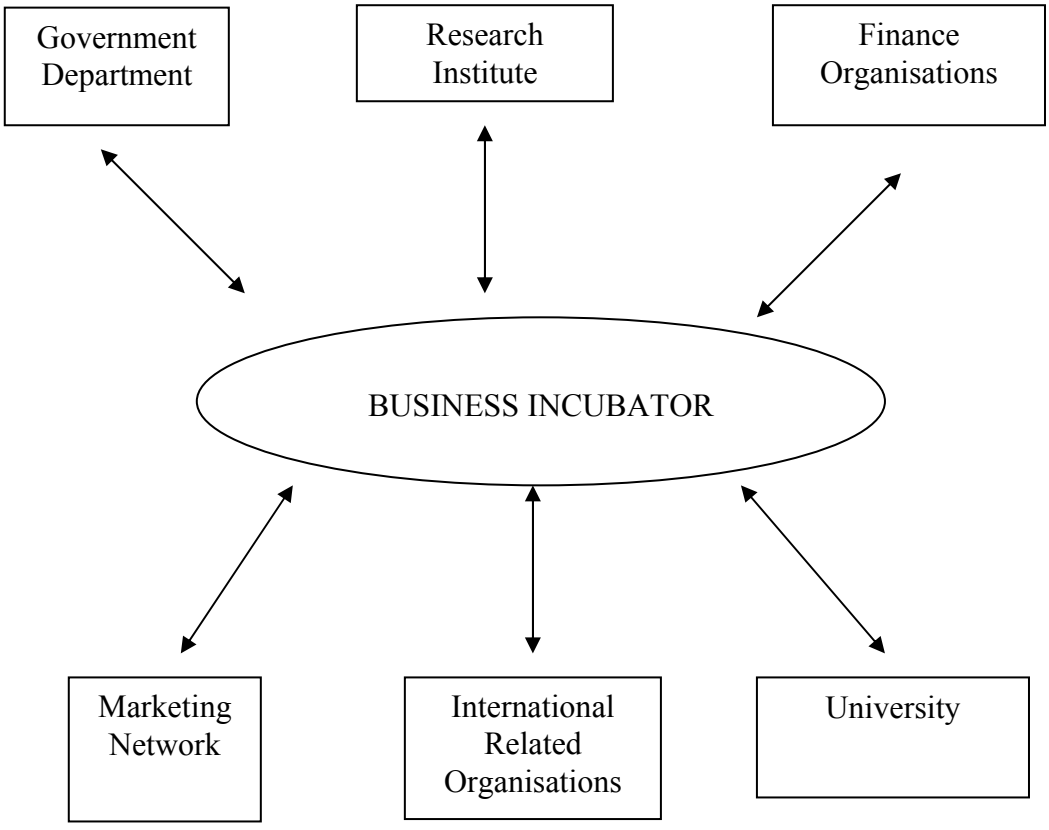


Fig. 5: Chinese model (Zuping 2001:27)

Benefit and effects of the Chinese model include:

- Incubating enterprises,
- creating employment,
- improving technology commercialisation,
- promoting regional development,
- creating a positive innovation environment,
- attracting overseas scholars, and
- making a good international influence.

Unique features include:

- Highly specialised,
- internationalised operating process,
- diversified forms, systematic management,
- multi-financial sources: - central & local government;
- large & medium sized enterprises (state-owned),
- venture capital funding organs,
- trans –national enterprises,
- innovation fund for hi-tech SME's.

Advantages include:

- government support through favourable policies, investments and sponsorship experience. New model: - Incubator and Venture Capital funding.
- Virtuous circle with great networks, active role models & business angels.
- Innovative and entrepreneurial S & T people.

The essential ingredients for success of science parks & innovation centres are

- A desirable living environment
- A major technological university
- Major institutional research facilities and
- A skilled labour force.

Models that have emerged from a study on South Africa incubators are as follows (Cassim 2001: 8).

Table 2: Incubator models emerging in South Africa (Cassim 2001:8)

Objectives	**Value Added to Community and Society**		**Economic Value to specific Stakeholder Groups**		
	Non Profit Enterprise Development Incubators	Public Private Partnerships (PPP)	For Profit Corporate Incubators		For Profit Real- Estate Incubator
			Venture Capital	Private Equity	
	Venture Creation	Innovation and Technology Commercialisation	Capitalise investment opportunity		Real-Estate Appreciation
Primary Objective	Job Creation	Economic development of a region	Outsource functions to employees		
	Enhance Entrepreneurial Culture	Faculty Industry Collaboration	Opportunities through downsizing		
	Diversify economic base of an area	Regional reputation within a sector	Contribute to the economic development of the sector		Create investment opportunity
Secondary Objective	Generate sustainable income for incubator	Capitalise investment opportunity	Create goodwill within the community		
	Utilise vacant facilities	Instructional mission(Technology Transfer)			
	Empowerment objective	Empowerment objective	Empowerment objective		

3.4 Conceptual Model and Hypotheses

From the various studies, the most appropriate conceptual model used for this study is the one that was used by Lalkaka to establish and assess business incubators in various countries.

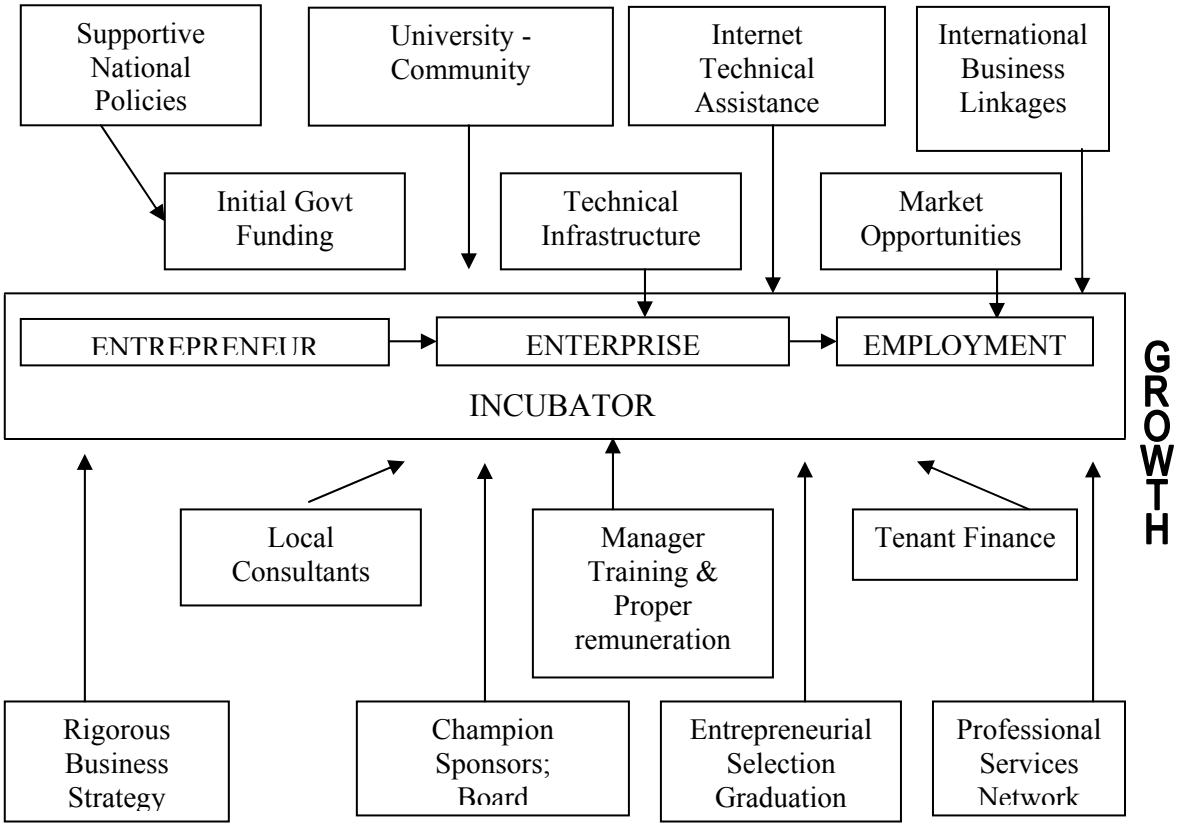


Fig. 6: National and International Environment:-Incubator Success Factors (Lalkaka 1997:11)

3.4.1 Linking the success factors to the model

The list of success factors is as follows:

Table 3: List of success factors

	Success Factor
1	Proximity to a university/research park
2	Feasibility Study
3	Availability of funding to entrepreneurs
4	Stringent selection criteria

5	Quality of entrepreneurs
6	Stakeholder Consensus
7	Supportive government policies
8	Successful incubatees and graduates
9	Competent and properly incentivised Management
10	Financial Sustainability
11	A willing advisory board
12	Networking

The model utilised in the study and how it is linked to the success factors is indicated below. The success factors are indicated by their numbers on the above table in the model below:

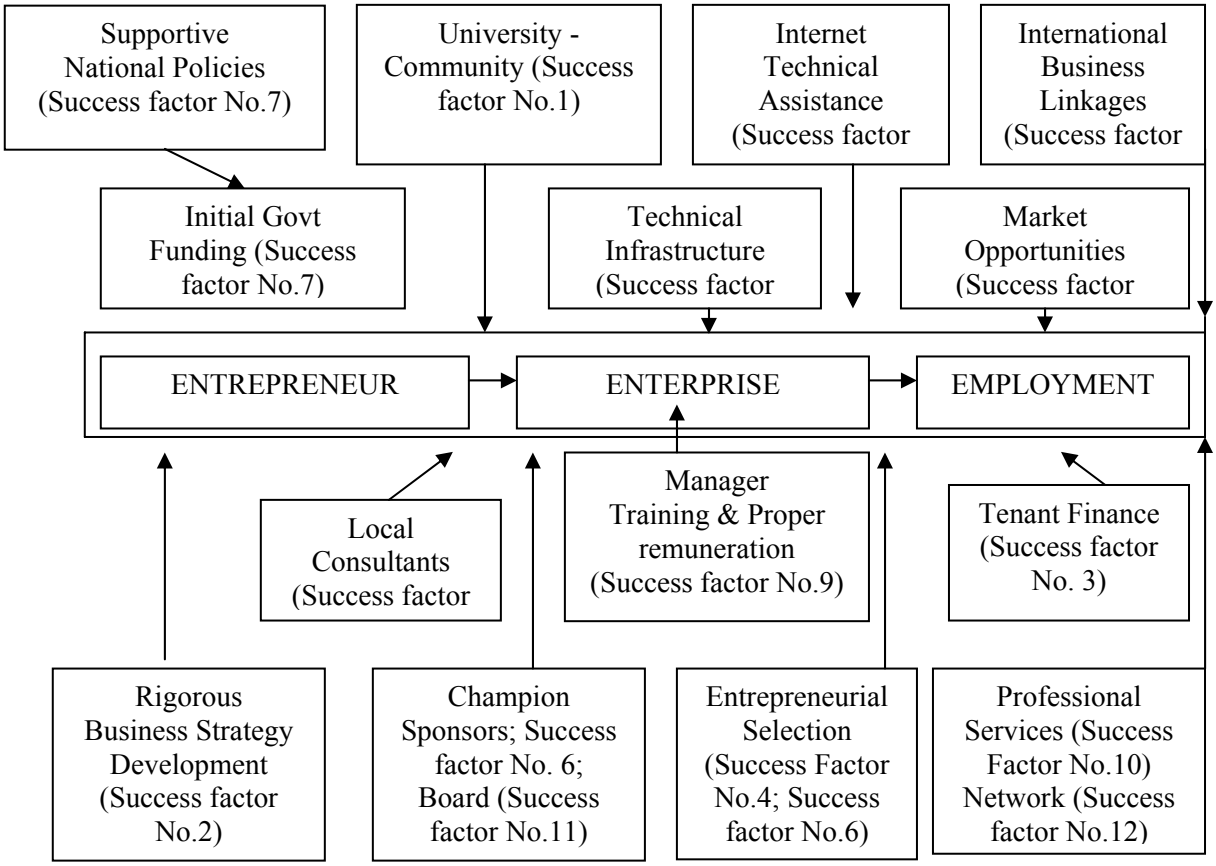


Fig. 7: Linking the study model to the success factors

3.4.2 Linking success factors to the research instruments (questionnaires)

Table 4: Linking the Success Factors to the research instruments

	Success Factor	Related question
1	Proximity to a university/research park	Questions No. 6 - 8 of the Centre Manager questionnaire; Question No.10 of the Centre Manager questionnaire; Question No.15 of the Centre Manager questionnaire
2	Feasibility Study	Question No.8 of the Centre Manager questionnaire; Question No.8 of the Entrepreneur questionnaire.
3	Availability of funding to entrepreneurs	Question No.17 and 18 of the Centre Manager questionnaire; Question No. 9 - 11 of the Entrepreneur questionnaire.
4	Stringent selection criteria	Question 14 of the Centre Manager questionnaire; Question 10 of the Godisa Manager questionnaire.
5	Quality of entrepreneurs	Question No. 1-7 of the Entrepreneur questionnaire; Question No.9 of the Entrepreneur questionnaire.
6	Stakeholder Consensus	Question No. 5-6 of the Centre Manager questionnaire; Question No. 4-5 of the Godisa Manager questionnaire.
7	Supportive government policies	Question No. 6 and Question No. 9 of the Centre Manager questionnaire; Question No. 11 of the Godisa Manager.
8	Successful incubatees and graduates	Questions No. 21-27 of the Centre Manager questionnaire; Question No. 12 of the Entrepreneur questionnaire.
9	Competent and properly incentivised Management	Questions No. 1-3 and No.9 of the Godisa Manager questionnaire; Questions No.1-4 and Questions No.12-

		13 of the Centre Manager questionnaire.
10	Financial Sustainability	Questions No. 28-30 of the Centre Manager questionnaire; Question No. 7 and No. 13-14 of the Entrepreneur questionnaire.
11	A willing advisory board	Question No. 11 of the Centre Manager questionnaire; Question No. 8 of the Godisa Manager.
12	Networking	Questions No. 19 - 20 of the Centre Manager questionnaire; Question 13 of the Godisa Manager.

3.4.3 Hypotheses

The testable hypotheses from the relevant literature are as follows:

- The success factors for incubation in South Africa will be the same as those of international incubators.

- Some of the success factors for incubation in South Africa will be the same as those of international incubators, while others will be different.

The writer believes that the identified success factors will differ in their relevance to South African incubators as indicated in Table 5 below:

Table 5: Hypotheses of the study

	Success Factor	**Hypothesis**
H1	Proximity to a university/research park	It is believed that this success factor will also apply to South African conditions since the availability of equipment and other resources is key to any incubator.

H2	Feasibility Study	It is believed that this factor will also apply to South Africa because a feasibility study helps to avoid unforeseen circumstances.
H3	Availability of funding to entrepreneurs	Funding is a major concern to any business in South Africa. Seeing that equipment is very expensive, it is believed that an incubator in which there is plenty of funding available for entrepreneurs will have more chances of success than the one that does not have.
H4	Stringent selection criteria	At this stage of incubation in South Africa, it is impossible for any incubator to supply everything to everyone given the scarcity in resources. It is therefore believed that an incubator that has strict selection criteria has more chances of success than others even in South Africa.
H5	Quality of entrepreneurs	It is believed that even in South African conditions, it will be easier and will lead to more success to incubate entrepreneurs that are better

		educated and have a better background than otherwise.
H6	Stakeholder Consensus	Since incubation is at its early stages in South Africa, it is believed that it won't matter whether stakeholder roles are clearly identified since all of these are focused at seeing incubation moving off the ground. It is therefore believed that this factor will be irrelevant for the success of South African incubation.
H7	Supportive government policies	Since incubation is still in a learning curve in South Africa for incubators, incubatees and policy makers, it is believed that the government must still be involved not only in incubation support but also in other measures that are complementary to incubation initiatives.
H8	Successful incubatees and graduates	Much as it is still early for other incubators to produce graduates, it is believed that those incubators that have entrepreneurs who are already showing some success have more chances

		of succeeding than others.
H9	Competent and properly incentivised Management	In order to take incubation off the ground in South Africa, experienced and highly educated managers are required. This factor is therefore believed to be relevant to success.
H10	Financial Sustainability	Those incubators that are keen on making it on their own financially even in South Africa devise means that make them succeed more than those that depend on government for a long time.
H11	A willing advisory board	It is believed that at this stage, it is irrelevant for the success of incubation whether the board support incubatees and managers or not. At this stage everyone is still learning.
H12	Networking	Networking is important for any kind of business. It is even more invaluable for early stages since incubators can learn from both failures and successes of others especially in international communities. As well, incubators in South Africa are in different stages, those

		that are better advanced can share experiences with others if they are networking.

CHAPTER IV: RESEARCH DESIGN AND METHODOLOGY

The Research questions are as follows:

- What are the relevant success factors associated with incubation internationally?
- Are these factors applicable to South African conditions?
- What are the main similarities and differences between the local and international models?

If the questions are analysed properly, they are addressing the how scenario for instance "How do success factors for South African incubators compare with those of international incubators"? The case study is therefore best suited to address the research questions. The research employed a Type2 Case study as described by Yin (1994:41-42) since it is a single case study with twelve embedded cases. The main unit of analysis was the Godisa programme and the twelve incubators will be embedded units within the Godisa unit.

The study is based on a case study of the Godisa programme. Although not all the four DTI sponsored incubators were officially part of Godisa at the time of the study, they were also included in the study. The main method employed in the study was that of telephonic interviews and sending out questionnaires, which were completed and returned although historical documents were also used to collect evidence. The research instruments used were mainly questionnaires at three levels: the Godisa Programme Manager, the incubator CEOs and the incubatees/trainees. The questionnaires were sent to the subjects before interviews were conducted. This was done immediately after approval of the research instruments was obtained from the Ethics Committee of the University of Pretoria.

4.1 Research Strategy

The type of research employed in this study is that of theory-testing and application empirical research. The theory testing applies because a lot of research has already been conducted elsewhere and a series of success factors have arisen from those studies. From these success factors, twelve which were thought to be more relevant to South African conditions were identified. The main aim of this study is to test whether these success factors really apply to South Africa using the Godisa case. The research will also contain

numerical data, because in order to measure success some numerical evidence is required e.g. revenue, number of tenants, number of graduates etc.

The logic for this research is as stated in the University's Research Guide (Buys 2005:61) as follows:

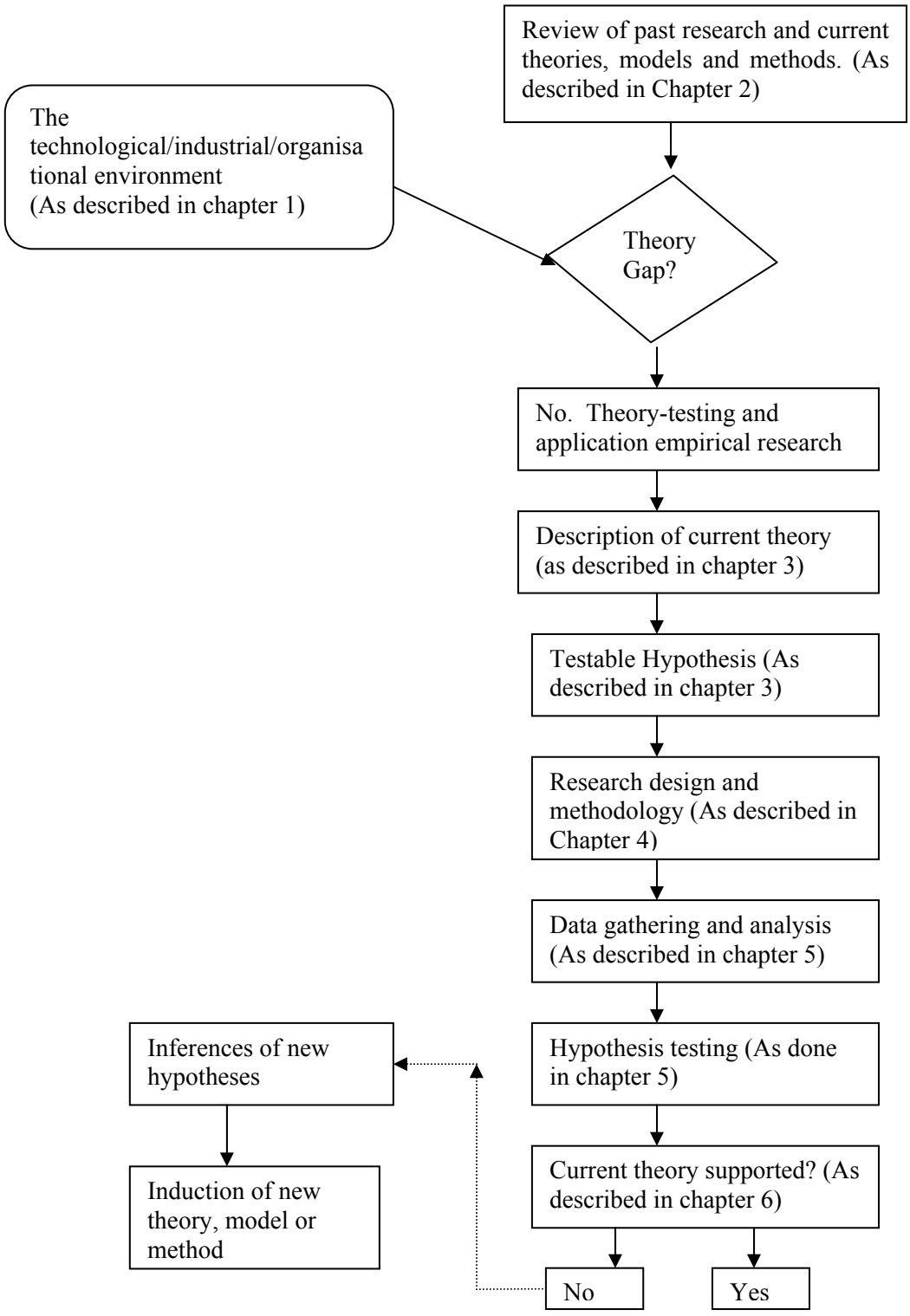


Fig. 8: Research Logic (Buys 2005:61)

Since the questions are of a how nature, the researcher had no control over the events and the focus was of a contemporary phenomenon within a real life context, while exploratory in nature, the preferred strategy was therefore a case study.

The research design that was followed was a 2x2 Matrix and was based on the units of analysis – holistic and embedded (Yin 1994:38). The holistic unit of study was the whole Godisa programme and the embedded units were the individual incubators. From the previous literature review, it has become clear that researchers in this field have preferred this design since in most cases incubators have an umbrella body that funds them and is responsible for making policy for them whereas they also function as separate entities.

In order to increase validity and reliability of the study, the following model as advised by Yin (1994:33) was employed for the study:

Table 6: Case Study Tactics for Design Tests (Yin 1994:33)

Tests	Case Study tactic	Phase of research in which it occurs
Construct validity	Use multiple sources of evidence	Data collection
	Establish chain of events	Data Collection
	Have key informants review draft report	Composition
Internal validity	Do pattern-matching	Data analysis
	Do explanation-building	Data analysis
	Do time-series analysis	Data analysis
External validity	Use replication logic in multiple case studies	Research design
Reliability	Use case study protocol	Data collection
	Develop case study database	Data collection

For this specific case study, in order to ensure construct validity; multiple sources of evidence were employed e.g. documents (business plans, feasibility studies, minutes); evidence including interviews; and historical documents were utilised, the key informants like the University (through interaction with the study leader) and the sponsors of the programme (Godisa) were kept informed as they also participated in the research.

In order to ensure internal validity, the researcher, while analysing data did pattern-matching among the various incubators and also between individual incubators and previous studies.

In order to ensure external validity, the same types of questions were asked from the interviewees. Although the interviews were not of a formal nature, the researcher stuck to the format in the questionnaires to ensure receiving answers to the same questions.

To ensure reliability, a case study database was developed using Microsoft Excel.

4.2 Research Methodology

The methodology employed was that of obtaining information using multiple sources of evidence. The sources included historical documents and interviews. The most important interaction was that of systematic interviews conducted by the researcher mostly by telephone. The interviewees included the Godisa Programme Manager, the Chief Executive Officers (CEO's) of the twelve incubators and a target of five entrepreneurs or trainees from each incubator. The whole process of interviewing depended on the schedules of the CEO's.

Initial contacts with the Godisa Programme Manager and some incubator CEO's were made prior to the interviews. Their response was very positive and they stated that they would be willing to participate in the study. Some documents like the latest progress reports, business plans, financial reports and feasibility studies were reviewed before the interviews. Information from these documents was recorded in the case study database.

The information gathered was utilised to indicate two issues: the success of the incubator (turnover, graduates, financial sustainability etc.) and the factors that led to that success.

The information gathered from various sources of evidence was then analysed, followed by writing the dissertation. The data collected from the interviews was used to test the

hypotheses and quantitative information was treated statistically. Relevant conclusions were reached and relevant recommendations were made to policy makers and academia.

4.3. Research Instruments

With the view that some of the incubators investigated were still new and had not reached all the stages of incubator development, it was decided to adopt the format that was used by Lalkaka (1997:16-17) in identifying success determinants, which was a stage-by-stage approach. The format was modified to accommodate other success factors that were not specifically mentioned.

The study was conducted with people at three levels as follows:

- The overall Godisa manager;
- The twelve centre managers;
- The entrepreneurs in training or incubation; efforts were also made to reach incubator graduates or past trainees. (An estimation of around ± 60 individuals)

The study took the form of questionnaires that were filled in by the different individuals; individual interviews with them; and the review of historical documents. The three questionnaires included slightly different questions as attached. (ANNEXURES A, B & C).

The type of evidence that was collected from the study consisted of both qualitative and quantitative data. The collected data was analysed to address the initial propositions of the study.

4.3.1 Methods for data collection

A general strategy was selected for the analysis of qualitative data as suggested in Yin (2003:110) in order to prioritise what to analyse. This general strategy was using a theoretical or descriptive framework incorporating an inductive approach. This strategy was utilised in conjunction with a specific analytical technique or procedure. When the

data was collected, it was placed in different tables in the database and was categorised accordingly.

The case study is dealing with theory testing, therefore the appropriate general strategy utilised is the one, which relies on the hypotheses that were mentioned in the previous chapters of this study. In the hypotheses for this study, several success factors for incubation were cited. These hypotheses were used to shape the research questions for this study and consequently the research instruments. The type of evidence that was prioritised arose from the hypotheses and therefore led to the focus only on certain types of questions and these questions were related to the theoretical framework as indicated in chapter 3. The analysis therefore focused on testing the hypotheses.

In order to ensure both internal and external validity, the above-described general strategy was used in conjunction with a specific analytical strategy. The analytical strategy or procedure that was most suitable for use together with the general strategy was that of pattern matching. In the hypotheses, several success factors were listed and a pattern created as to how these variables would apply to the South African situation. This conceptual approach was established using existing theory. The data obtained was then matched against these patterns. This gave an indication of which of the success factors are applicable to South Africa. In the end, the adequacy of the theoretical framework was tested as a means to explain the findings. The theoretical framework was such that each of the success factors was explained differently resulting in twelve independent variables that were suggested to be related to one dependent variable, which is success in this case. A pattern arose in the form of a hypothesis. This pattern was then first matched with each of the twelve embedded units of study before a conclusion was made at the level of the holistic unit of study and inferential statistics was utilised to generalise the findings.

Lateral replication was also applied since the case study consists of embedded cases, which represent the same situations, thereby increasing the reliability of the study. Each of the embedded cases were analysed individually against the pattern and then compared to others. A general conclusion was then drawn about the holistic case.

Numerical data that was obtained from the different embedded cases was used for purposes of determining whether the incubator/entrepreneur is successful. After that the factors that are shaping such success were determined.

In order to ensure high quality analysis, all evidence was considered; and all major rival interpretations were addressed. The analysis addressed the most significant aspects of the case study as defined at the beginning.

Some answers were attempted using secondary data. The department of Trade and Industry stores some documents related to the study to support its operations. The researcher had access to some of this information including minutes of meetings, monthly reports, quarterly reports, annual reports, business plans and other documents. This information was available both in hard copy and in soft copy formats. However, it was easier to obtain information for the centres that were founded by DTI than for those that are originally Godisa. Most of the secondary data was qualitative rather than quantitative in nature and was therefore useful in explanatory analysis.

The researcher initially planned to visit each and every incubator manager on-site where observations could also be made. This proved to be impossible because of long-distances between the incubators and the time it could take to finish all the visits. The most preferred strategy for collecting the evidence therefore proved to be through the telephone and sending out questionnaires.

Personal contacts were established with most of the incubator managers even before the research was started. They were informed of the research and most showed a high level of enthusiasm. Even though some of the questions could be regarded as sensitive the managers did not have any difficulty answering these mostly because the initial trust had already been established.

The use of questionnaires made it appear as though the study was employing a survey strategy. In most cases, respondents just completed and returned the questionnaires without the interviewer being present. This was done through e-mail and fax. The

researcher ensured that the questions in the questionnaires were in such a way that they helped answer the research questions.

This was done by relating all the questions in the questionnaires to the theoretical framework as follows:

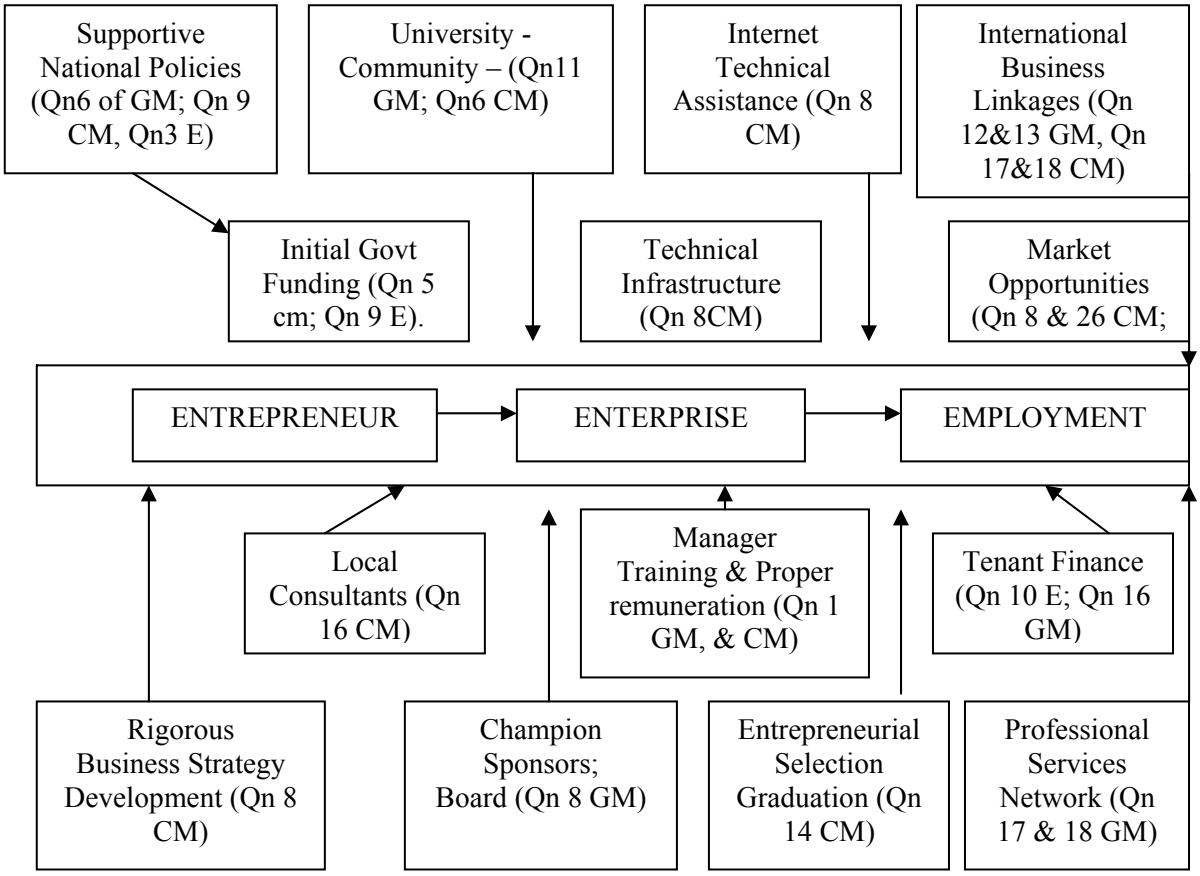


Fig. 9: Relating the research model to research instruments

(GM- refers to the questionnaire for the Godisa Manager; CM refers to the questionnaire for the Centre managers; E refers to the questionnaire for the entrepreneurs)

Self-administered questionnaires were therefore sent to participants and these were returned to the researcher mostly via e-mail though some were faxed. Interviewer administered questions were recorded by the interviewer on the basis of the respondent's answers as per telephone interviews.

Reliability of the data (i.e. ensuring that the correct person responds) was also improved by sending the questionnaires via e-mail rather than posting and also by telephoning respondents. Advice for sending out questionnaires was obtained from the following table:

Table 7: Main attributes of questionnaires (Saunders, Lewis, and Thornhill 2003:284)

Attribute	On line	Postal	Delivery and collection	Telephone	Structured interview
Population's characteristics for which suitable	Computer-literate individuals who can be contacted by e-mail or internet	Literate individuals who can be contacted by post, selected by name, household, organisation etc		Individuals who can be telephoned, selected by name, household, organisation etc	Any; selected by name, organisation, in the street etc
Confidence that right person has responded	High if using e-mail	Low	Low but can be checked at collection	High	
Likelihood of contamination or distortion of respondent's answer	Low	May be contaminated by consultation with others		Occasionally - distorted or invented by interviewer	Occasionally-contaminated by consultation or distorted/invented by interviewer
Size of sample	Large, can be geographically dispersed		Dependent on number of field workers	Dependent on number of interviewers	
Likely response rate	Variable, 30% reasonable within organisations, Internet 10% or lower	Variable, 30% reasonable	Moderately-high, 30-50% reasonable	High 50% - 70% reasonable	
Feasible length of questionnaire	Conflicting advice; however, fewer "screens" probably better	6-8 A4 pages		Up to half an hour	Variable depending on location
Suitable types of	Closed questions	Closed questions but not too complex, simple		Open and closed	Open and closed

questions	but not too complex, complicated sequencing fine if uses IT; must be of interest to respondents.	sequencing only, must be of interest to the respondent		questions, but only simple questions, complicated sequencing fine	questions, including complicated questions, complicated sequencing fine.
Time taken to complete collection	2 - 6 weeks from distribution (dependent on number of follow-ups)	4-8 weeks from posting (dependent on number of follow-ups)	Dependent on sample size, number of field workers etc.	Dependent on sample size, number of interviewers etc but lower than self-administered for same sample size	
Main financial resource implications	World wide web page design	Outward and return postage, photocopying, clerical support, data entry	Field workers, travel, photocopying, clerical support, data entry	Interviews, telephone calls, clerical support, photocopying and data entry if not using CATI. Programming, software and computers if using CATI	Interviews, travel, clerical support. Photocopying and data entry if not using CAPI. Programming, software and computers if using CAPI.
Role of interviewer/field worker	None		Delivery and collection of questionnaires, enhancing respondent participation	Enhancing respondent participation, guiding the respondent through the questionnaire, answering respondents' questions	
Data input	May be automated	Closed questions can be designed so that responses may be entered using optimal mark readers after questionnaires have been returned		Response to all questions entered at time of collection using CATI.	Response to all questions can be entered at time of collection using CAPI

All respondents were first informed of the research prior to sending questionnaires. This was done face to face and over the telephone. This was followed by sending questionnaires to them. A deadline for the return of the responses was communicated to all of them. A week after the deadline, a follow-up e-mail was sent to those who had not yet responded as a reminder. Telephone calls were also used to follow-up until a satisfactory number of respondents was received.

4.3.2 Methods for data analysis

The general method for data analysis as indicated below was followed as indicated in the following figure:

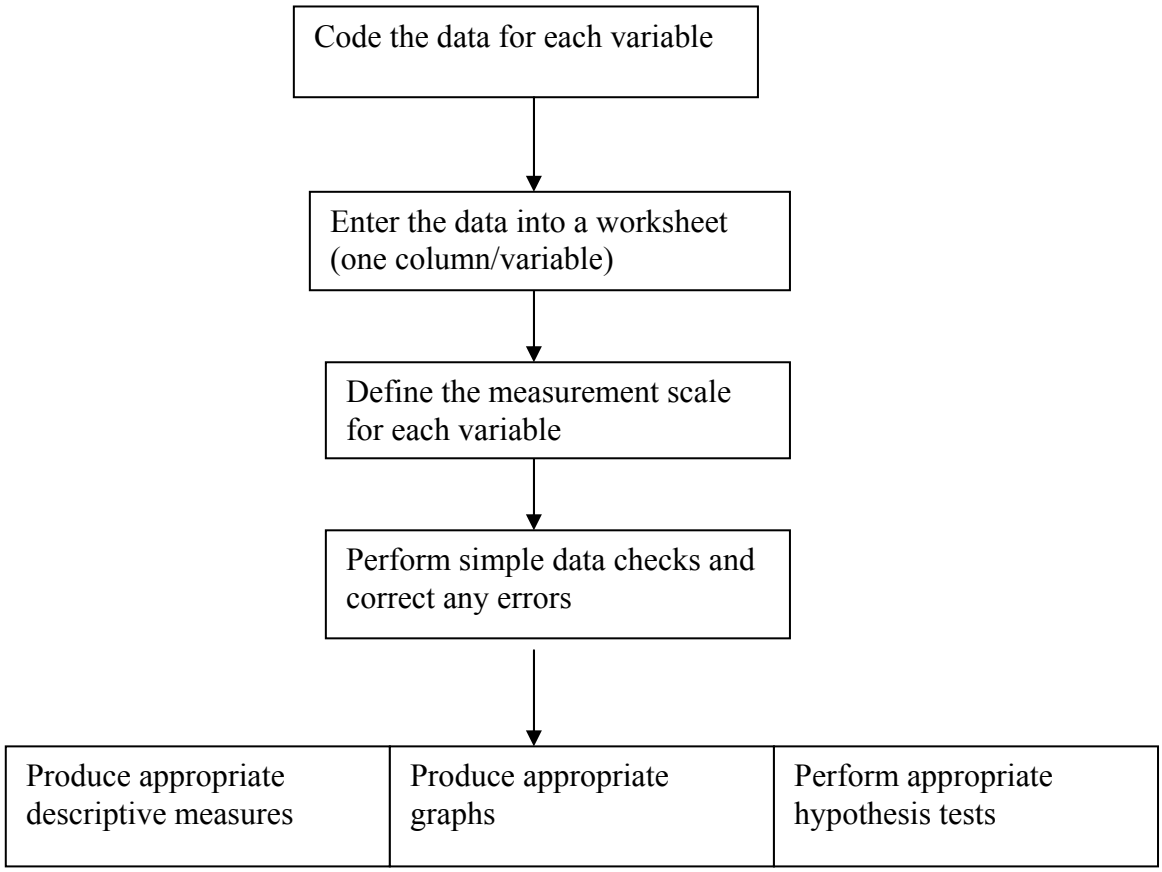


Fig.10: schematic illustration of a typical data-analysis process (Page and Meyer 2003:162)

Some of the evidence contained categorical data because values could not be measured numerically but could be classified into categories or characteristics. Analysis of these

data was descriptive (nominal) but they were counted to establish which category had the most and whether cases were spread evenly across categories.

A simple analysis procedure was followed after the data was received as indicated in the table below:

Table 8: Analysis procedures (Page and Meyer 2003:144)

	Univariate	Bivariate	Objective
Descriptive measures	Measures of centre and spread	Measures of association	Summarise responses
Graphs	Pie and bar charts, box-plots and histograms	Stacked bar charts, scatter graphs	Display of response distributions and relationships
Hypothesis tests	**Goodness-of-fit tests**	Tests of association	Test whether sample results can be generalised to the population

The study utilised bivariate tests as relationships were being established between two variables, being success and the success factors one at a time.

The specific descriptive measures were followed as indicated in the following table:

Table 9: Common descriptive measures (Page and Meyer 2003:149)

Measurement scales	Measures		
	Centre	Spread	Association
Nominal (always discrete)	Frequencies, modes	Frequencies, index of qualitative variation	Cross-tabulation
Ordinal discrete	Frequencies, modes, mean, median	Frequencies, range, standard deviation	Cross-tabulation
Ordinal continuous	mean, median, trimmed mean	Standard deviation, inter-quartile range	Spearman rank correlation co-efficient
Interval continuous	mean, median, trimmed mean	Standard deviation, interquartile range	Pearson correlation coefficient

Some of the following graphs were utilised to describe the data:

Table 10: Common graphs (Page and Meyer 2003:155)

Measurement scale	Graphs illustrating:	
Dependent variable	Univariate distributions	Bivariate associations

Nominal	Pie chart	2 pie charts
Ordinal discrete	**Bar chart**	Stacked or clustered bar charts
Ordinal continuous	Histogram, box-plots	Box-plots, scatter-plots and mean plots
Interval continuous	Histogram, box-plots	Box-plots, scatter-plots and mean plots

In order to illustrate the relationship between each of the success factors and success, in this particular study, scatter-plots were utilised.

Page and Meyer (2003:173) describe some of the most commonly used bivariate tests as follows:

Table 11: Commonly used bivariate tests (Page and Mayer 2003:173)

	Independent variable	
Dependent variable	Discrete	Continuous
Nominal	Chi-squared test of association (cross-tab test)	Log-linear analysis
Ordinal-discrete	Chi-squared test of association (cross-tab test	Log-linear analysis
Ordinal-continuous	Kruskal-Wallis test (Mann-Whitney for 2 groups)	Spearman correlation
Interval-continuous, no parametric assumptions	Kruskal-Wallis test (Mann-Whitney for 2 groups)	Spearman correlation
Interval-continuous parametric assumptions	ANOVA test with multiple pair wise comparisons (2 sample t-test for 2 groups)	Pearson correlation Simple linear regression
Interval-continuous, parametric assumptions, extensions for >1 independent variable	Interaction test for > 1 independent variables	Multiple linear regression for >1 independent variables

For this particular study, Mann Whitney and Kruskal-Wallis tests were utilised to indicate the significance of the relationship between two variables. In order to indicate the strength of the relationship, the previously ordinal variables were converted to continuous in order to determine the strength of the relationships. This was done using the Spearman rank correlation co-efficients for each of the success factors and success.

All data collected was entered in tables in Excel spreadsheets and presented accordingly

Table 12: Data presentation by data type: a summary (Saunders, Lewis and Thornhill 2003:340)

	Categorical		**Quantifiable**	
	Descriptive	**Ranked**	**Continuous**	**Discrete**
To show one variable so that any specific value can be read easily	Table/frequency distribution (data often grouped)			
To show the frequency of occurrences of categories or values for one variable so that highest and lowest are clear	Bar chart (data may need grouping)		Histogram or frequency polygon (data must be grouped)	Bar chart or pictogram (data may need grouping)
To show the trend for a variable		Line graph	Line graph or histogram	Line graph or bar chart
To show the proportion of occurrences of categories or values of one variable	Pie chart or bar chart (data may need grouping)		Histogram or pie chart (data must be grouped)	Pie chart or bar chart (data may need grouping)
To show the distribution of values for one variable			Frequency polygon, histogram (data must be grouped)	Frequency polygon, bar chart (data may need grouping) or box plot
To show the interdependence between two or more variables so that any specific value can be read easily	Contingency table/cross-tabulation (data often grouped)			
To compare the frequency of occurrences of categories or values for two or more variables so that highest and lowest are clear	Multiple bar chart (continuous data must be grouped, other data may need grouping)			
To compare the		Multiple line graph or multiple bar chart		

trends for two or more variables so that conjunctions are clear		
To compare the proportions of occurrences of categories or values for two or more variables	Comparative pie charts or percentages component bar chart (continuous data must be grouped, other data may need grouping)	
To compare the distribution of values for two or more variables		Multiple box plot
To compare the frequency of occurrences of categories or values for two or more variables so that totals are clear	Stacked bar chart (continuous data must be grouped, other data may need grouping)	
To compare the proportions and totals of occurrences of categories or values for two or more variables	Comparative proportional pie charts (continuous data must be grouped, other data may need grouping)	
To show the relationship between cases for two variables		Scatter graph/scatter plot

All the data that could be analysed statistically was analysed using descriptive statistics as follows where applicable:

Table 13: Descriptive statistics by data type: a summary (Saunders, Lewis and Thornhill 2003:352)

To calculate the measure of:		Categorical		Quantifiable	
		Descriptive	Ranked	Continuous	Discrete
Central tendency that…	…represents the value that occurs most frequently	Mode			
	…represents the middle value			Median	
	…includes all data values (average)			Mean	
Dispersion that…	…states the difference between the highest and lowest values			Range (data need not be normally distributed but must be placed in rank order)	
	…states the difference within the middle 50% of values			Inter-quartile range (data need not be normally distributed but must be placed in rank order)	
	…states the difference within another fraction of the values			Deciles or percentiles (data need not be normally distributed but must be placed in rank order)	
	…describes the extent to which data values differ from the mean			Variance, or more usually, the standard deviation (data should be normally distributed)	
	…compares the extent to which data values differ from the mean between variables			Coefficient of variation (data should be normally distributed)	

In order to test the relationship between variables where applicable, statistics to examine relationships were applied as follows:

Table 14: Statistics to examine relationships, differences and trends by data type: a summary (Saunders, Lewis and Thornhill 2003:357)

	Categorical		Quantifiable	
	Descriptive	Ranked	Continuous	Discrete
To test whether two variables are associated	Chi square (data may need grouping)		Chi square if variables grouped into discrete classes	
To test whether two groups (categories) are different	Kolmogorov-Smirnov (data may need grouping)		Independent t-test or paired t-test (often used to test for changes over time)	
To test whether three or more groups (categories) are different			Analysis of variance (ANOVA)	
To assess the strength of relationship between two variables		Spearman's rank correlation coefficient	Pearson's product moment correlation coefficient (PMCC)	
To assess the strength of a relationship between one dependent and one or more independent variables			Regression coefficient	
To predict the value a dependent variable from one or more independent variables			Regression equation	
To compare relative changes over time			Index numbers	
To disseminate the trend over time of a series			Time series: moving averages Regression equation	

of data		

4.3.3. Key research variables

4.3.3.1 Independent variables

The questions in the questionnaire were designed in such a way as to provide answers related to a set of independent variables.

The study had twelve independent variables that were treated individually in association with the dependent variable. The twelve independent variables represent the twelve success factors that were identified. These are as follows:

1. Proximity to a university/research park
2. Feasibility Study
3. Availability of funding to entrepreneurs
4. Stringent selection criteria
5. Quality of entrepreneurs
6. Stakeholder Consensus
7. Supportive government policies
8. Successful incubatees and graduates
9. Competent and properly incentivised Management
10. Financial Sustainability
11. A willing advisory board
12. Networking

The questions in the questionnaires that related to these success factors could receive responses that were discrete, nominal or ordinal, there were never continuous values. However, for the purposes of analysis, some values were converted to be either ordinal or continuous.

The responses to questions related to the dependent variable were continuous in nature. Various variable relationships were investigated in the study as indicated by Page and Meyer (2003: 67). The dependent variable was success.

4.3.3.4 The dependent variable

The dependent variable in this study related to the concept of success. Since incubators are not equal in size and age, it was necessary to develop a certain normalised measure that would enable fair comparison of the incubators. An operational definition was therefore developed for success. In addition, measurable variables were defined.

For incubators, the operational definition of success was "Return on Investment" measured as sales per capital invested. For the entrepreneurs, the operational definition was that of sales per entrepreneur.

Measurable variables were sales (in Rands), capital (in Rands) and the number of entrepreneurs per incubator.

These measures for the dependent variable therefore caused a fair comparison between successful and unsuccessful incubators.

For independent variables there were responses that were measured in a nominal scale where numbers stand for particular characteristic but cannot convey any sense of order or value in the number. This was possible only after coding. In a dichotomous scale, there were only two options that were mutually exclusive.

CHAPTER V: DATA GATHERING AND ANALYSIS

5.1. Data gathering process

Data was gathered mostly using the questionnaires (Annexures A, B and C). A teleconference was held with the Godisa Chief Executive Officer in order to obtain answers to all the questions and to obtain up-to-date additional information about Godisa. Questionnaires were sent to all the twelve centre managers, who in turn, and where possible, distributed the questionnaire for entrepreneurs (Annexure C) to their tenants/clients.

Secondary data was also obtained from sources such as annual reports, quarterly reports etc.

When the questionnaires were sent, they were not pre-coded since it was allowed that a person could make more than one selection for one question. Coding was only done after the questionnaires were received.

5.2. Data /Information gathered

5.2.1. Godisa

From the interview held with the Godisa CEO, the following information was obtained, in addition to the questionnaire answers:

- As of the date of the interview (6 September 2004), two [Mpumalanga Stainless Initiative (MSI) and Downstream Aluminium Centre for Technology (DACT)] of DTI- funded incubators had already been incorporated into Godisa; the other two were still outstanding.
- DTI-funded centres have a strong focus on training as opposed to the Godisa centres where incubation is the main focus. Upon merging, a balance will be found between these areas. However, there is a lot of synergies expected among these centres.

- The EU contract to fund the three pilot centres is due to end in November 2004, after which Godisa will take over because there is still need for further funding.
- The Technology Demonstration Centre (TDC) has so far proved to be the most successful of the three pilots.
- Three years is not a reasonable period for financial self-sustainability of a technology business incubator; this period may be estimated at between seven to ten years.
- Godisa exercises no control over the centres that it funds; only advice and guidance is given, hence these centres are fully autonomous and have their own board of directors.

The answers that were provided for the Godisa Manager questionnaire were not utilised in any further analysis but they provided a broader picture as follows:

- It became apparent that the Godisa CEO position demands a person who is highly qualified and experienced in the fields of Business Management and Entrepreneurship.

- From the answers, it could be established that much as Godisa is the umbrella body for incubators, each incubator is autonomous on its own. Godisa's role is more of an advisory and supportive nature than control. On that note, Godisa assists centres with their business plans, Key Performance Indicators, and many other operational issues.

- Godisa stakeholders include government in all spheres, private sector, and international government agencies. Godisa does not work in isolation from other government support. There is strong integration of the programme with others at local and provincial levels.

- Godisa does not see itself working on its own in future without support from government/donors. Incubators are selected on the basis of a good business plan, feasibility, technology focus and national priorities. Godisa is highly networked with international associations.

5.2.2. Incubator Centres

Thirty questions were asked from the centre managers.

The questionnaire was divided into two sections – A and B. Section A deals with the Manager and Section B deals with the incubator. Section B is further divided into four subsections (a – d). (a) deals with the preparatory phase of the incubator; (b) deals with the implementation phase; (c) deals with the operations of the incubator and (d) deals with sustainability. The responses were analysed as follows:

A. THE MANAGER

1. Please select the qualifications that you possess: Four choices were given as follows, some of the respondents made more than one choice. The number of responses is mentioned in brackets next to each of the choices:

   a. Business degree/Diploma (7)

   Five out of eleven (about 64%) centre managers possess a Business degree/Diploma

   b. Entrepreneurship degree/Diploma (0)

   Surprisingly enough none of the Managers is in possession of an Entrepreneurship degree/Diploma. This may be attributed to the fact that Entrepreneurship as a formal qualification is relatively new in South Africa.

   c. Science/ Technology degree/Diploma (8)

   The majority of the managers that responded (about 73%) possess a Science/Technology degree/diploma.

   d. Other (3)

   About 27% of the managers are in possession of other qualifications besides the ones that were listed. These include Human Sciences, Engineering, Marketing and Medicine.

This can be illustrated graphically as follows:

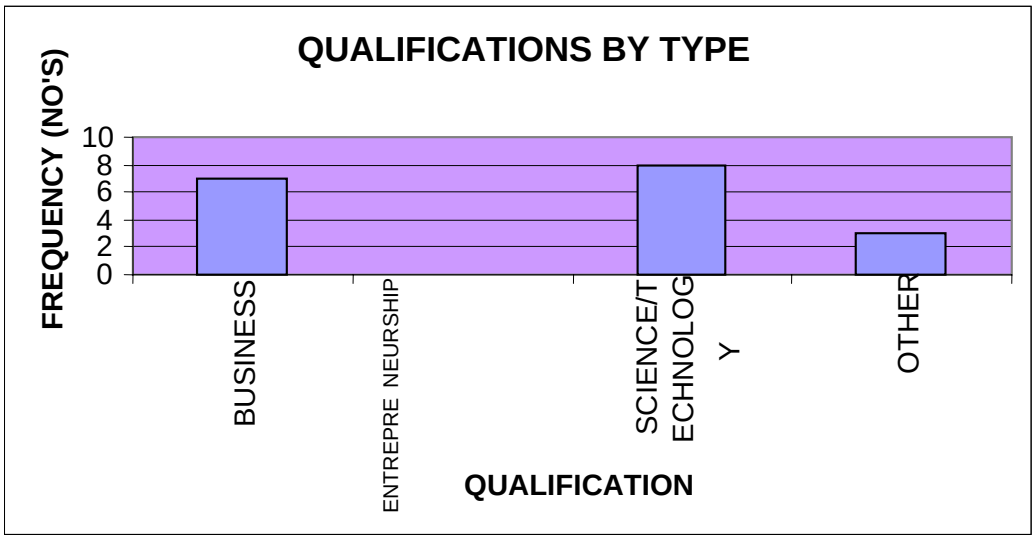


Fig. 11: Illustration of Qualifications of incubator managers

2. Please select the previous experience gained. Four choices were given and the following responses were received:

   a) Entrepreneurship (8)

   The majority of incubator managers (about 73%) have previous experience in entrepreneurship, mostly having owned their own businesses.

   b) Business Management (6)

   About 55% incubator managers have previous experience in Business Management.

   c) Training (4)

   About 36% of incubator managers have previous experience in the field of training.

   d) Other (3)

   About 27% of the managers have other experience ranging from Project Management; Lectureship and practicing medicine.

   This can be illustrated graphically as follows:

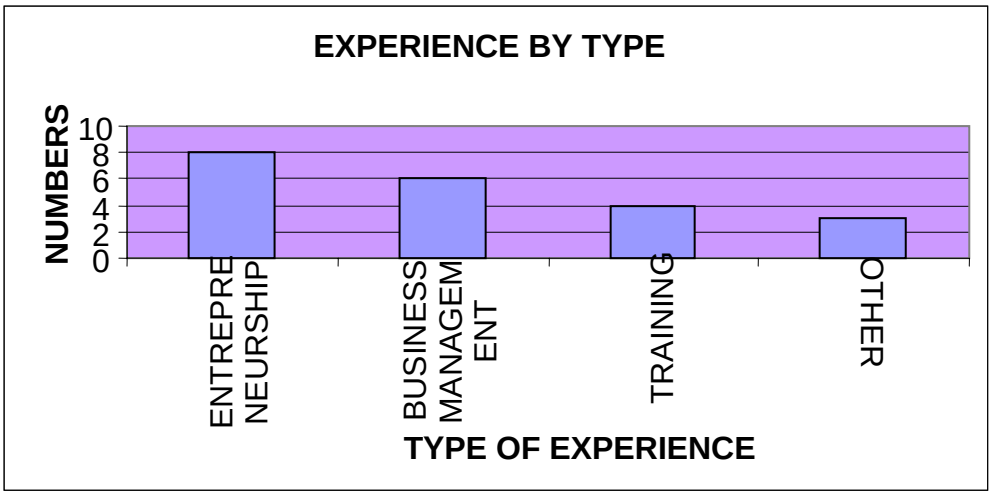


Fig. 12: Illustration of experience of incubator managers

3. How are you remunerated?

(a) Fixed salary only (3)

About 27% of the incubator managers are being remunerated through a fixed salary only. It is interesting to note that all three incubators are **DTI** funded ones.

(b) Performance related salary (0)

None of the incubator managers are being paid only based on performance

(c) Fixed salary + Performance bonus (8)

The majority (about 73%) of the managers are being remunerated both a fixed salary and a performance-based salary.

(d) Other (0)

No other means of salary was mentioned by managers.

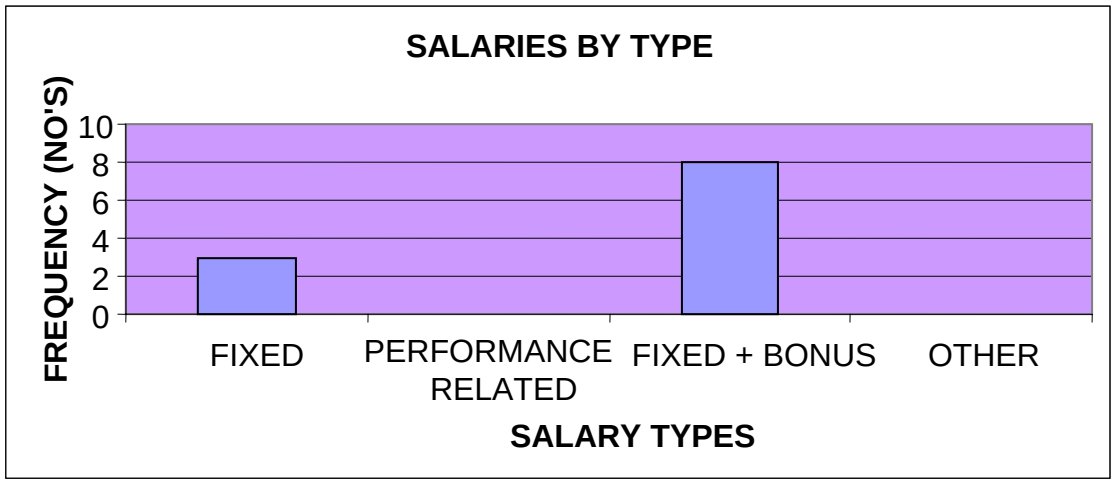


Fig. 13: Illustration of incubator manager salary types

4. Are you presently furthering your Education? Yes /No. If Yes, in which field?

Yes (6), the majority of the managers (about 55%) answered Yes to the question

No (5), The remaining managers (about 45%) answered No mostly because of the demanding job.

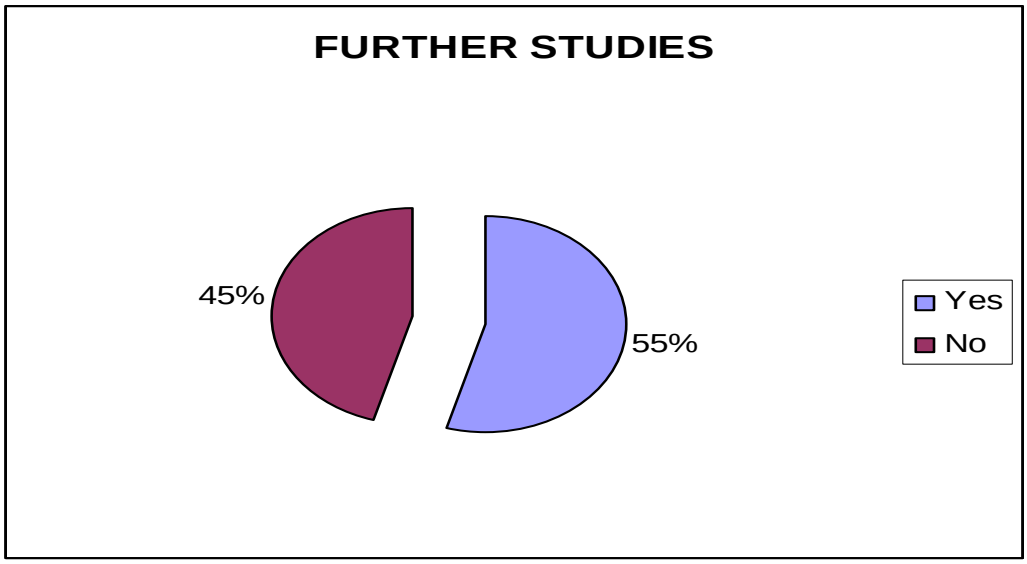


Fig. 14: Illustration of managers who are furthering their studies

For those that answered "Yes" the relevant figures are mentioned beside their respective fields of study:

(a) Project Management (0)

None of the managers are pursuing further studies.

(b) Business Management (3)

About 50% of the managers who are furthering their studies are in the field of Business Management.

(c) Entrepreneurship (1)

About 17% of the managers are furthering studies in the field of Entrepreneurship

(d) Other (2) About 33% of the Managers are pursuing other studies including PhD and Chartered Financial Analyst.

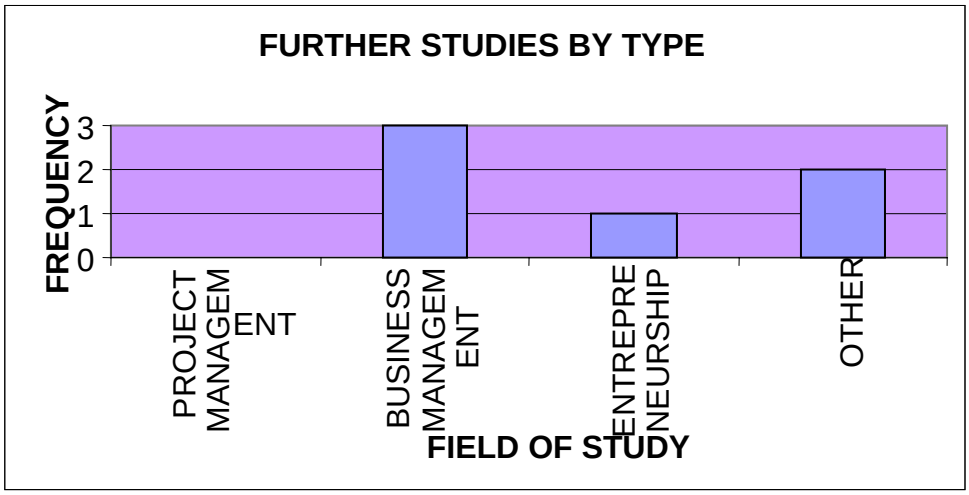


Fig. 15: Illustration of further studies by type

B. THE INCUBATOR

(i) PREPARATORY PHASE

5. What were the categories of the initial sponsors?

(a) Government (11)

All (100%) of incubator managers mentioned government as one of the initial sponsors

(b) Private Sector (4)

Only about 36% of the incubator managers mentioned private sector as their other initial sponsor.

(c) International Donors (4)

About 36% of the incubator managers mentioned international stakeholders as one of the initial sponsors in the incubator.

(d) (Other (0) No other sponsors were mentioned.

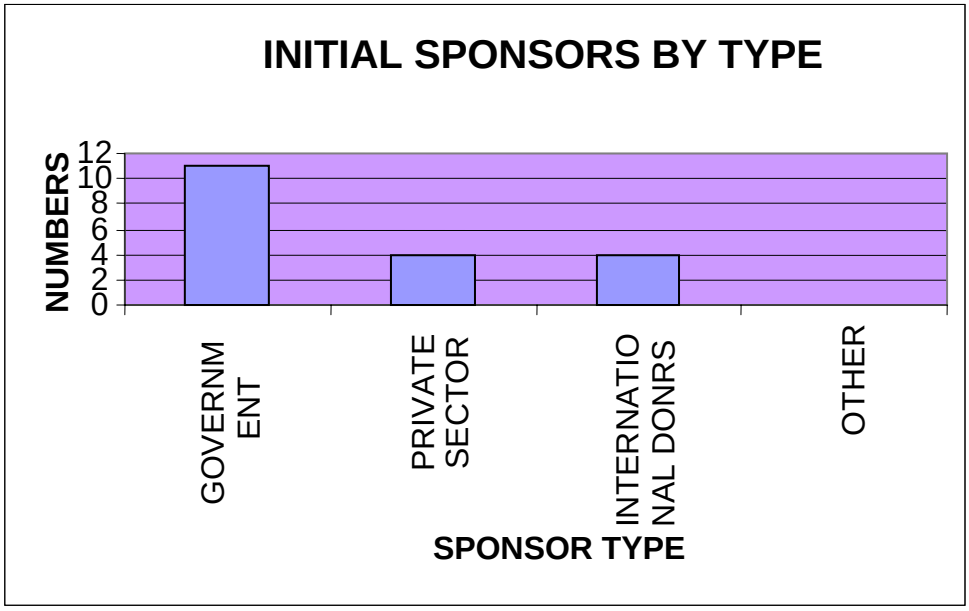


Fig. 16: Illustration of initial sponsors by type

6. What were the categories of other stakeholders involved in the project? When asked about the subsequent stakeholders in the project the managers answered as follows:

(a) Local government (5)

45% of the managers mentioned local government as one of their subsequent stakeholders.

(b) Provincial Government (5)

Another 45% of the managers mentioned provincial government as one of their subsequent stakeholders.

(c) National Government (9)

About 82% of the incubator managers mentioned national government as one of their subsequent stakeholders.

(d) Local communities (1)

Only about 9% of the managers mentioned local communities as one of their subsequent stakeholders.

(e) Tertiary Institutions (6)

Tertiary institutions were mentioned as subsequent stakeholders in about 55% of the cases.

(f) Private Sector (5)

Private sector was mentioned in about 45% of the cases as one of the subsequent stakeholders.

(g) Others (1) In about 9% of the cases, other stakeholders were mentioned, which was the science councils category.

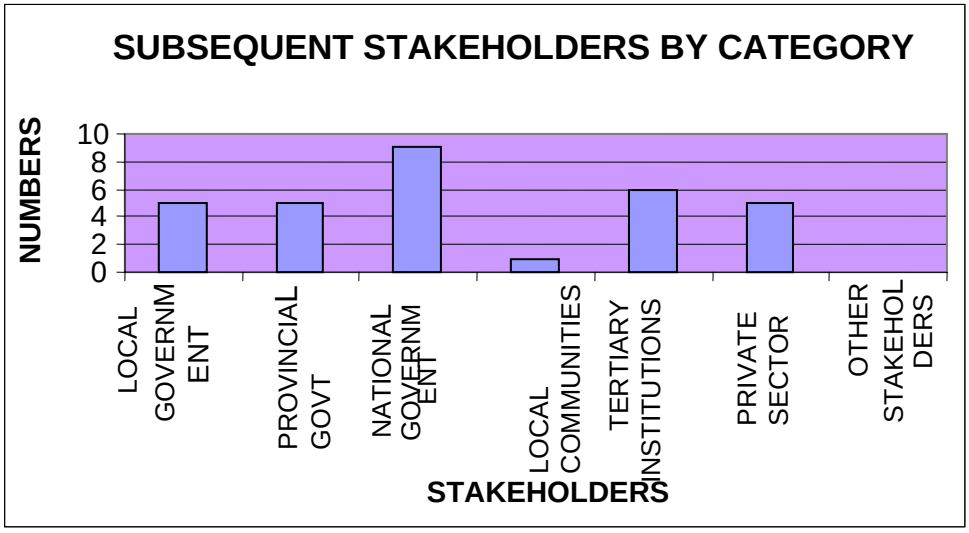


Fig. 17: Illustration of subsequent stakeholders by category

7. What were the roles of the stakeholders

(a) Funding (10)

In about 91% managers reported the role of stakeholders as funders.

(b) Planning (6)

In about 55% of the cases managers have mentioned stakeholders as having a role in planning.

(c) Advice (5)

In about 45% of the cases, stakeholders were mentioned as having the role of giving advice.

(d) Donation of infrastructure/land (4)

In only about 36% are stakeholders mentioned to have a role of donation of infrastructure/land.

(e) Others (1). In about 9% of the cases, other roles were mentioned including providing other non-financial resources.

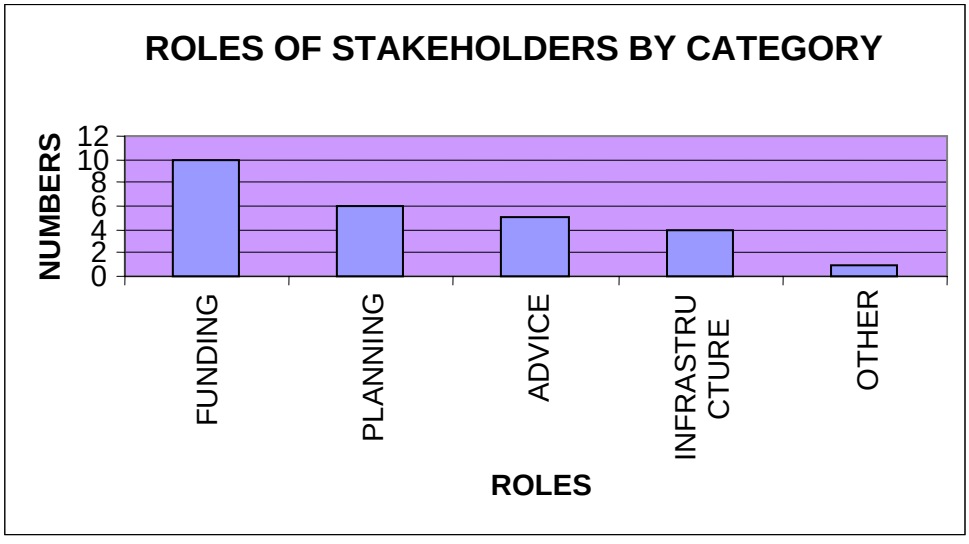


Fig. 18:Illustration of stakeholder roles in incubators

8. Was there a Feasibility Study (Building, proximity to university/research institute/ demand for clients etc) conducted?

Yes (2)

Only in about 18% cases, a feasibility study was conducted before commencing with the project. In both cases the feasibility studies could not be attached because they were resident with the initial stakeholders and the incubator managers did not have access to them.

No (9)

In the majority of cases (92%), feasibility studies were not conducted.

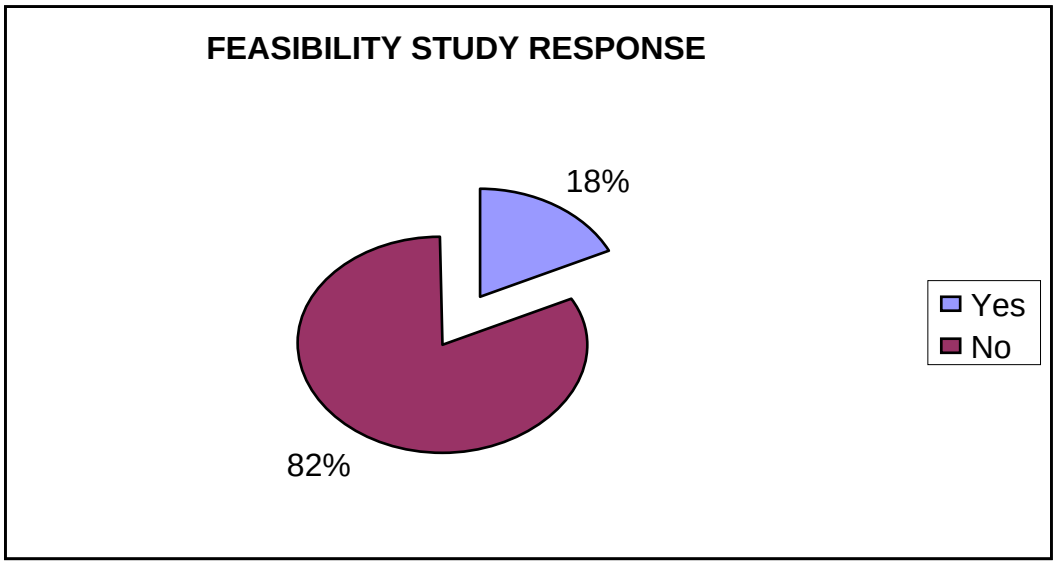


Fig. 19: Illustration of whether a feasibility study was conducted

9. Are there any supportive government policies in place in your area? Yes/No. If Yes, how do they benefit the incubator?

Yes (8) About 73% of the managers answered yes

No(3) The rest (about 27%) of the managers answered no

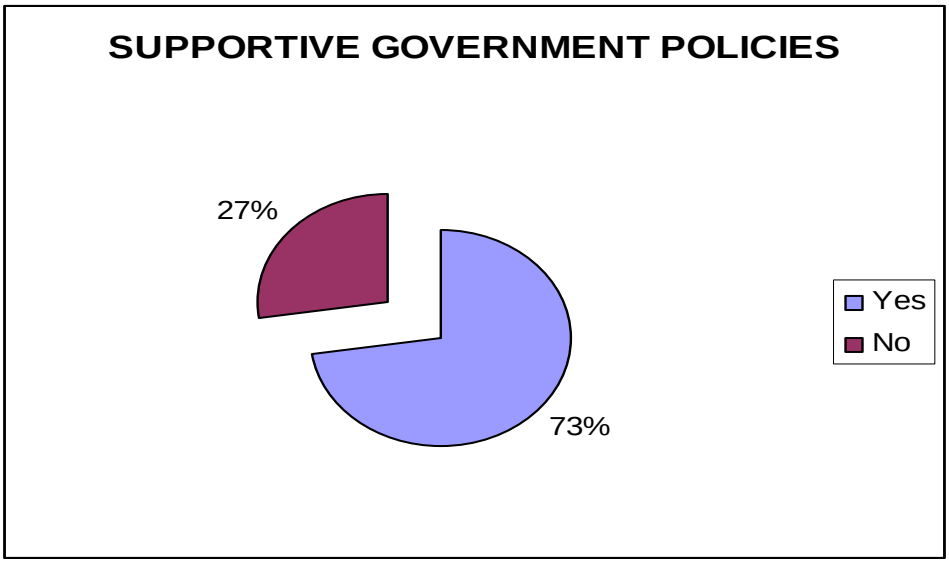


Fig. 20: Illustration of the existence of supportive government policy at local levels

For those who said yes, their further responses were as follows

(a) Tax rebates for the incubator (0)

None of the cases mentioned tax rebates as a form of benefit they receive from government policies in their area.

(b) Funding for the incubator (8)

All the cases (100%) in which the answer was "Yes" indicated that the policies are conducive for funding for the incubator.

(c) Funding for the incubatees (0)

None of the incubator managers indicating funding for incubatees as a benefit from policies in their area.

(d) De-regulation (0)

De-regulation was not cited as a benefit

(e) Other (0) No other benefits were mentioned

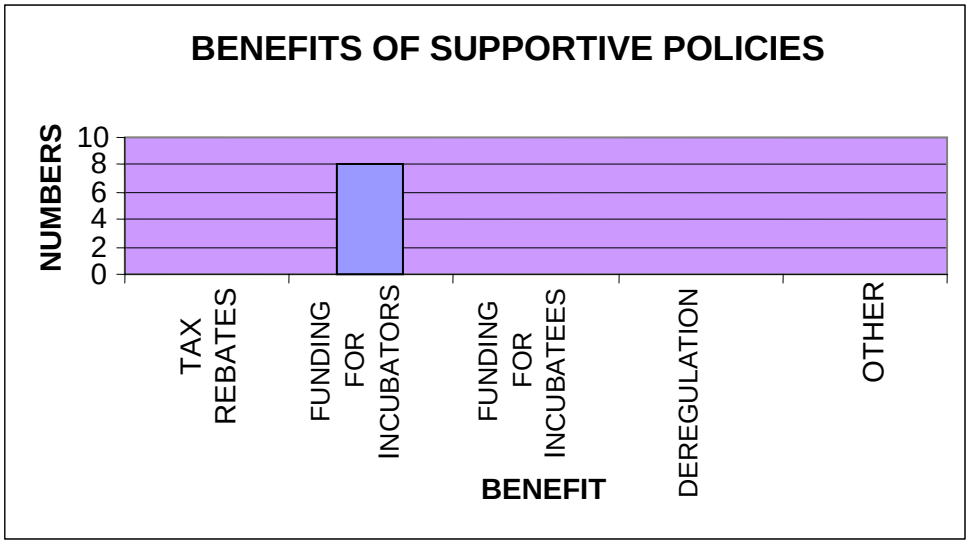


Fig. 21: Illustration of benefits of supportive government policies

(ii) IMPLEMENTATION PHASE

10. What are the categories of board members?

(a) Government (8)

In about 73% of the cases, government was cited as one of the categories of board members.

(b) Private Sector (10)

In majority of cases (about 92%) of the cases private sector was cited as one of the board member categories

(c) Tertiary Institutions (8)

In about 73% of the cases, tertiary institutions were cited as board member categories

(e) Others (2)

In about 18% of the cases other categories were cited ranging from Science Councils and Science parks.

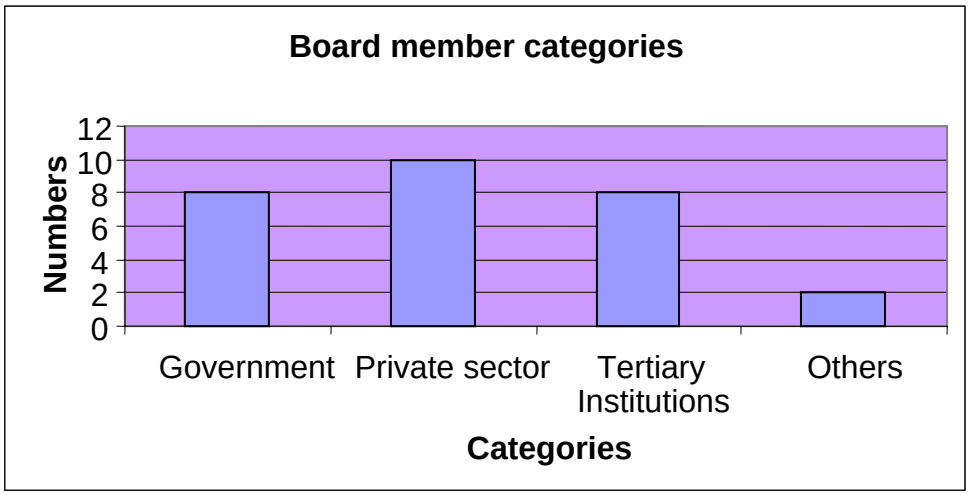


Fig. 22: Illustration of incubator board member categories

11. What are the roles of the board members?

(a) Advising entrepreneurs (1): In only about 9% of the cases was advising entrepreneurs mentioned as the role of board members.

(b) Advising the CEO (7)
In about 64% of the cases the role was mentioned as advising the CEO

(c) Policy inputs (10)
In about 92% of the cases the role of the board was mentioned to be related to inputting into policy.

(d) Other (1) In only about 9% of the cases other roles were quoted including advising all management

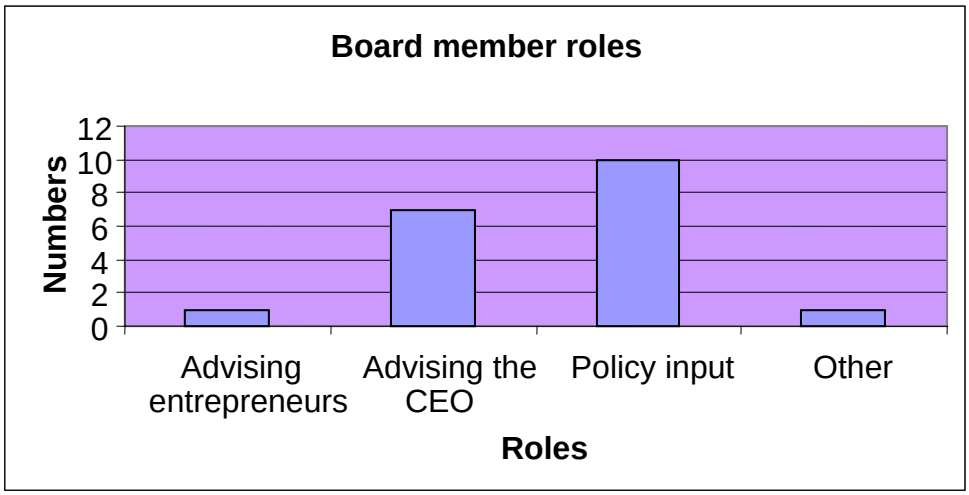


Fig. 23: Illustration of board member roles

12. Criteria used for management team selection :

(a) Entrepreneurial/coaching/Education (8)

In about 73% of the cases the Entrepreneurial or coaching experience or the level of Education is considered before appointing management team.

(b) Previous relevant experience (8)

In another about 73% previous relevant experience is used as a criterion for management team selection.

(c) Other Experience or Education (2)

In about 18% of the cases other experience or education including Research and Technology Development and Production and Technical knowledge has been mentioned

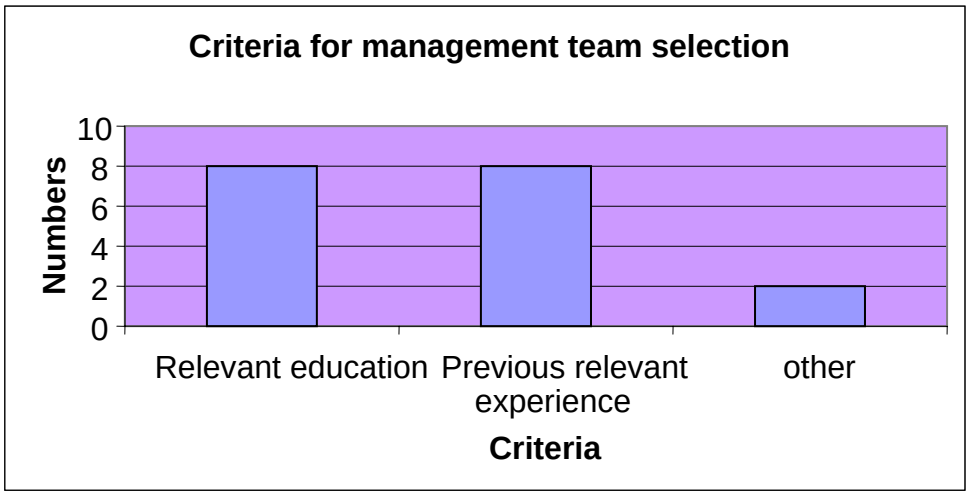


Fig. 24: Illustration of criteria used for management team selection

13. Are there any Training programmes in place to develop the management team?

Yes/No

Yes (8)

In the majority (about 73%) of the incubators there are Training programmes in place to develop the management team

No (3)

In 27% of the incubators there are no structured management development programmes

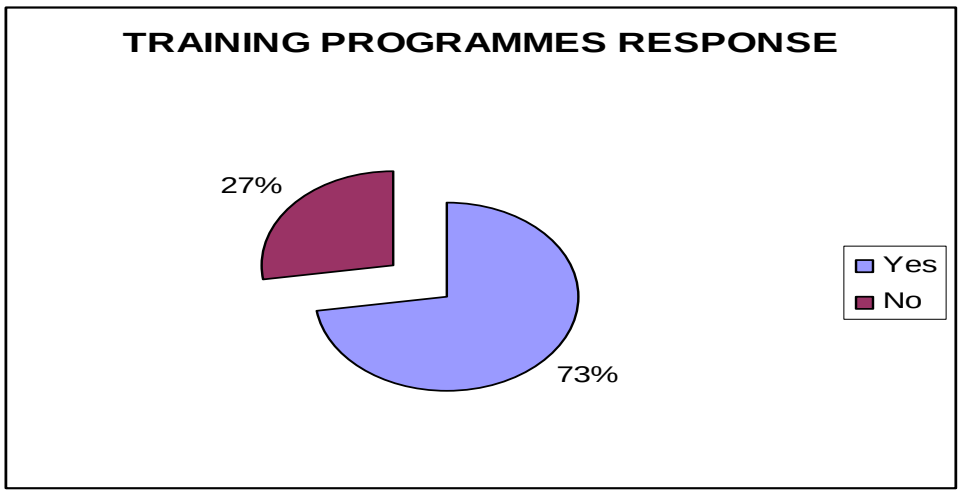


Fig. 25: Illustration of Training programmes availability

For those that have structured programmes they exist in the following areas:

(a) Entrepreneurship (4)

In about 50% of the cases, the training programmes are in the area of Entrepreneurship.

(b) Project Management (5)

In about 63% of the cases, training programmes are in the area of Project Management.

(c) Business Management (5)

In about 63% of the cases, training programmes are in the area of Business Management.

(d) Other (5)

In about 63% of the cases, training programmes are in other areas including conferences and ad-hoc courses.

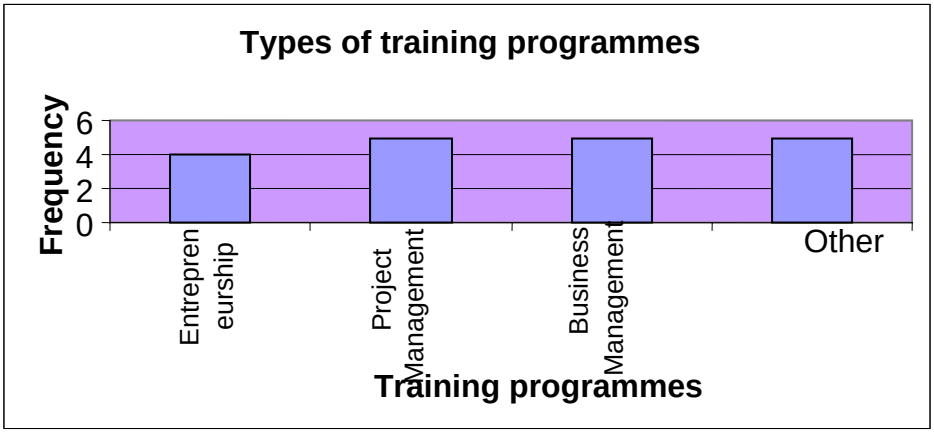


Fig. 26: Illustration of training programme types

14. What are the Entry Criteria employed for tenants

Most incubators have Entry criteria expect for the virtual incubator

(a) Level of education (2)

In only about 20% of the cases is the level of education the determinant for entry into the incubator.

(b) Product/process feasibility (9)

The majority of incubators (about 90%) consider product/process feasibility before allowing tenants into the incubator.

(c) Financial health (1)

Only in about 10% of the incubators is financial health one of the entry criteria.

(d) Previous experience (1)

Only in about 10% of the incubators is previous experience one of the entry criteria.

(e) Others (3) In about 30% of the cases other situations are considered including completion of a specific course; Intellectual Property/Innovation, core team and technology focus.

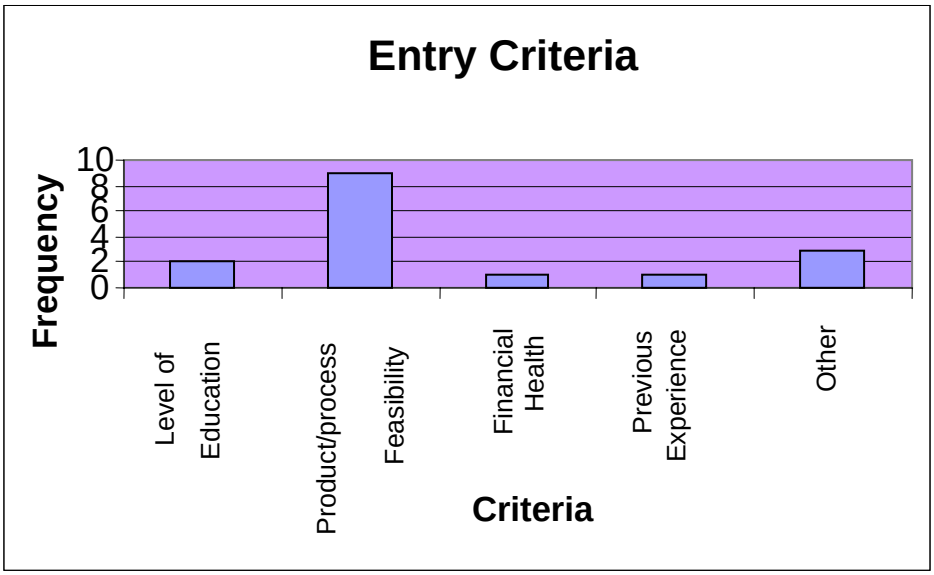


Fig. 27: Illustration of incubator entry criteria

15 What is the involvement of the local community in the project? (7)

In the majority of incubators (about 64%), local communities support incubators in one of several ways:

(a) Support (5)

In about 71% of the cases, local communities support the incubator by buying products from them.

(b) Promotion (3)

In about 43% of the cases, the incubator promotes its products to the local communities.

(c) Marketing (4)

In about 57% the incubator markets its products to the local communities.

(d) Tenants (5)

In about 71% of the cases, local communities serve as tenants the incubators.

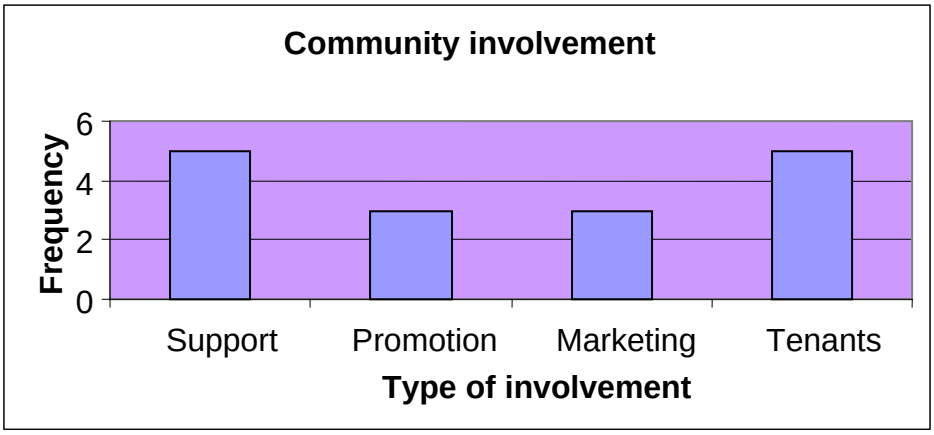


Fig. 28: Illustration of community involvement by type

(iii) OPERATIONS

16. How does the incubator benefit from the tenants? Incubators charge their tenants in one or more of the following ways:

(a)Equity (1)

Only about 9% of the incubators take a stake in their tenants as a way of payment for their services.

(b) Royalties (3)

In only about 27% of the cases tenants pay royalties to incubators

(c) Charge per use (7)

In the majority of cases (about 64%) of the cases, incubators charge tenants per use.

(d) Other (2)

In only about 18% of the cases are other methods used for payment including levy on production and government funds.

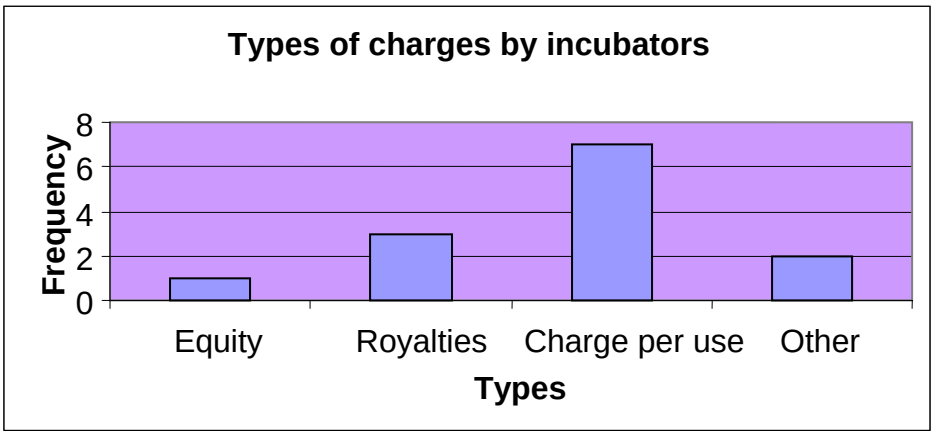


Fig. 29: Illustration of incubator charges by type

17. Does the incubator provide credit facilities to tenants? If yes, what type?

Yes (6)

In about 55% of cases, there is some kind of credit facility provided by the incubator to the tenants.

No (5)

In the remaining 45% of the cases, there are no credit facilities

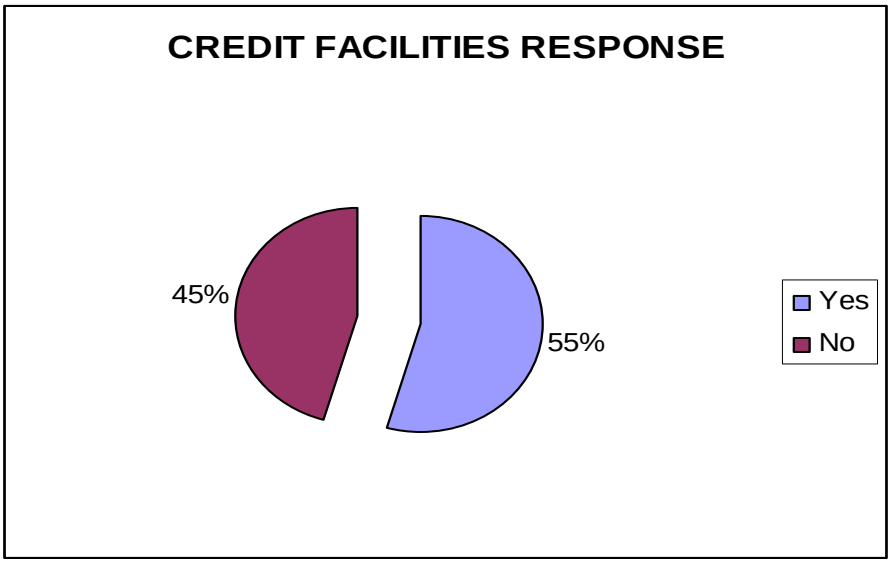


Fig. 30: Illustration of availability of credit facilities in incubators

For those who said yes, the type of credit facilities were as follows:

(a) Revolving credit loans (4)

Among those incubators that provide credit facilities, revolving credit is the most popular type of credit facility (67%)

(b) Bank guarantees (0)

None of the incubators provide bank guarantees to their tenants

(c) Long-term loans (0)

None of the incubators provide long-term loans to their tenants.

(d) Other (2).

In 33% of the cases, other forms of credit are provided including supply of material on credit; facilitation of loan applications from other institutions, selling tools to tenants interest free over 24 months and giving them equipment loans.

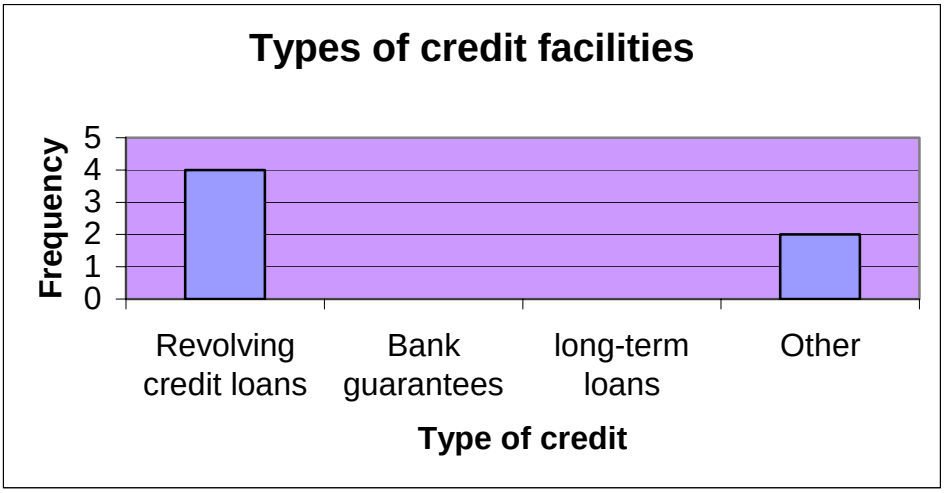


Fig. 31: Illustration of credit facilities by type

18. What is the role of large private sector companies or associations in the incubator?

In most incubators (about 73%) the incubators work with private sector in one way or another. The remaining incubators (about 27%) there is no private sector collaboration.

(a) Subcontracting (4)

In 50% of the cases, the interaction with private is through subcontracting.

(b) Funding (training etc) (2)

In about 25% private sector partially funds the incubator.

(c) Employing some graduates (3)

In about 33% of the cases private sector employs some of the graduates from the incubators.

(d) Other (2)

In another 25% of the incubators private sector has other roles to play including mentoring and in-kind contributions.

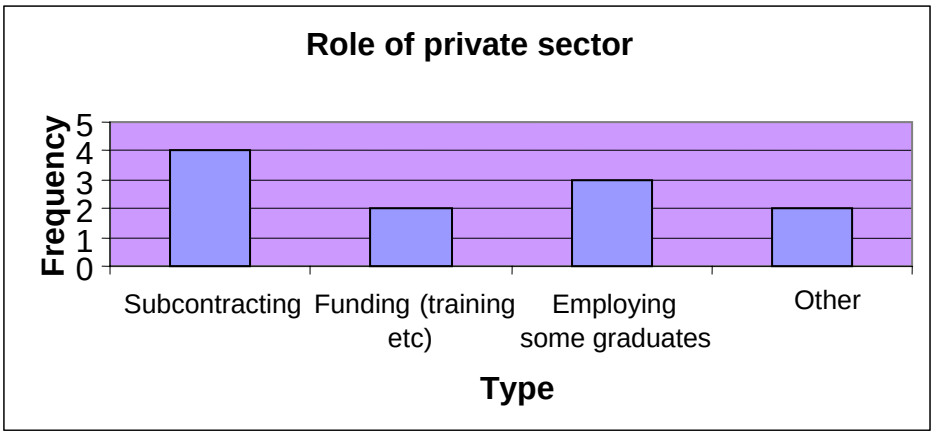


Fig. 32:Illustration of private sector involvement by type

19. Does the incubator have networking partners?

Yes (9) In the majority of cases (about 82%) incubators do have networking partners

No (2) The remaining incubators (about 18%) do not have networking partners.

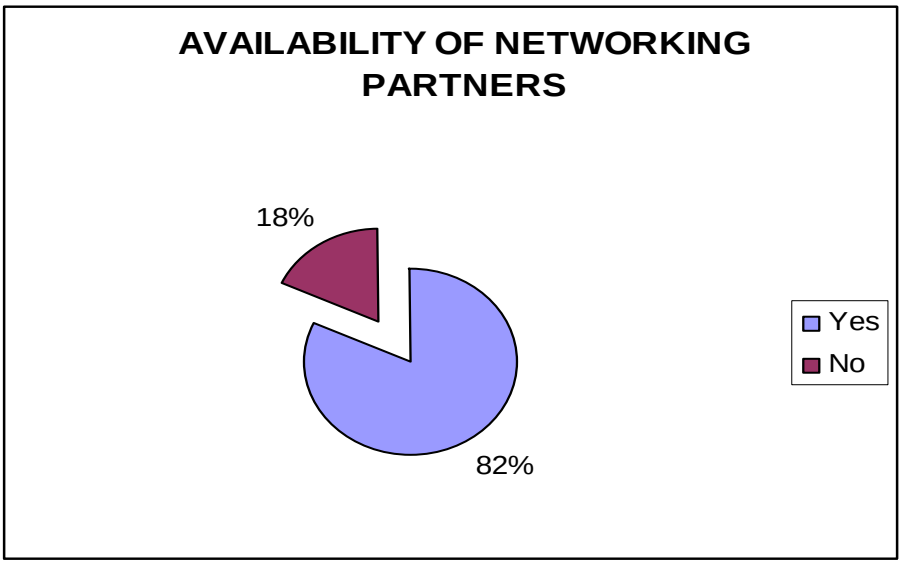


Fig. 33: Illustration of availability of networking partners for incubators

If yes are they from:

(a) Private Sector? (6)

In cases where the answer was "yes", about 67% of the incubators network with private sector.

(b) Other incubators? (8)

In the majority of cases, about 89% of the incubators network with other incubators

(c) International communities? (4)

In about 44% of the cases where the answer was "yes", the incubators network with international communities.

(d) Local communities? (3)

In about 33% of the cases where the answer was "yes", the incubators network with local communities.

(f) Other? (2)

In about 22% of the incubators networking is with other partners including tertiary institutions and parastatals.

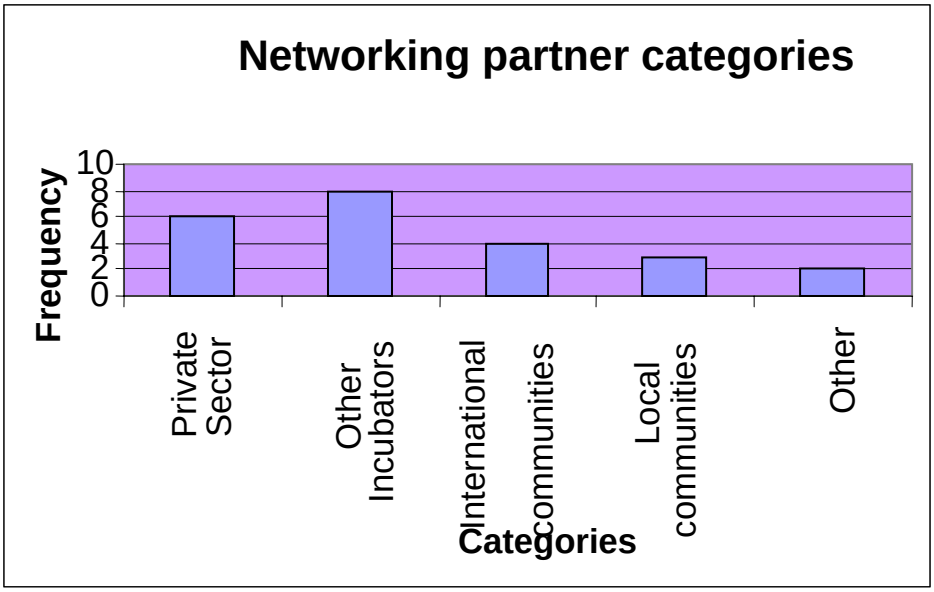


Fig.34: Illustration of networking partners by category

20. Is the incubator a member of incubation associations?

Yes (10)

In about 91% of the cases, incubators do belong to one or more incubator association(s)

No (1) In only about 9% of the cases, an incubator does not belong to an association.

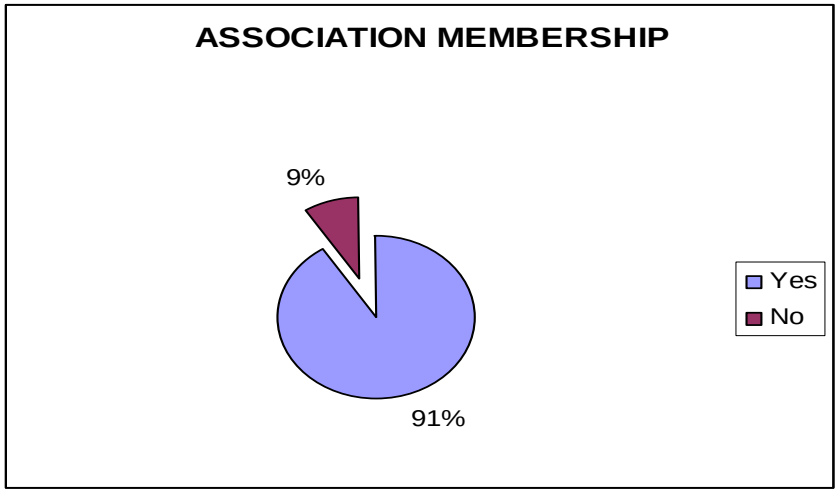


Fig. 35: Illustration of incubator association membership

If Yes, are they:

(a) Local? (10)

All the incubators (100 %(that responded yes to the question belong to the local incubation association

(b) International? (2)

Only 20% of the incubators also belong to an international incubation association.

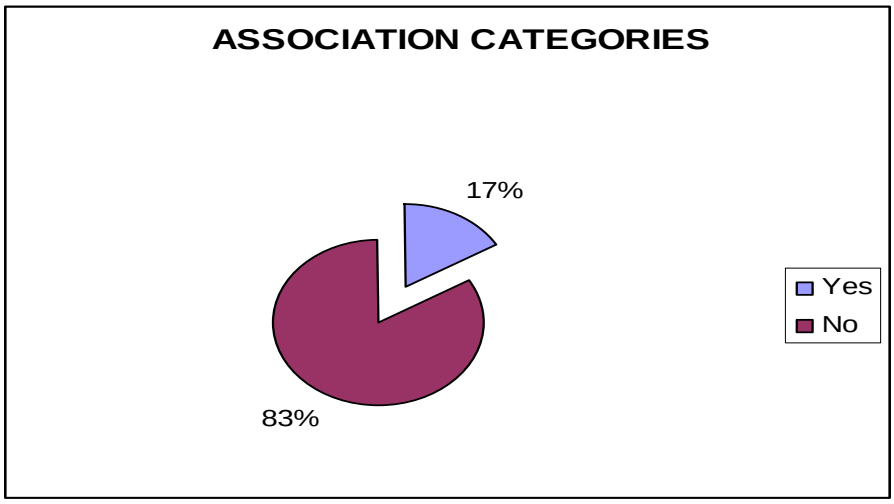


Fig. 36: Illustration of association membership type

21. Number of entrepreneurs in training: On average, 121 entrepreneurs are undergoing training in eight incubators. The other three incubators do not offer training as such.

The highest number of trainees is seven hundred (700) in one incubator and the least is two(2). In total, the incubators offer training to eight hundred and forty seven (847) entrepreneurs.

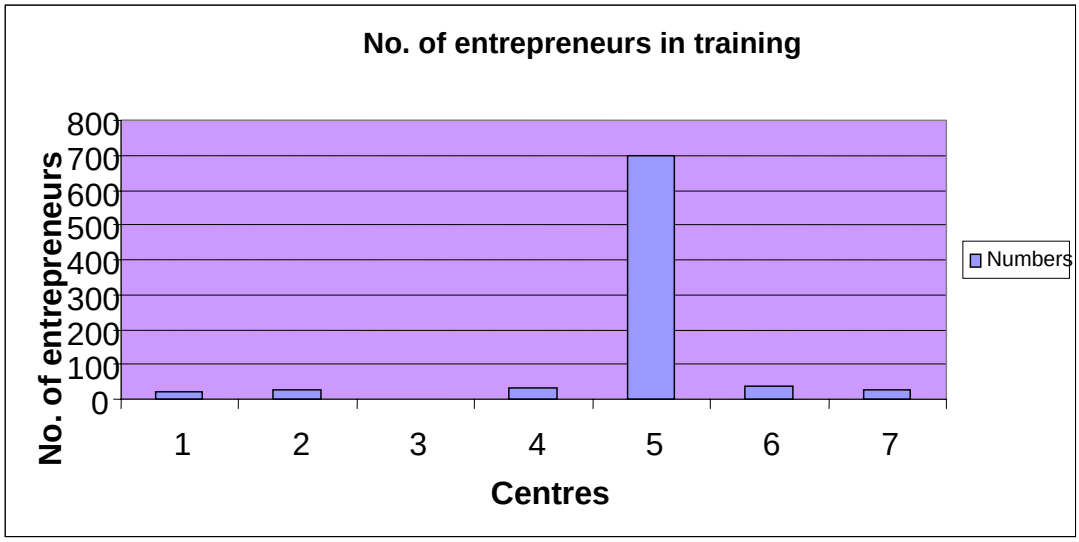


Fig. 37: Illustration of entrepreneurs in training per centre

22. Number of entrepreneurs in incubation: On average, there are eighteen (18) entrepreneurs in incubation in all the incubators. The highest number of incubatees is 62 in one centre and the least is 3. In total, the incubators are incubating one hundred and eighty two (182) entrepreneurs.

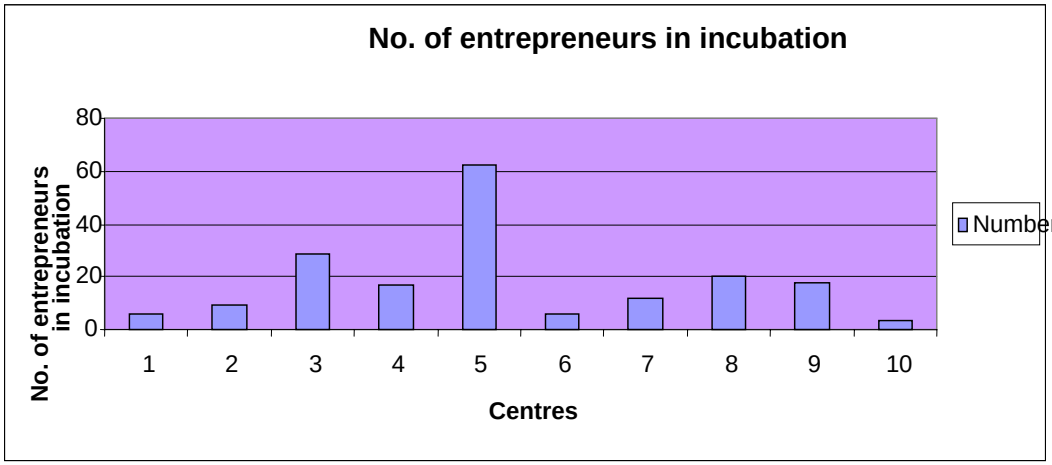


Fig. 38: Illustration of entrepreneurs in training per centre

23. No. of entrepreneurs graduated: Graduation has only taken place in seven centres. On average, five (5) entrepreneurs have graduated from the centres. The centre with the

highest graduates had graduated eleven (11) entrepreneurs and the least had not graduated any entrepreneurs. In total, incubators have graduated forty six (46) entrepreneurs.

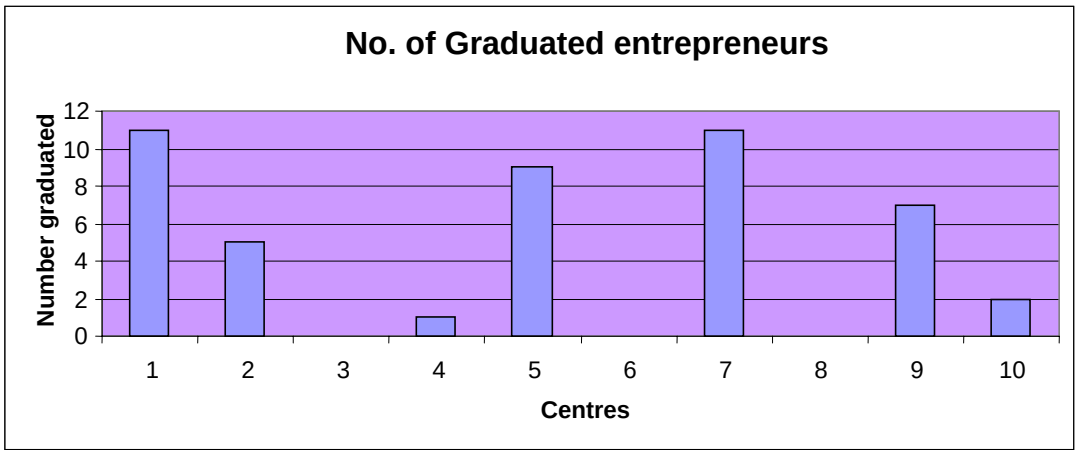


Fig. 39: Illustration of graduated entrepreneurs per centre

24. No. of entrepreneurs completed courses: In the centres where training is offered, an average of eighteen (18) entrepreneurs have completed the training. The centre with the highest number has forty five (45) and the least has three (3).

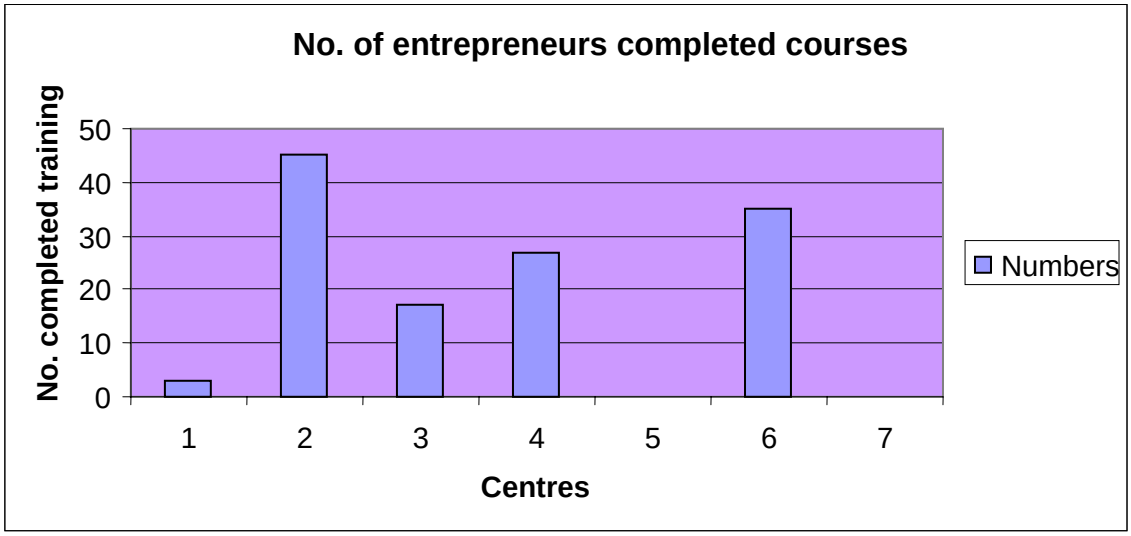


Fig. 40: Illustration of trained entrepreneurs per centre

25. Sales generated by entrepreneurs: On average, entrepreneurs from seven centres have generated sales of R702, 000, with the maximum being R3, 000,000 and the minimum being R60, 000.

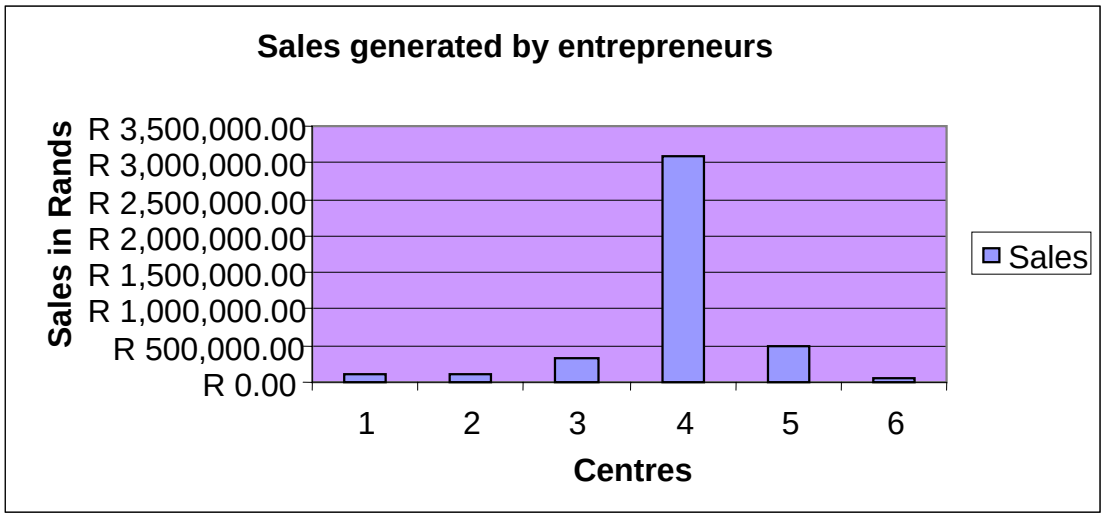


Fig. 41: Illustration of sales generated per centre

26. Number of jobs created by entrepreneurs while in the incubator: On average, the entrepreneurs from all incubators have created 24 jobs while incubated, with the maximum being eighty seven (87) and the minimum being zero (0).

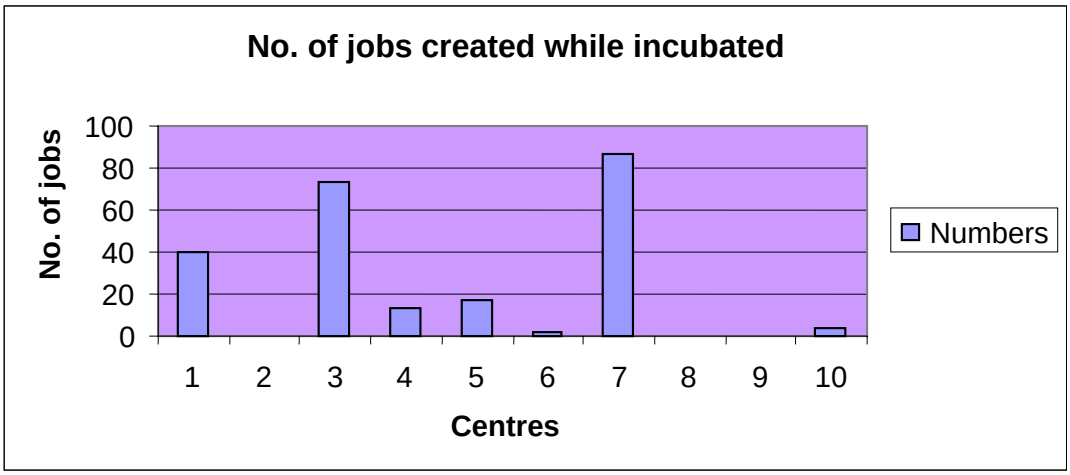


Fig. 42: Illustration of jobs created per centre

27. Number of jobs created after graduating: After graduation, entrepreneurs have created an average of ninety seven (97) jobs, with the maximum being seven hundred (700) and the minimum being zero (0).

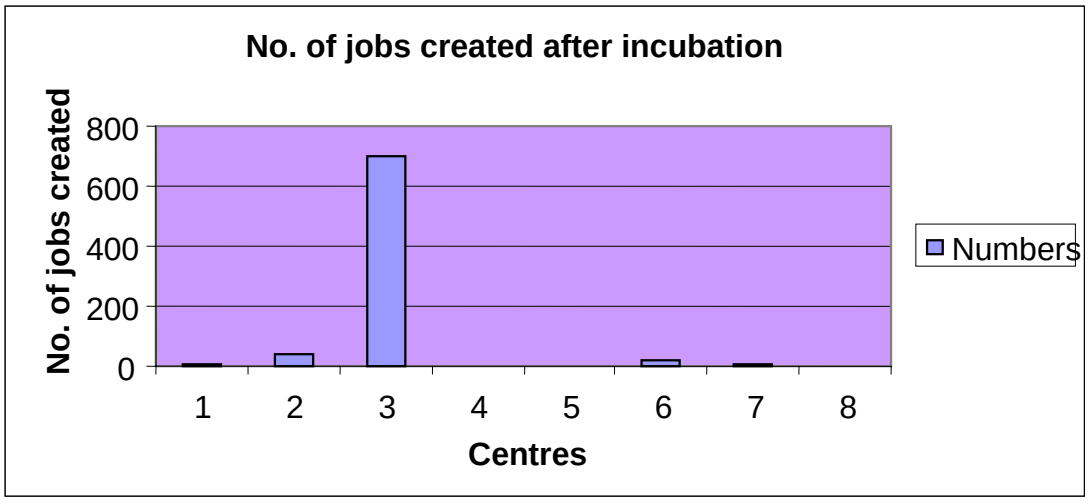


Fig. 43: Illustration of jobs created after incubation

(iv) SUSTAINABILITY

28. What are the main markets for incubator products?

(a) Local (10)

In about 91% of the incubators, the main markets are local (within South Africa).

(b) Export (2)

In about 18% of the incubators, main markets are export.

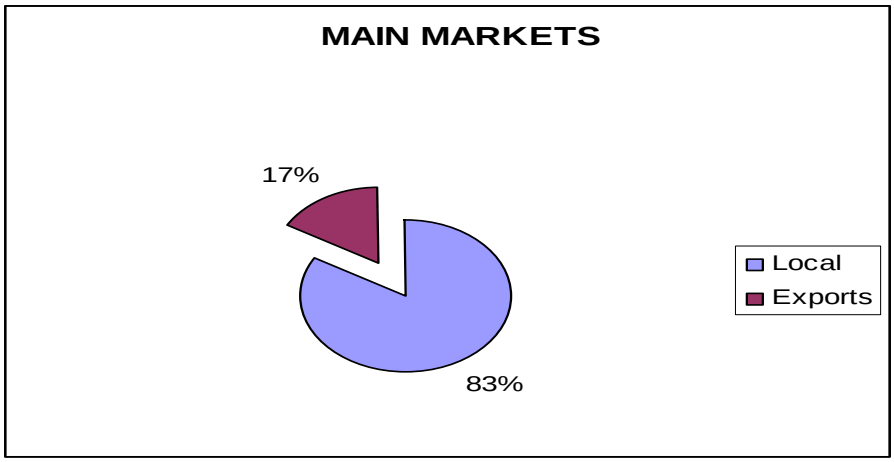


Fig. 44: Illustration of incubator main markets

29. Sales generated by the incubator since inception: The average sales for incubators was R1,331,000 with the maximum being R4,050,000 and the minimum being R30,000.

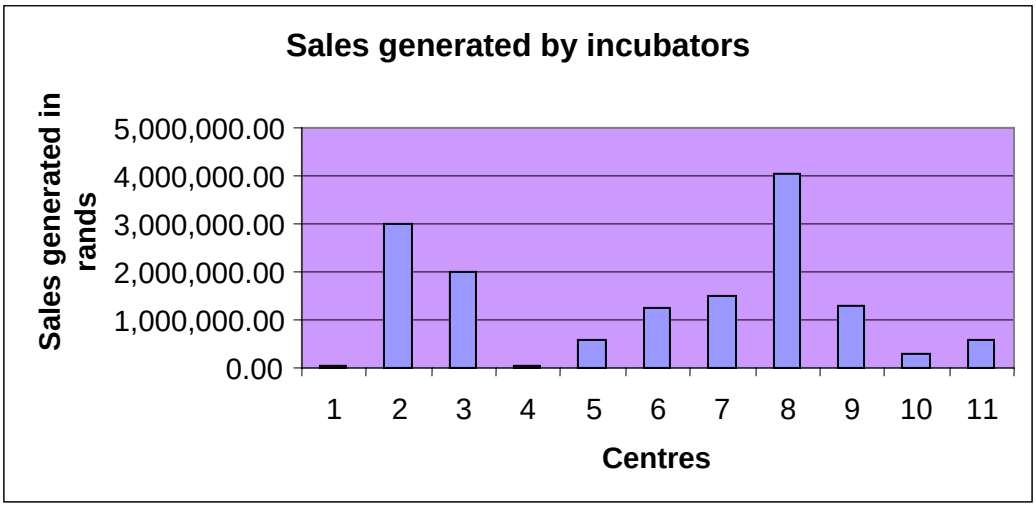


Fig. 45: Illustration of sales generated by incubators

30. What are the plans for future financial sustainability of the incubator?

(a) Donor funding (6)

About 55% of the incubators believe that they will obtain donor funding to ensure sustainability.

(b) Continued government subsidy (6)

Yet another 55% believes that they will obtain government subsidy continuously to survive.

(c) Private Sector Funds (6)

Another 55% believe that they will utilize private sector funds for sustainability.

(e) Other (3)

About 27% of the incubators will utilize other methods including increase in machining incoming by providing a service to cluster members and local businesses; Skills Development Fund; sale of products and training.

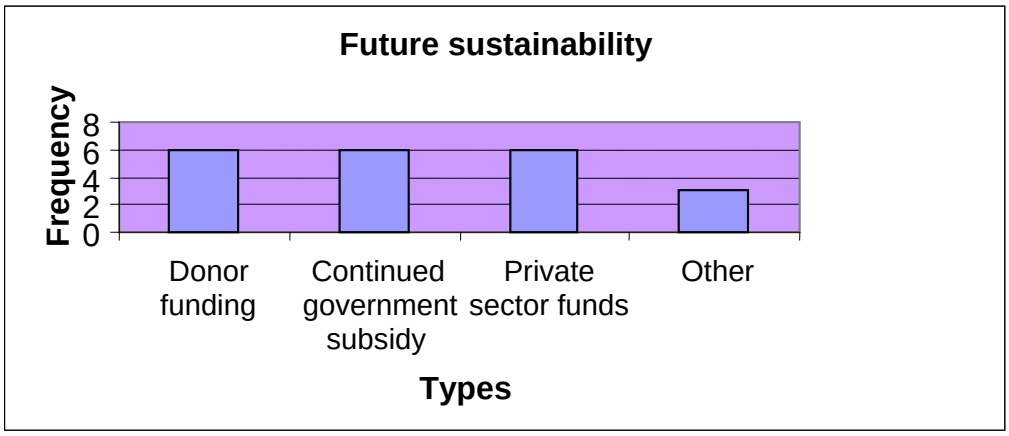


Fig. 46: Illustration of type of future sustainability plans

5.2.3 Entrepreneurs

Of the expected sixty (60) entrepreneurs (i.e. five entrepreneurs per centre), only twenty six (26) responded implying a response level of forty three percent (43%). One centre gave an explanation that it was difficult for them to interact with entrepreneurs since it is a virtual incubator. Yet another centre is not really an incubator but a demonstration centre. Some of the centres could not get hold of five entrepreneurs, therefore the numbers per centre varied from zero to five, with an average of two per centre. Other centres were still trying to get hold of their entrepreneurs. This also implies that the validation of the hypothesis in terms of entrepreneurs will only concentrate on available data.

The method that was used in most cases is that of sending the questionnaires to the incubator manager, who then in turn was to pass on the questionnaires to incubatees. Some incubatees that participated had telephonic interviews with the researcher while others just completed the questionnaires and sent them to the researcher.

The questionnaire was divided into two sections. The first section was dealing with the entrepreneur him/herself and the second one was dealing with the business of the entrepreneur.

Responses can be summarized as follows:

A. ENTREPRENEUR

1. Please select your Education level before incubation/training:

(a) Below Matric (0)

None of the entrepreneurs who responded had a level of education below Matric

(b) Matric (13)

The majority (50%) of entrepreneurs entered the incubators with a Matric qualification.

(c) University/Technikon Graduate (9)

About 35% of the entrepreneurs were University Graduates when they entered the incubators.

(d) Other (4)

About 15% of entrepreneurs had other qualifications besides the above-mentioned including N4, N5 and NTC III

This can be demonstrated graphically as follows:

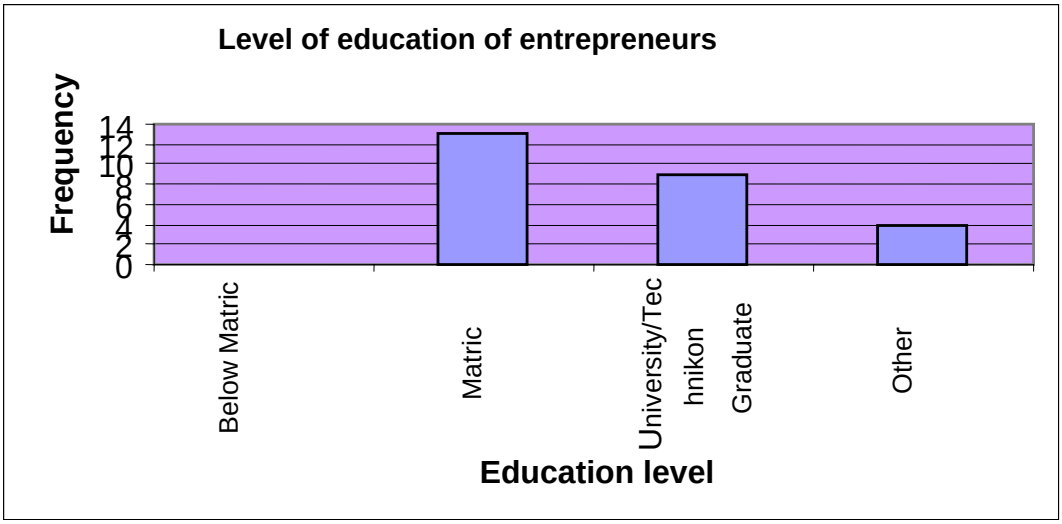


Fig. 47: Illustration of educational levels of entrepreneurs

2. Did you have any previous knowledge on the product/Course. Yes/No. If Yes, what category?

Yes (14) About 53% of incubatees had prior knowledge of the product

No (12) The remaining 47% did not have any prior knowledge of the product.

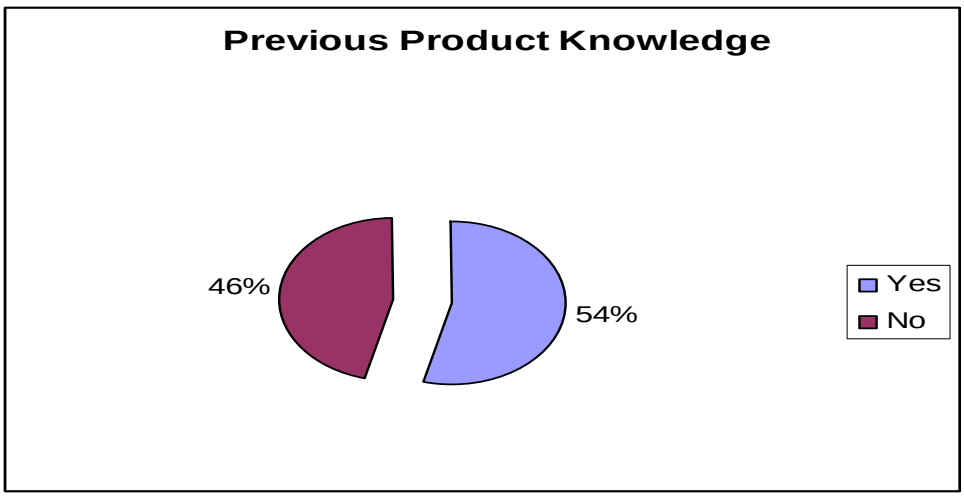


Fig. 48: Illustration of previous product knowledge by entrepreneurs

(a) Technical (10)

About 71% of the entrepreneurs who replied yes to the question indicated that they have previous technical knowledge of the product/Course.

(b) Business (5)

About 36% of the entrepreneurs have previous business knowledge of the product/ Course.

(c) Marketing (6)

About 43% of the entrepreneurs have previous Marketing knowledge of the product/Course

(d) Distribution (4)

About 29% of the entrepreneurs have previous Distribution knowledge of the product/Course

(e) Other (0) There was no other prior knowledge cited.

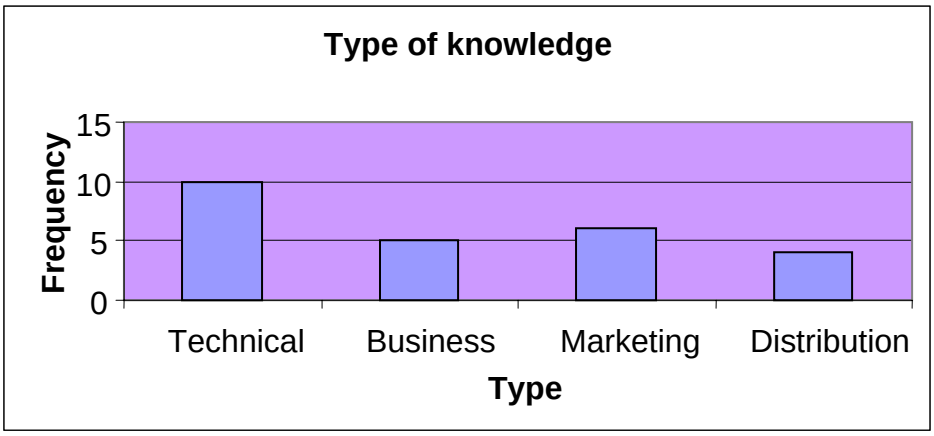


Fig. 49: Illustration of product knowledge by type

3. Did you have any previous experience on the products/processes? Yes/No.

Yes (14)

No (12)

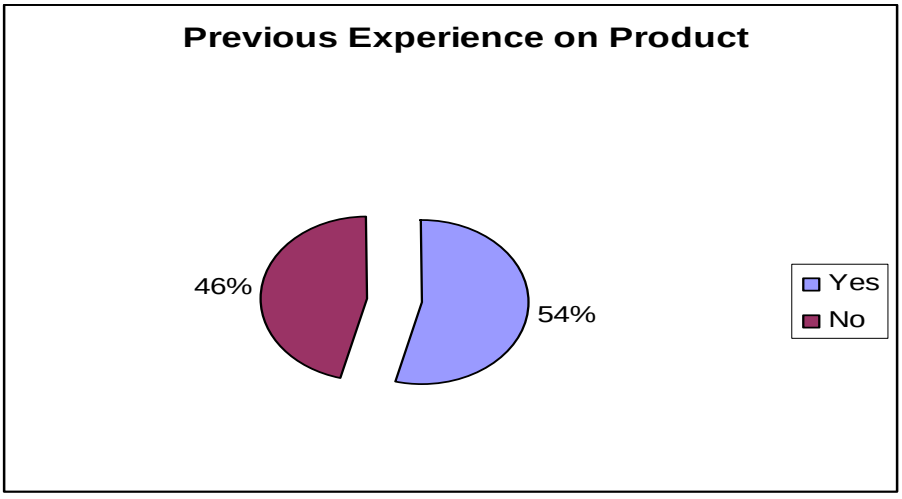


Fig. 50: Illustration of previous product experience by entrepreneurs

If Yes, what category?

(a) Technical (10)

About 71% of the entrepreneurs who answered yes indicated that they have technical experience with the product/Course

(b) Business (2)

About 14% of the entrepreneurs indicated previous business experience of the product/Course

(c) Marketing (3)

About 21%of the entrepreneurs indicated previous Marketing experience of the product/Course

(d) Distribution (3)

Yet another 21% had Distribution experience

(e) Other (1)

Only about 7% had other experience including fabrication experience.

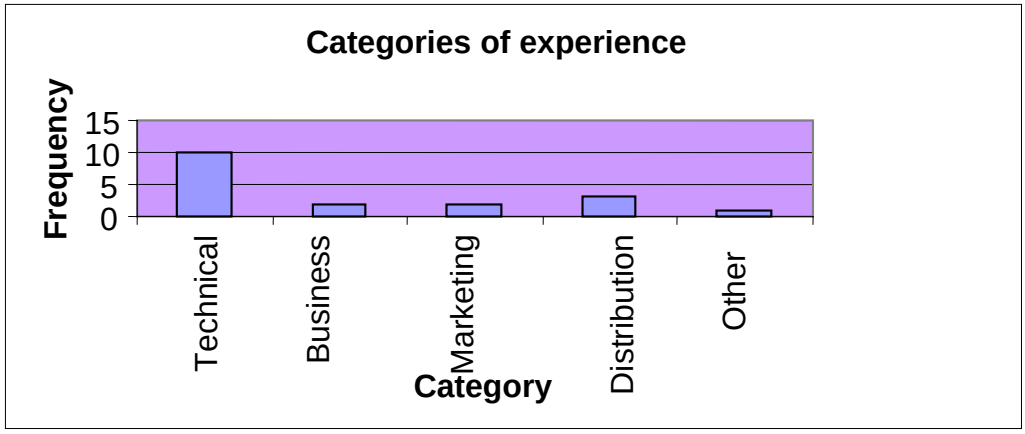


Fig. 51: Illustration of product experience by type

4. What was your family background?

(a) Wealthy family (1)

Only about 4% of the entrepreneurs come from a wealthy family

(b) Average family (18)

The majority (about 69%) of the entrepreneurs come from an average family background.

(c) Poor family (5)

Only about 19% of the entrepreneurs come from a poor family background.

(d) Educated family (3)

Only about 12% of the entrepreneurs come from an educated family background.

(e) Uneducated family (2)

Only about 8% of the entrepreneurs come from an uneducated family background.

(f) Other (0)

None of the entrepreneurs come from any other family background.

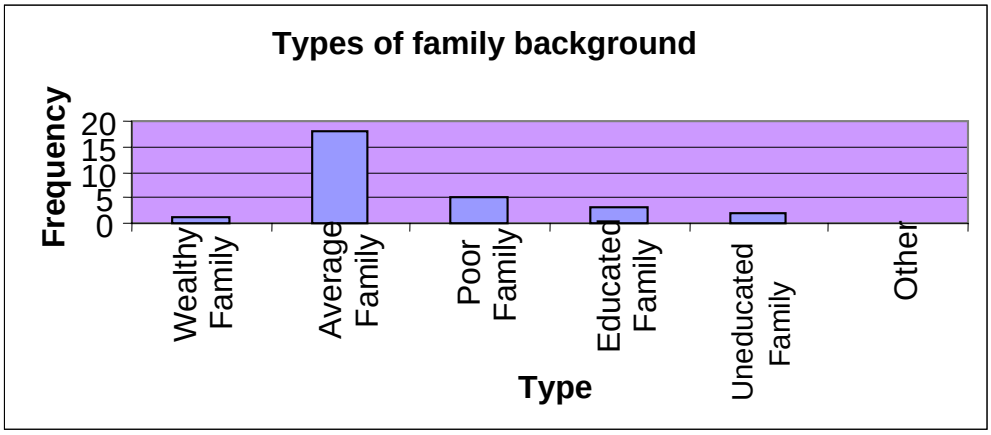


Fig. 52: Illustration of types of family background

5. Who motivated you to join the incubator?

(a) Family (1)

Family seems to play the least role in motivating incubatees/entrepreneurs (about 4%)

(b) Own drive (18)

The majority of entrepreneurs (about 69%) enter the incubators out of their own drive.

(c) Incubator Management (8)

About 31% of the entrepreneurs were motivated by the incubator management to join the incubator

(d) Other (3)

Other sources of motivation (about 12%) include a friend; fellow students and mentors; and an advert in the newspaper.

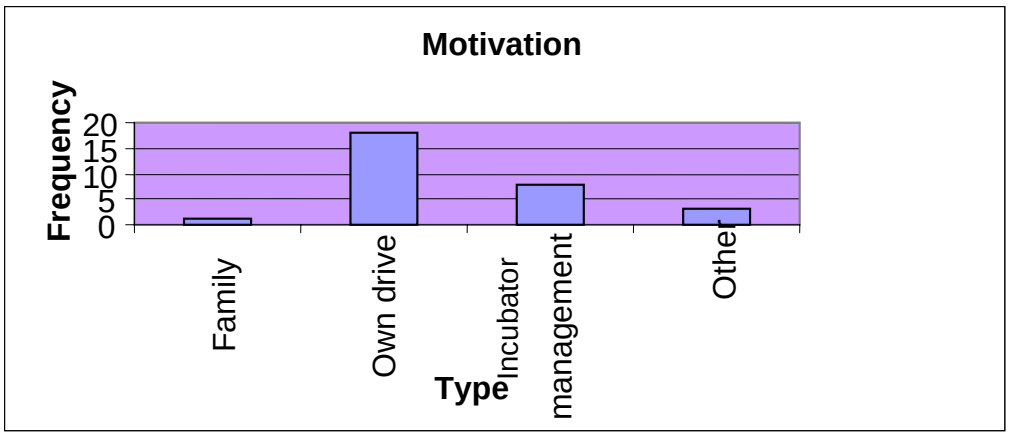


Fig. 53: Illustration of motivation by type

6. What was your employment status before incubation/training?

(a) Employed (14). This category also includes self-employment.

About 54% of the incubatees/trainees were employed before joining the incubator.

(b) Unemployed (5)

About 19% of entrepreneurs were unemployed before joining the incubator

(c) At school (3)

About 12% of entrepreneurs were fresh from school

(d) Other (3)

The rest (another 12%) were doing other activities rather than the ones listed above.

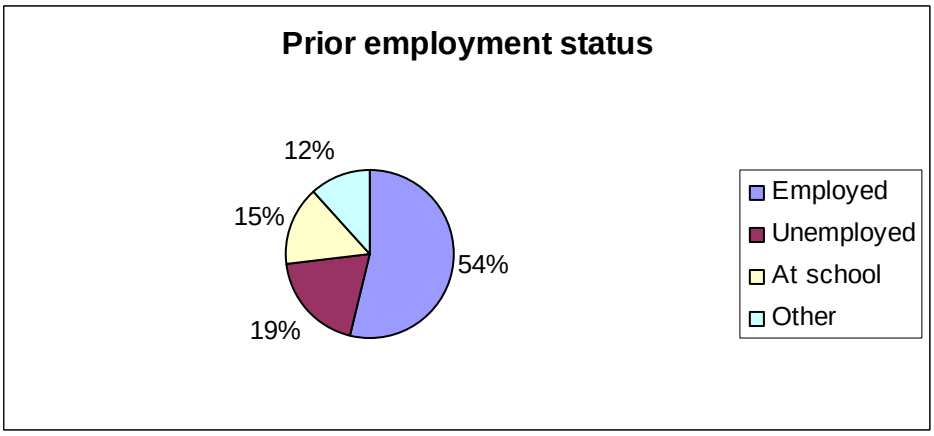


Fig. 54: Illustration of employment status prior to incubation

7. If applicable, what is your employment status after incubation/training?

Applicable (15)

Fifteen of the interviewees had already graduated from the incubators

Not applicable (11)

(a) Employed (14)

The majority (93%) of the entrepreneurs that have already gone out of incubators are employed (majority self-employed)

(b)Unemployed (1) - The remaining 7% is still unemployed after incubation

(c) At school (0)

None went back to school after incubation.

(d) Other (0)

None had any other activities except the ones listed above.

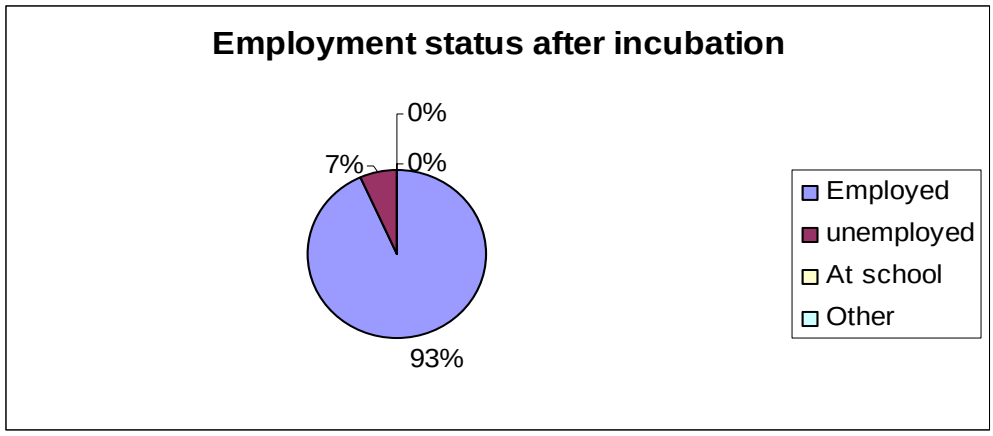


Fig. 55: Illustration of employment status after incubation

B. THE BUSINESS

8. What is the legal status of your business?

(a) Close corporation (20)

CC's (77%of entrepreneurs have registered CC's) are the most preferred types of entities due to the easiness in registration

(b) Pty Limited (3)

12% are Pty Limited.

(c) Section 21 (0)

None are section 21.

(d) Other (2); not yet registered

The rest (about 11%) have not yet registered.

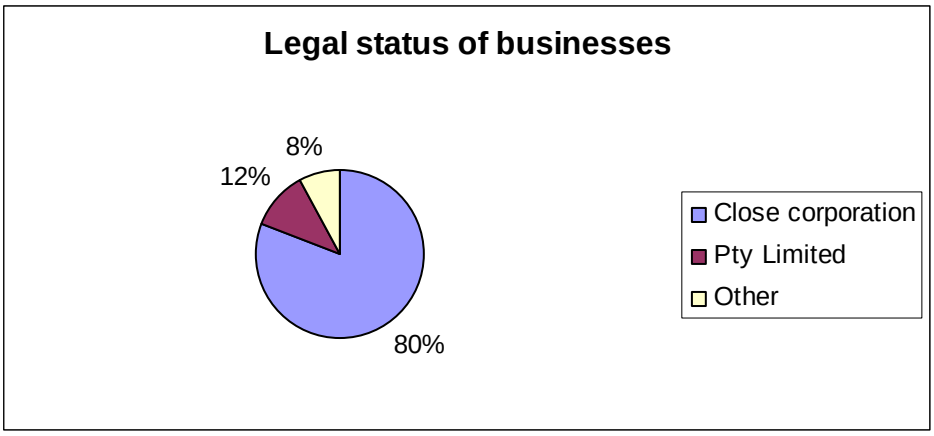


Fig. 56: Illustration of legal entities employed by entrepreneurs

9. Where did you obtain your initial capital?

(a) Family (6)

About 23% of the entrepreneurs obtained their initial capital from family

(b) Bank loans (1)

Only about 4% of entrepreneurs received loans from banks as their initial capital.

(c) Government grants (0)

None of the entrepreneurs have ever accessed any government grants. One indicated that they are still trying DTI grants.

(d) Other (19)

The majority of entrepreneurs (about 73%%) used other means rather than the ones mentioned above to obtain initial capital including development loans; self-funding; no starting capital, incubator loans; selling service; own investment and funding from parent company.

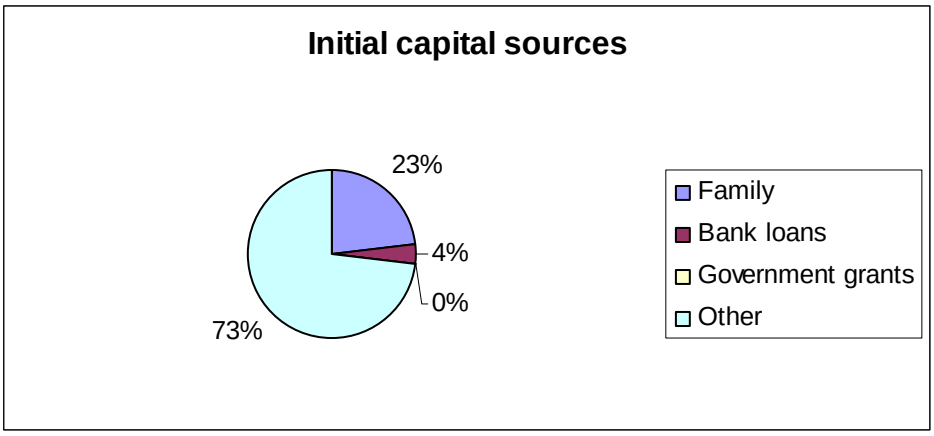


Fig. 57: Illustration of initial capital sources for entrepreneurs

10. Presently, do you have any access to grants and loans? If Yes, what types?

Yes (15)

The majority of entrepreneurs (about 58%?) do have access to loans and grants

No (11) The remaining 42% do not have.

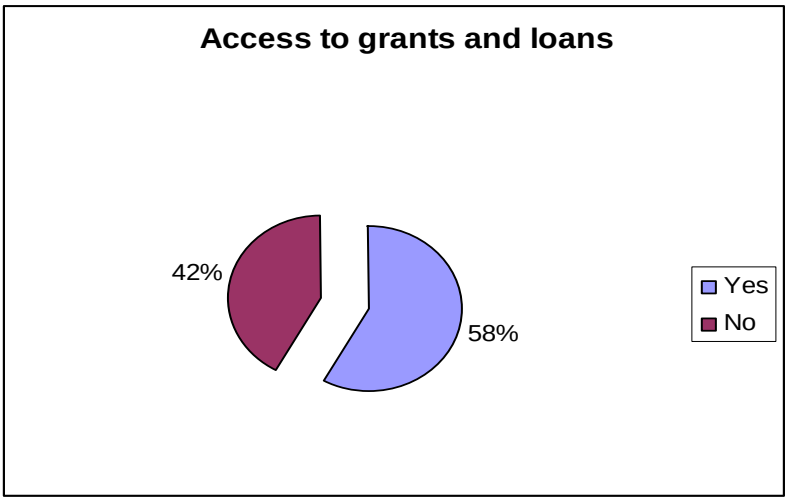


Fig. 58: Illustration of access to capital for entrepreneurs

(a) Government grants (2)

About 12% of the entrepreneurs have access to government grants

(b) Bank loans (1)

About 6% have access to bank loans

(c) Revolving credit from incubator (13)

The majority of entrepreneurs (about 76%) have access to the incubator revolving credit.

(d) Equity/venture capital (1)

In only 6% of the cases are entrepreneurs making use of equity/venture capital.

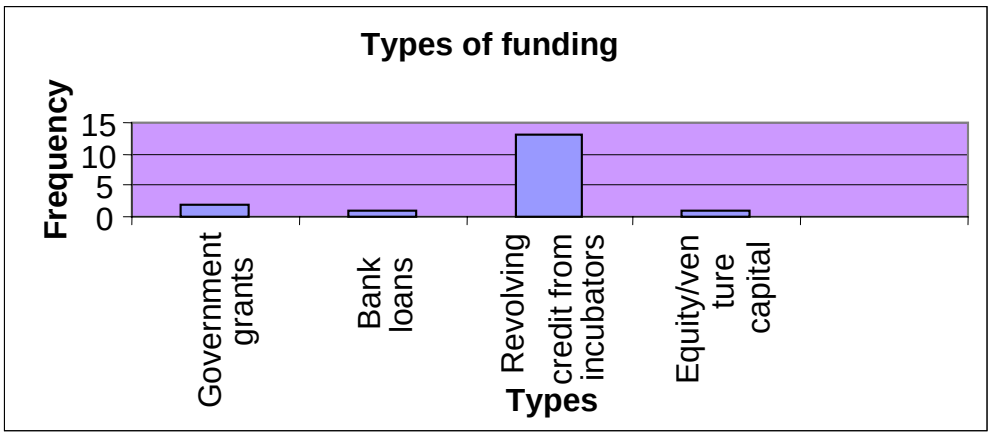


Fig. 59: Illustration of types of capital accessed by entrepreneurs

11. Are you involved with large private sector companies? Yes/No.

Yes (8)

In about 31% of the situations, entrepreneurs are working with large private sector companies

No (18)

In the majority of cases (69%), these companies do not play any role.

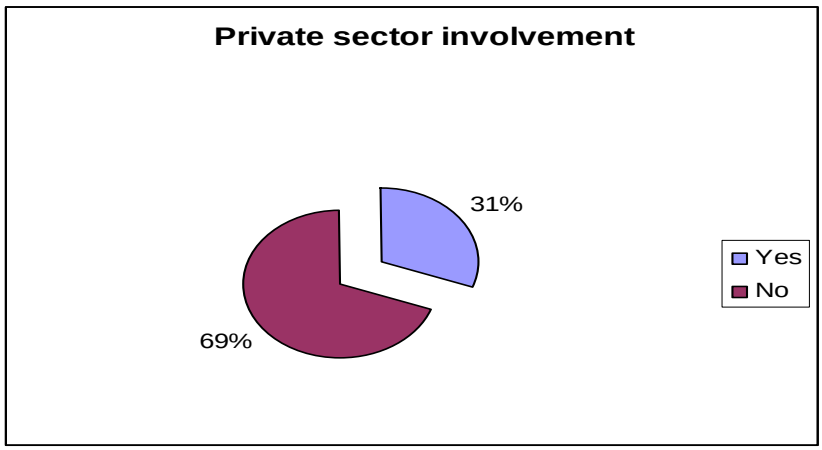


Fig. 60: Illustration of private sector involvement for entrepreneurs

If Yes, how?

(a) sub-contracting (7)

Where the answer is yes the majority of entrepreneurs (about 87%) serve as sub-contractors to the large companies.

(b) Partial funding

(c) Equity

(d) Other (1)

In the remaining 13% entrepreneurs benefit selling products to large private sector companies.

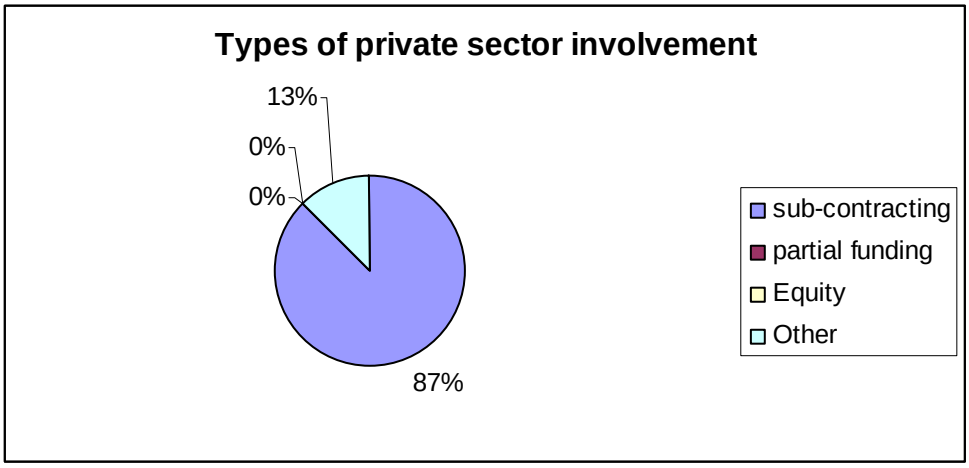


Fig. 61: Illustration of types of private sector involvement

12. Where are your main customers located?

(a) Local (22)

The majority of customers for entrepreneurs (about 85%) are located in South Africa.

(b) Abroad (4)

The rest (15%) are located internationally including Africa

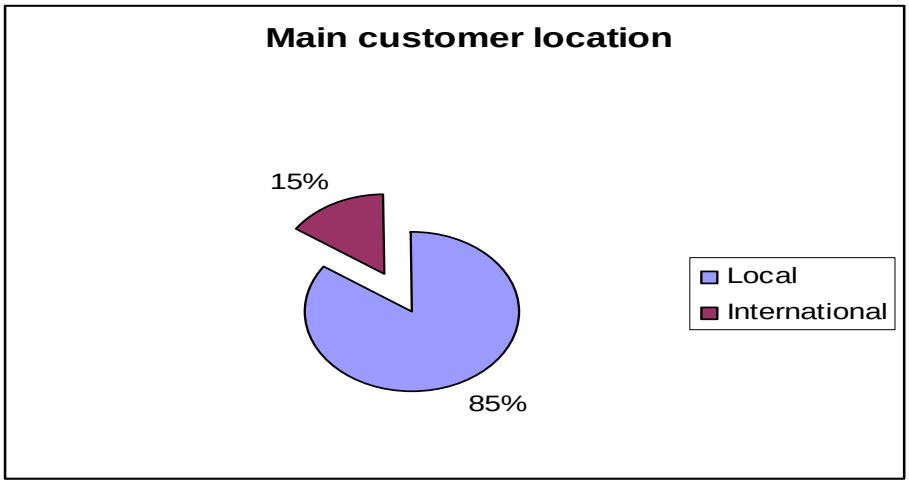


Fig. 62: Illustration of main customer location for entrepreneurs

13. Are you utilising /do you envisage utilising incubator consulting after graduation?

Yes (18)

No (8)

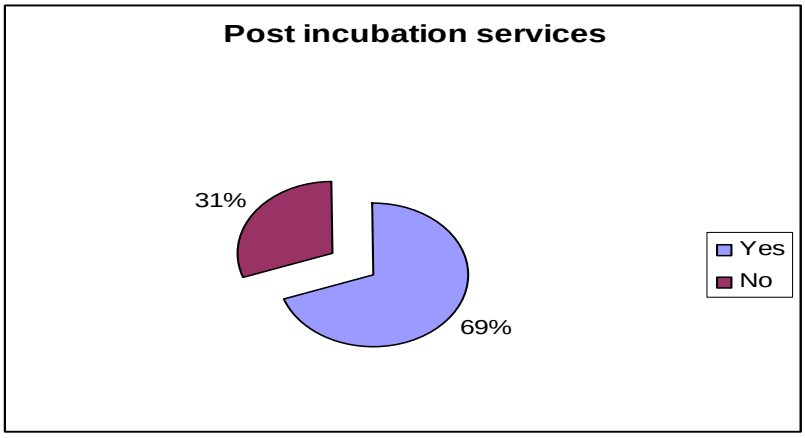


Fig. 63: Illustration of post-incubation services availability

Yes/No. If Yes, which services?

(a) Demonstration 7

About 39% of the entrepreneurs will utilize demonstration services from the incubators

(b) Further training 12

About 67% will utilize training services from the incubators

(c) Partial space for your employees 7

About 39% will utilize incubators to obtain partial space for their employees

(d) Other (5);

Other services (28%) include Marketing; Business Linkages; subcontracting tenants; networking and use of machines.

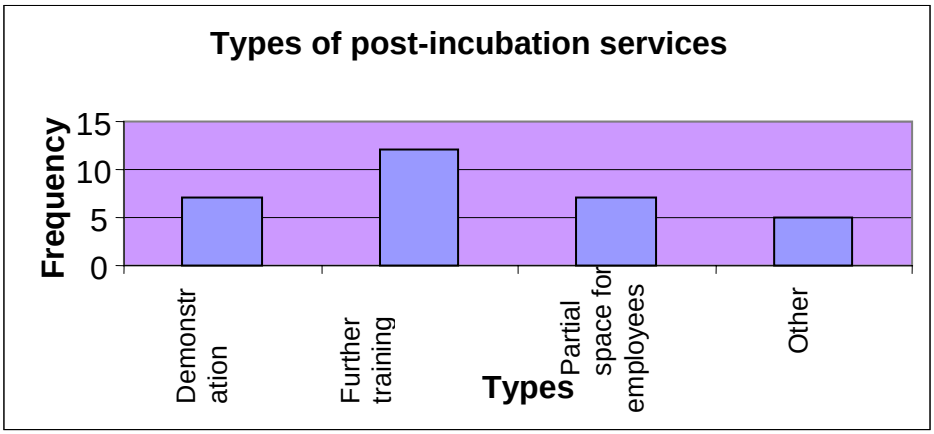


Fig. 64: Illustration of post-incubation services by type

Since the raw data had a lot of overlaps, it was necessary to recode the data in order to deal with both the independent and dependent variables (success factors and success respectively).

5.3. Data Analysis

5.3.1. Descriptive statistics relating to the success factors

Questions relating to the success factors were recoded in order to establish the relation of the said factors to incubators.

5.3.1.1.Proximity to the University/research park

Questions 6, 7 and 10 of the Incubator/Centre Manager questionnaire were in combination, related to this success factor. After recoding the following were the results:

Code	Response	Frequency
101	Yes	7
102	No	4

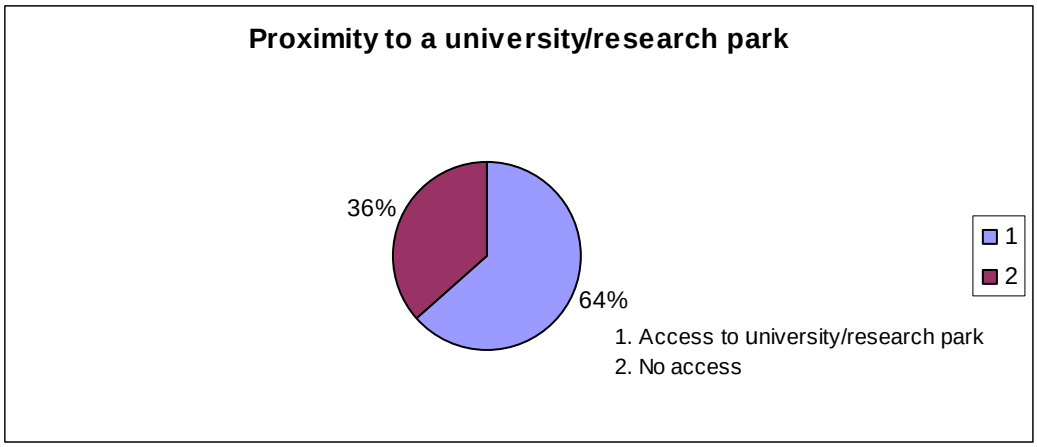


Fig. 65: Illustration of proximity to university by incubators

5.3.1.2. Feasibility study

Question 8 of the Incubator Manager Questionnaire referred to this success factor and the results as follows:

Code	Response	Frequency
201	Yes	2
202	No	9

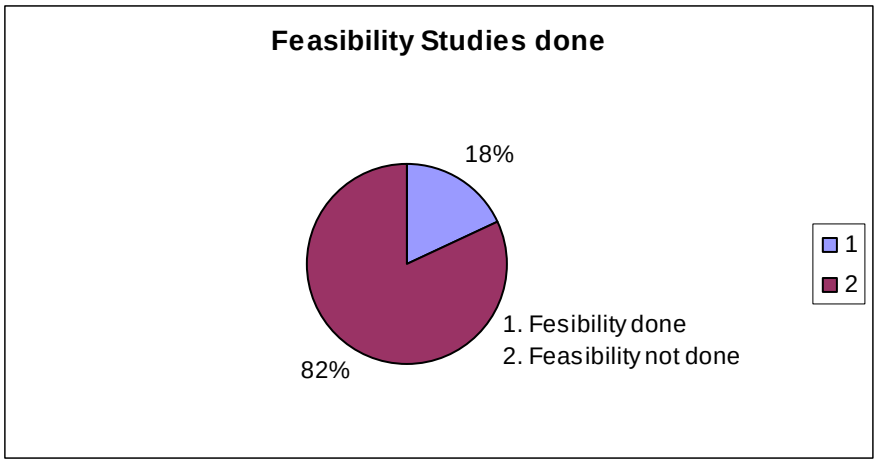


Fig. 66: Illustration of availability of feasibility study in incubators

5.3.1.3 Stringent selection criteria

Question 14 of the incubator/centre manager questionnaire refers to this success factor and after recoding the following was discovered:

Code	Response	Frequency
301	Highly stringent	3
302	Not so stringent	8

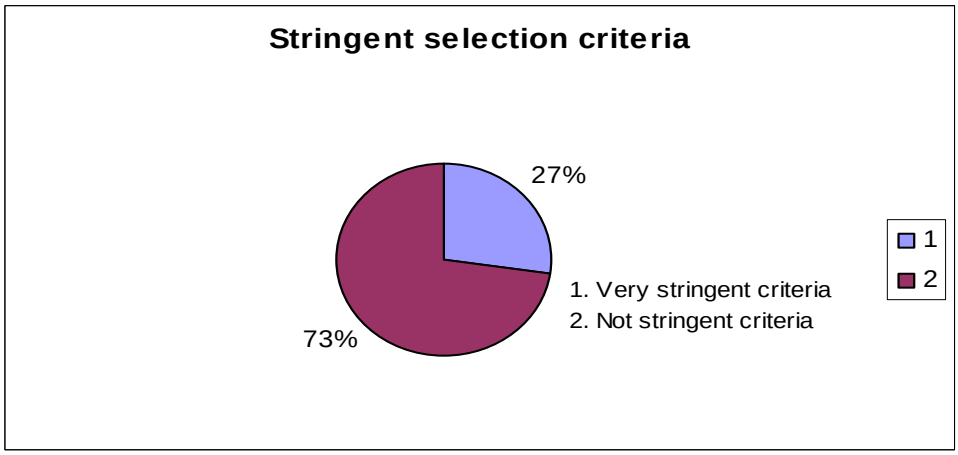


Fig. 67: Illustration of selection criteria levels in incubators

5.3.1.4. Availability of funding for incubators and incubatees

Question 17 of the incubator manager questionnaire and question 10 of the entrepreneur questionnaire addressed this success factor.

Incubators provide:

Code	Response	Frequency
4010	Incubators provide	6
4020	Not provide	5

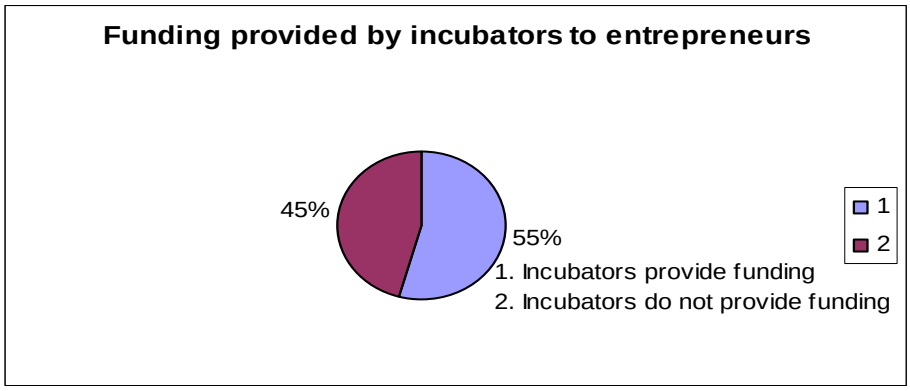


Fig. 68: Illustration of availability of funding in incubators

Incubatees have access to funding

Code	Response	Frequency
4011	Have access	15
4021	Do not have access	11

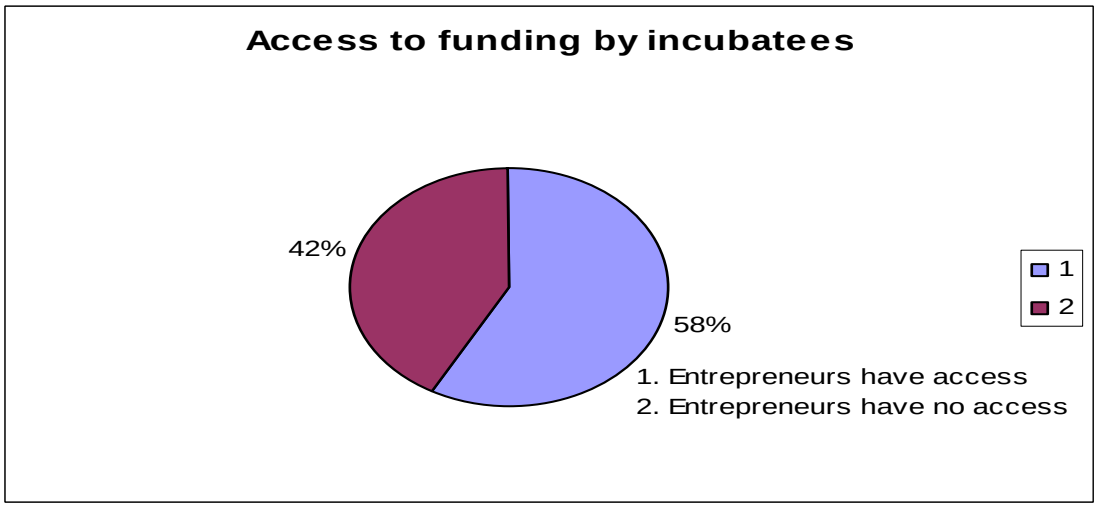


Fig. 69: Illustration of access to funding by entrepreneurs

5.3.1.5. Quality of entrepreneurs

Questions 1 - 5 of the entrepreneur questionnaire addressed this success factor.

Level of knowledge and experience;

Code	Response	Frequency
5011	High	4
5021	Average	12
5031	None	10

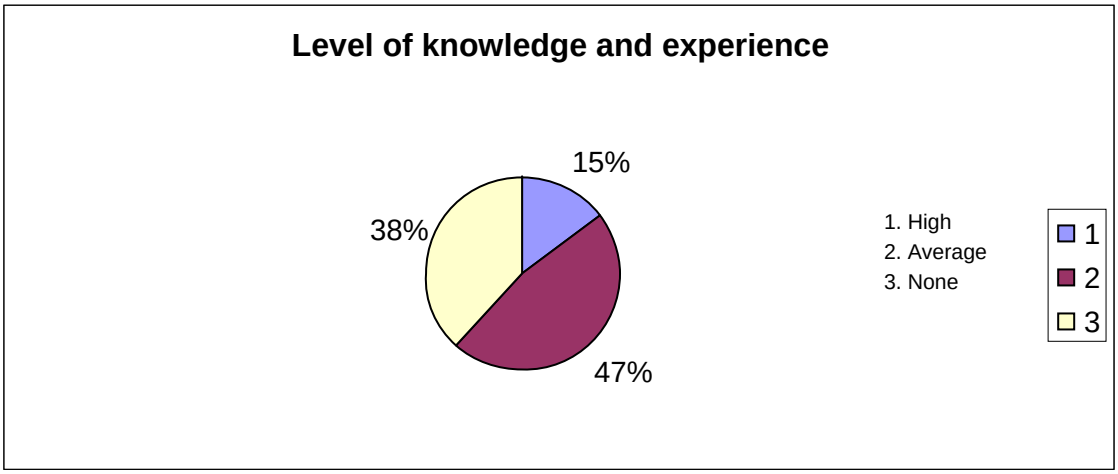


Fig. 70: Illustration of knowledge and experience levels

Motivation;

Code	Response	Frequency
5012	Internal	17
5022	External	9

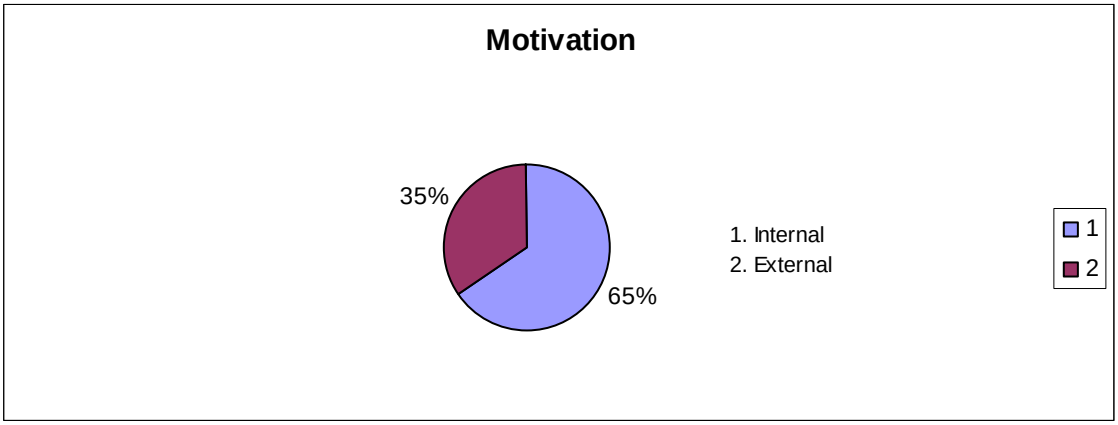


Fig. 71: Illustration of motivation by type

Family background;

Code	Response	Frequency
5013	Enabling	17
5023	Not enabling	9

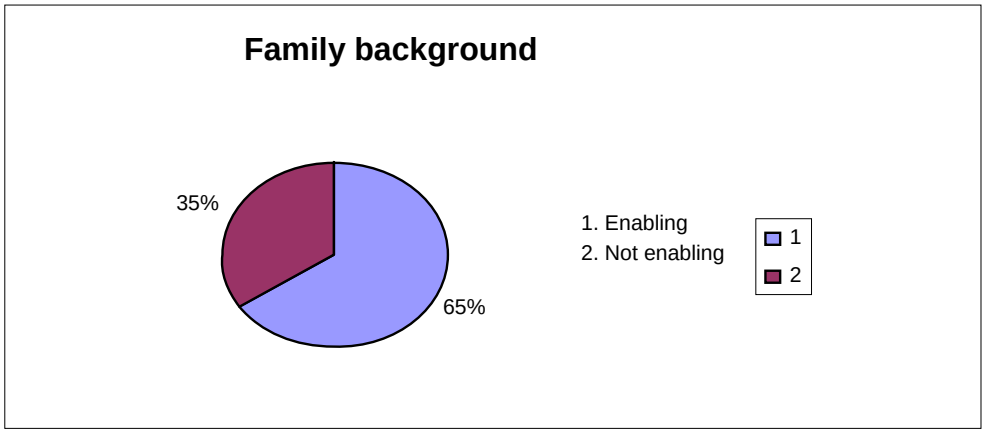


Fig. 72: Illustration of family background by type

5.3.1.6 Stakeholder Consensus

Questions 5, 6 and 7 of the Incubator Manager collectively address this success factor.

Code	Response	Frequency
601	High	8
602	Average	3

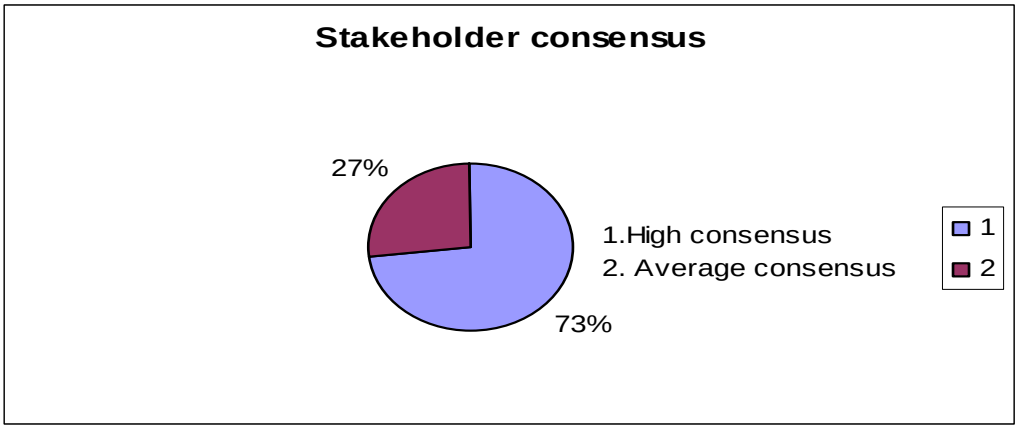


Fig. 73: Illustration of level of stakeholder consensus

5.3.1.7. Supportive government policies

Question 9 of the incubator manager questionnaire addressed this success factor.

Code	Response	Frequency
701	Local policies in place	8
702	No local policies in place	3

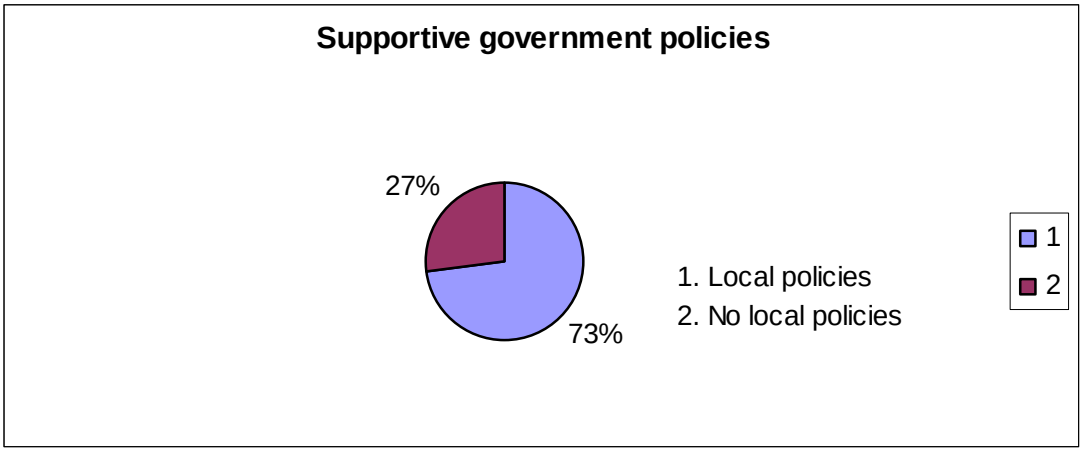


Fig. 74: Illustration of availability of government supportive policies

5.3.1. 8 Successful incubatees and graduates

It is believed that being able to export your products is one of the indicators of a successful business. Question 28 of the incubator manager questionnaire addressed this factor.

Code	Response	Frequency
801	Successful (export)	3
802	Local sales	8

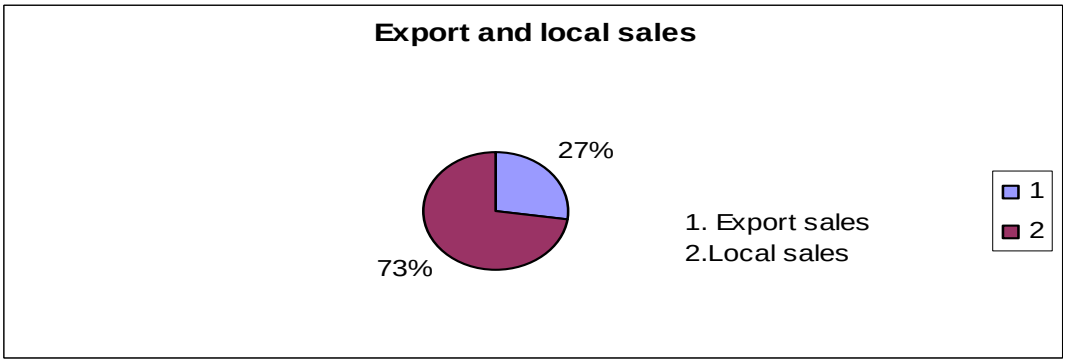


Fig. 75: Illustration of sales by location

5.3.1.9. Competent and properly incentivised incubator management

Questions 1-4 and 12-13 of the incubator manager questionnaire addressed this factor.

Competence;

Code	Response	Frequency
9010	Highly competent	5
9020	Average competency	6

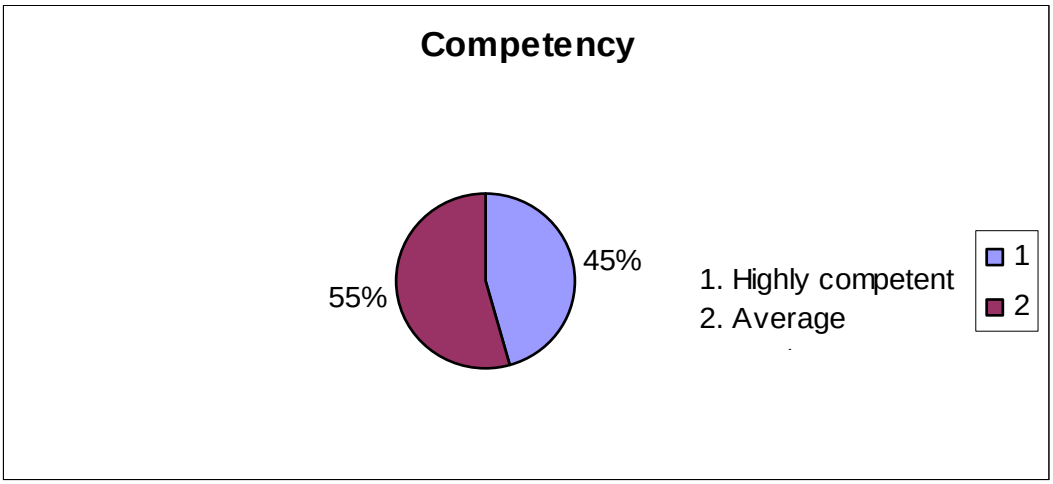


Fig. 76: Illustration of competency levels

Incentive;

Code	Response	Frequency
9011	No Proper incentive	3
9021	proper incentive	8

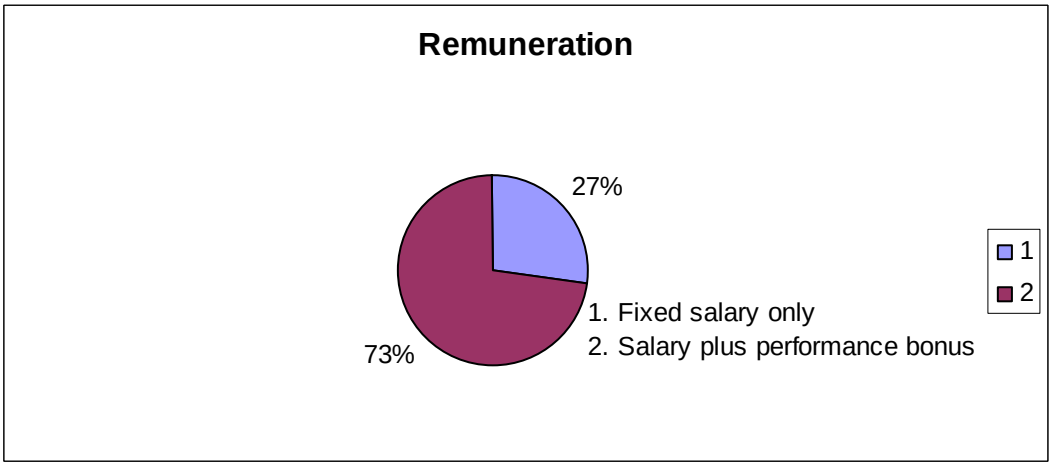


Fig. 77: Illustration of remuneration types

5.3.1.10 Sustainability

Question 30 of the incubator manager questionnaire addressed this question

Code	Response	Frequency
1001	Sustainability plans in place	10
1002	No sustainability plans	1

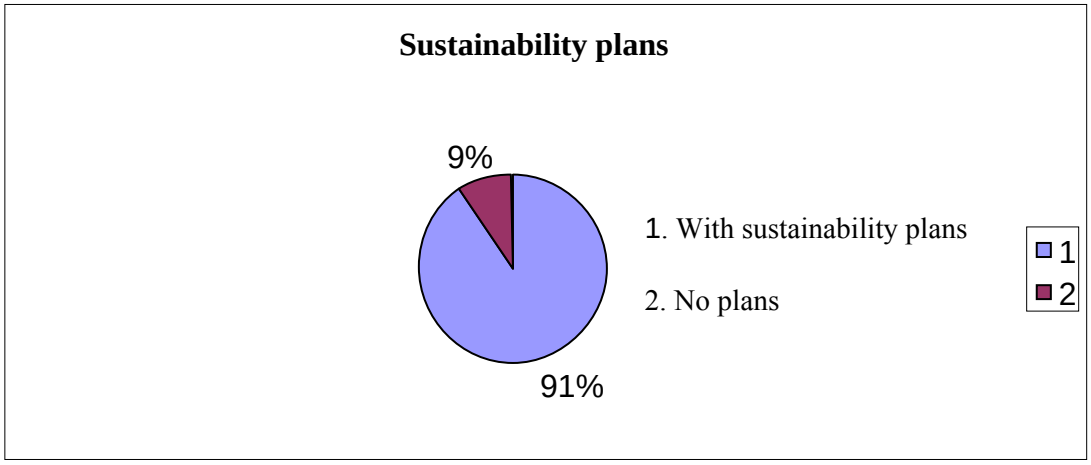


Fig. 78: Illustration of availability of sustainability plans

5.3.1.11 Board willingness

Question 11 of the incubator manager questionnaire addressed this factor

Code	Response	Frequency
1101	High willingness	1
1102	Medium willingness	7
1103	Low willingness	3

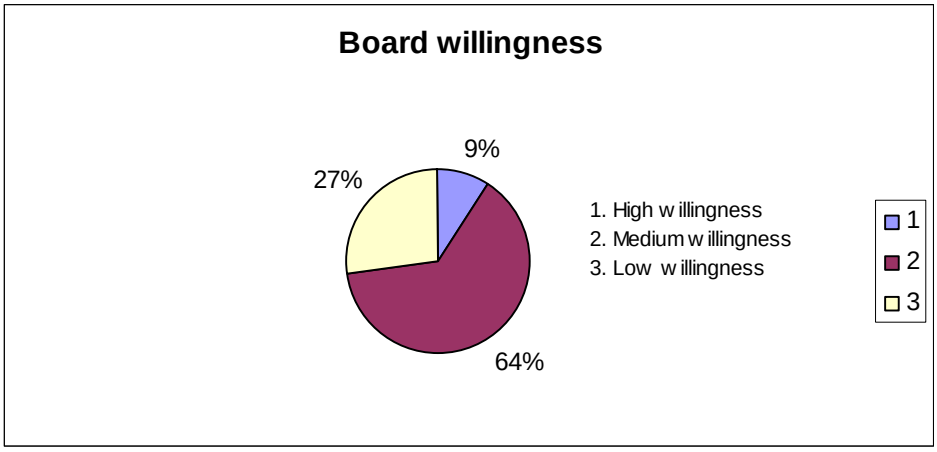


Fig. 79: Illustration of board willingness levels

5.3.1.12 Networking

Question 19 and 20 of the incubator manager questionnaire addressed this factor.

Code	Response	Frequency
1101	Highly networked	6
1102	Averagely networked	3
1103	No networks	2

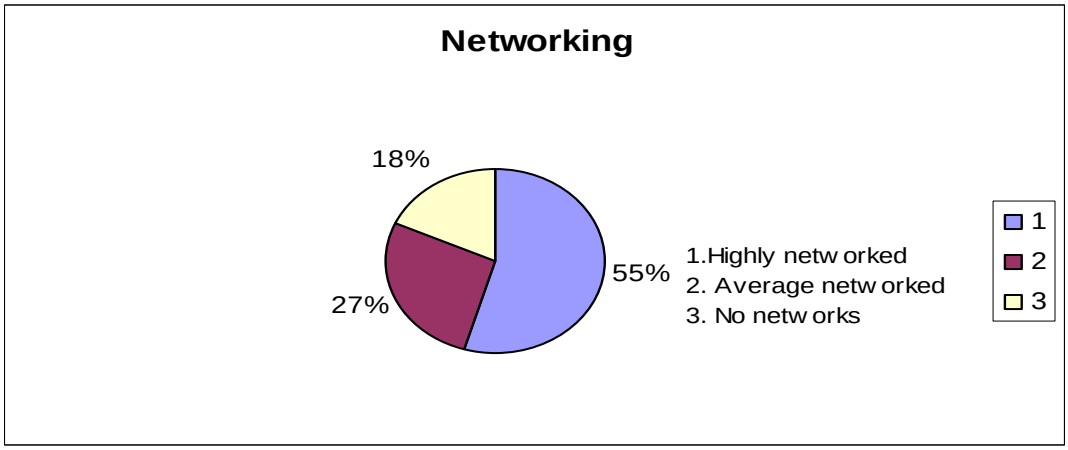


Fig. 80: Illustration of networking levels

5.4. Hypotheses testing

Several hypotheses were formulated in Chapter 3. Tests were then performed to determine whether those hypotheses were true. Two types of tests were performed: one to determine the significance of the relationship between the success factors and success and another to determine the strength of the relationship. In some cases, as indicated below, for significance the Mann-Whitney test was performed while in others the Kruskal Wallis test

1. Proximity to a University/Research Park

H1 Proximity to a University/Research park has a positive relationship with the success of the incubator centres.

H0 Proximity to a University/Research Park does not contribute to the success of the incubator centres.

As analysed in Annexure D, proximity has a significant relationship with success using the Mann-Whitney test (p value = 0.0062).

As further analysed in Annexure E, proximity has a strongly positive relationship with success (Spearman correlation co-efficient = 0.707), therefore the hypothesis is accepted.

Proximity is therefore one of the success factors for incubation in South Africa.

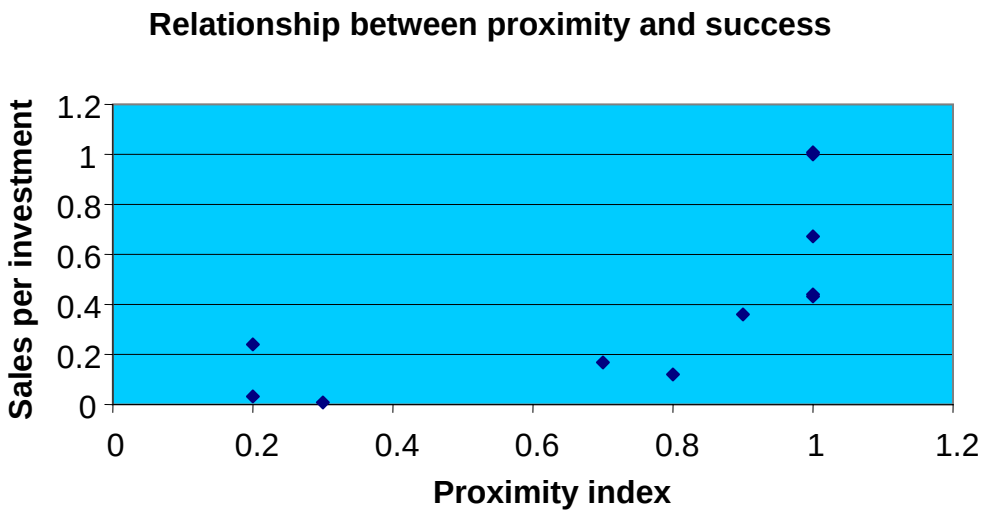


Fig. 81: An illustration of the relationship between Proximity and success

2. Feasibility study

H1 Conducting a feasibility study before establishing an incubator centre contributes to its success.

H0 A feasibility study does not contribute to the success of an incubator centre.

As analysed in Annexure D, there was an insignificant relationship between feasibility and success using the Mann-Whitney test (p-value = 0.1573).

As further analysed in Annexure E, there was a very weak positive relationship between feasibility and success (Spearman correlation co-efficient = 0.345). The hypothesis was therefore not accepted.

Feasibility is therefore not one of the success factors for incubation in South Africa.

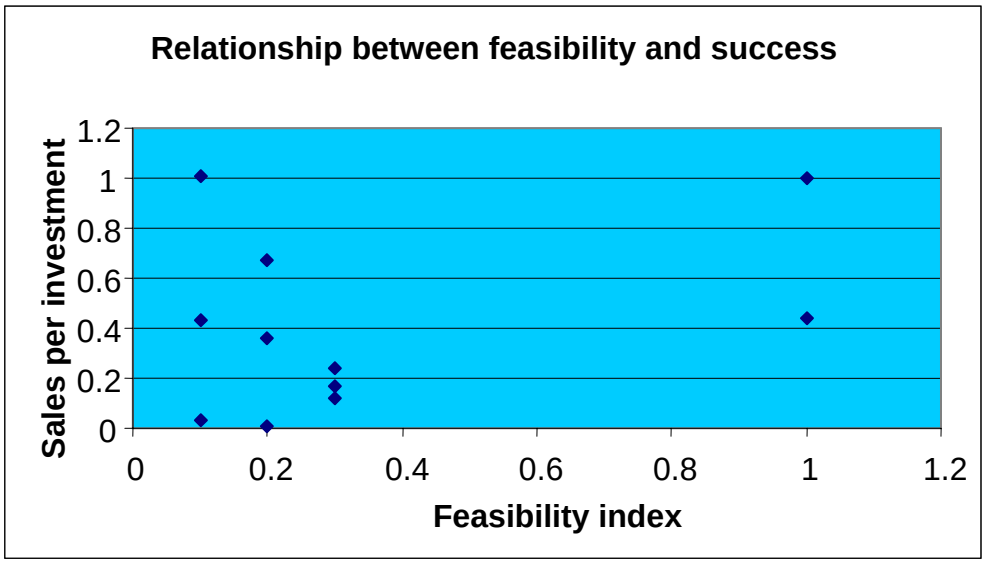


Fig. 82: An illustration of a relationship between feasibility and success

3. Availability of funding

H1 Those incubators that provide funding to incubatees and whose incubatees have access to other forms of funding, have a high rate of success.

H0 Those incubators that do not provide funding to incubatees and whose incubatees do not have access to other forms of funding have a low rate of success.

As analysed in Annexure D, the hypothesis was accepted because availability of funding both by the incubator and access by the incubatees have a significant relationship with success using the Mann-Whitney test (p-value = 0.0285 for incubators and 0.0001, for incubatees).

As further analysed in Annexure E, the hypothesis is accepted because availability of funding both by the incubator and access by the incubatee have a strongly positive relationship with success (Spearman correlation co-efficient = 0.645 and 0.751).

Availability of funding is therefore one of the success factors for incubation in South Africa.

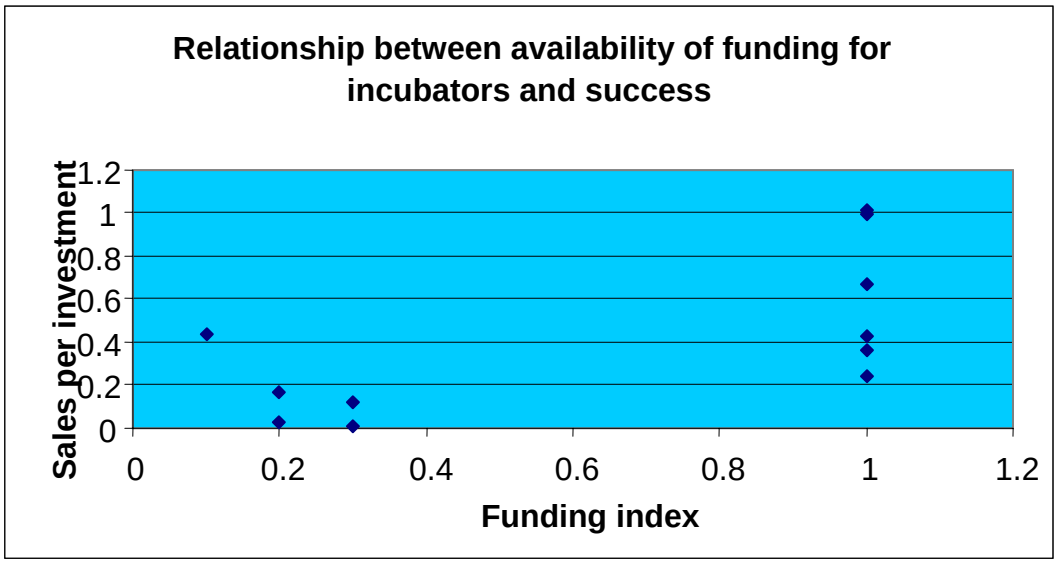


Fig. 83: Illustration of the relationship between availability of funding for incubators and success

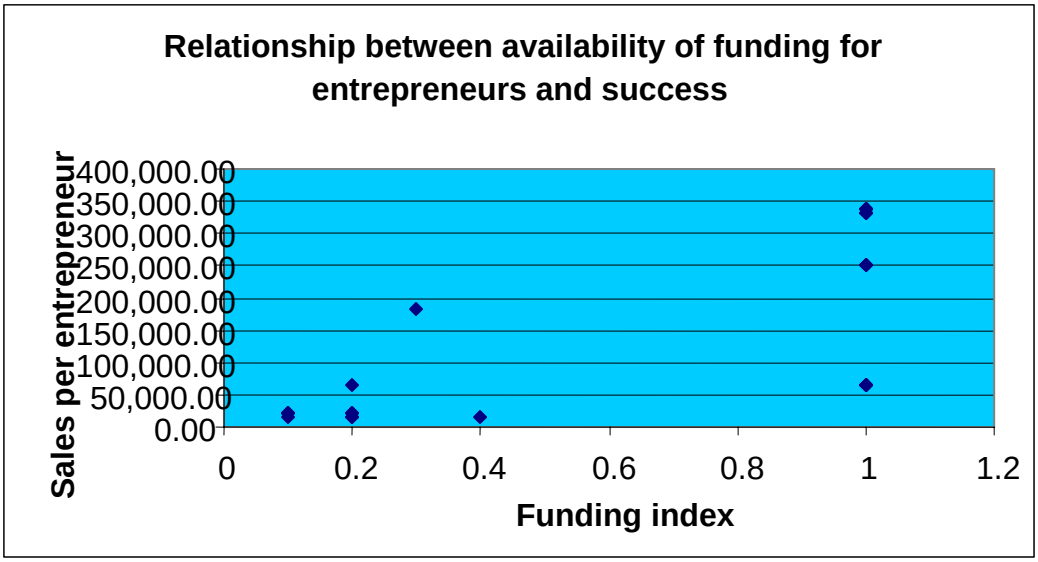


Fig. 84: An illustration of the relationship between availability of funding for incubatees and success

4. Stringent Selection criteria

H1 Stringent selection criteria in incubator centres have a positive relationship with success.

H0 Stringent selection criteria are no determinant of success for incubator centres.

From the analysis in Annexure D, the hypothesis is rejected because the relationship between selection criteria and success is insignificant using the Mann-Whitney test (p-value = 0.2207)

From the analysis in Annexure E, the hypothesis is rejected because stringent selection criteria have a negative relationship with success (Spearman correlation co-efficient = -0.345)

Stringent Selection criteria is therefore not one of the success factors for incubation in South Africa.

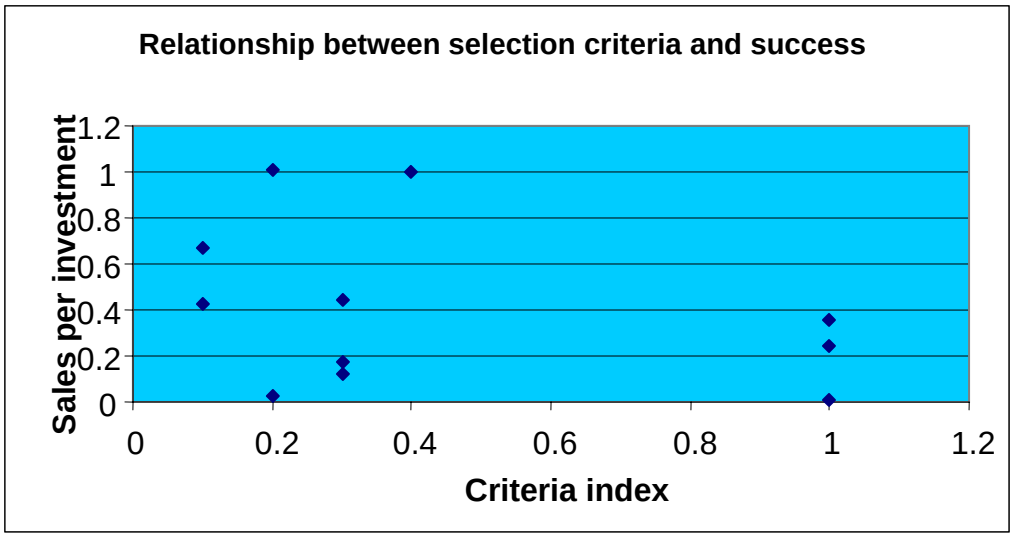


Fig. 85: An illustration of the relationship between selection criteria and success

5. Quality of entrepreneurs

H1 Entrepreneurs that have a high level of education; a high level of experience and knowledge; an enabling family and internal motivation have a high level of success

H0 There is no relationship between the quality of entrepreneurs and success.

As analysed in Annexure D.

There is an insignificant relationship between the level of education, experience and knowledge on the one hand and success on the other using the Kruskal-Wallis test (p-value = 0.0688).

There is a significant relationship between family background and motivation on the one hand and success on the other using the Mann-Whitney test.(p-value = 0.0029).

As further analysed in Annexure E.

There is a positive relationship between the level of education, experience and knowledge on the one hand and success on the other (Spearman correlation co-efficient = 0.69).
There is a positive relationship between family background and motivation on the one hand and success on the other (Spearman correlation co-efficient = 0.63).

Quality of entrepreneurs is therefore not one of the success factors for incubation in South Africa because one of the tests indicates that the relationship is insignificant for one of the elements.

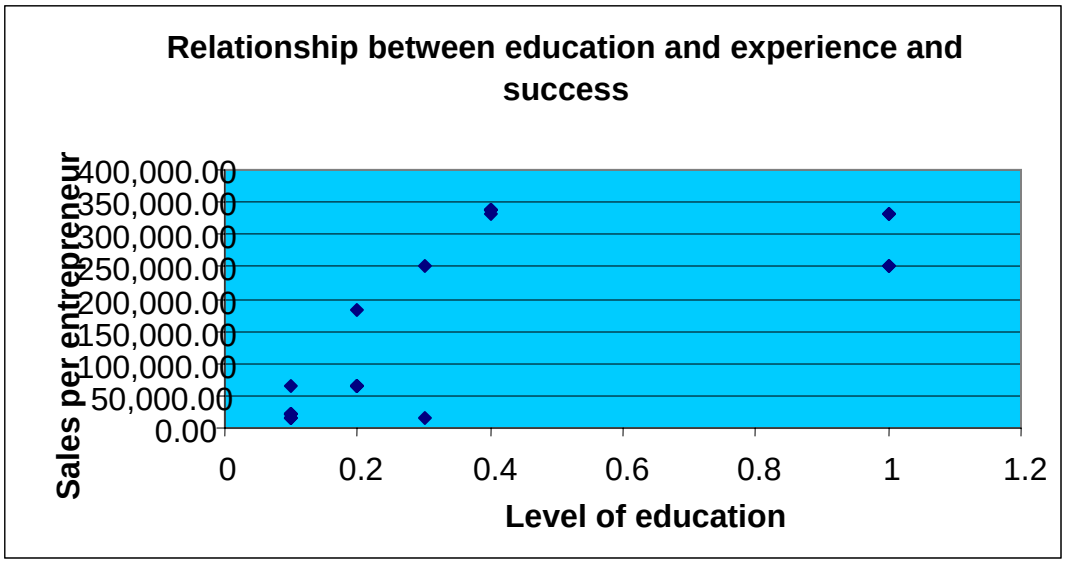


Fig. 86: An illustration of the relationship between education level and success

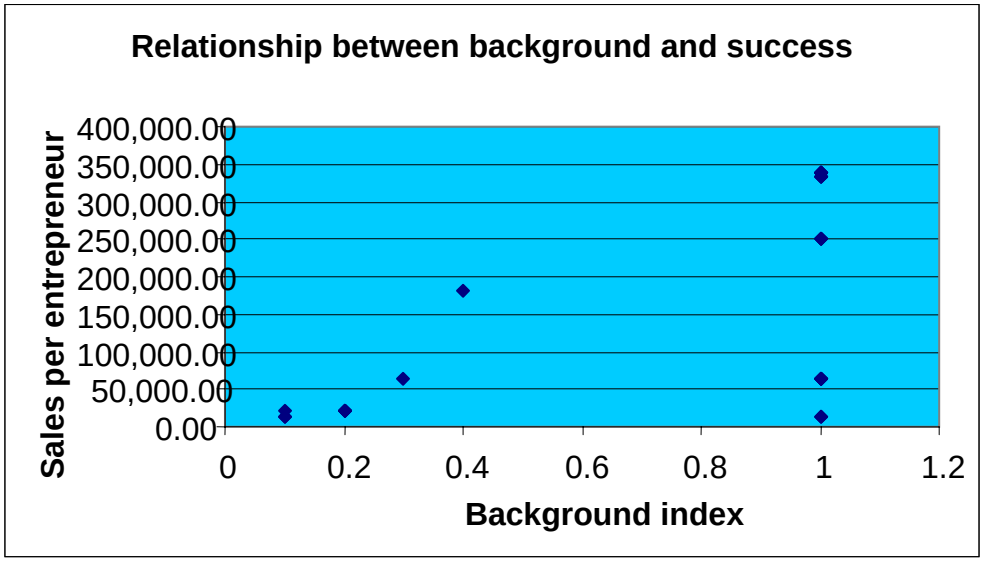


Fig. 87: An illustration of the relationship between family background and success.

6. Stakeholder Consensus

H1 Stakeholder Consensus is irrelevant to success of incubators.

H0 Stakeholder Consensus determines success of incubators.

As analysed in Annexure D, the hypothesis is rejected since there is a significant relationship between Stakeholder Consensus and success (p-value = 0.0143) using the Kruskal Wallis test.

As analysed in Annexure E, the hypothesis is rejected since there is a strong positive relationship between Stakeholder Consensus and success (Spearman co-efficient = 0.65).

Stakeholder. Consensus is therefore one of the success factors for incubation in South Africa.

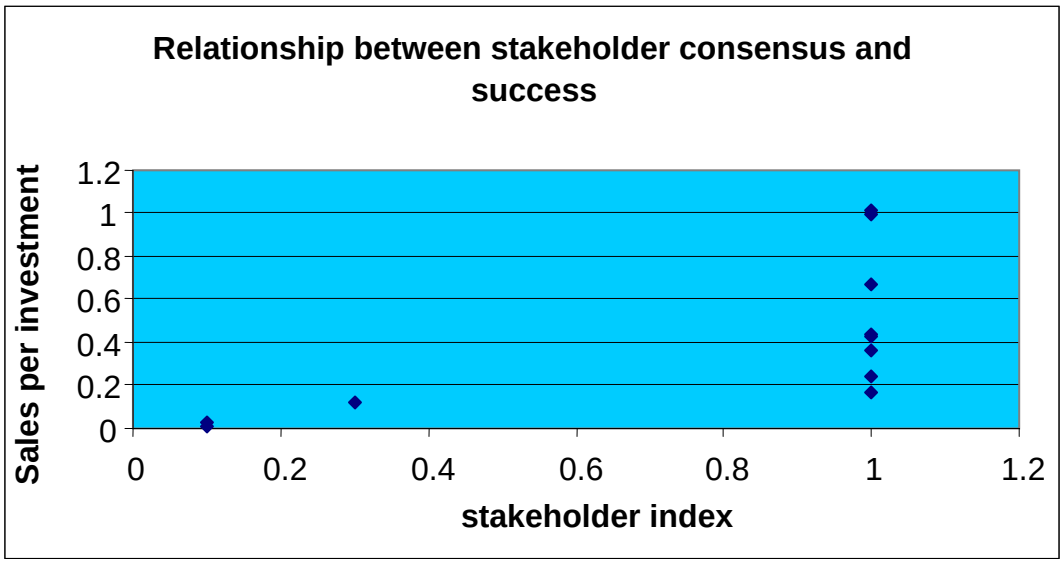


Fig. 88: An illustration of the relationship between stakeholder consensus and success

7. Supportive government policies

H1 Supportive government policies are crucial for the success of incubation in South Africa.

H0 Success of incubation in South Africa does not depend on supportive government policies.

From the analysis in Annexure D, the hypothesis is accepted since there is a significant relationship between success and supportive government policies, using the Mann-Whitney test (p-value = 0.0247).

From further analysis in Annexure E, the hypothesis is accepted since there is a positive relationship between success and supportive government policies (Spearman correlation co-efficient = 0.62) .

Supportive government policies is therefore on of the success factors for incubation in South Africa.

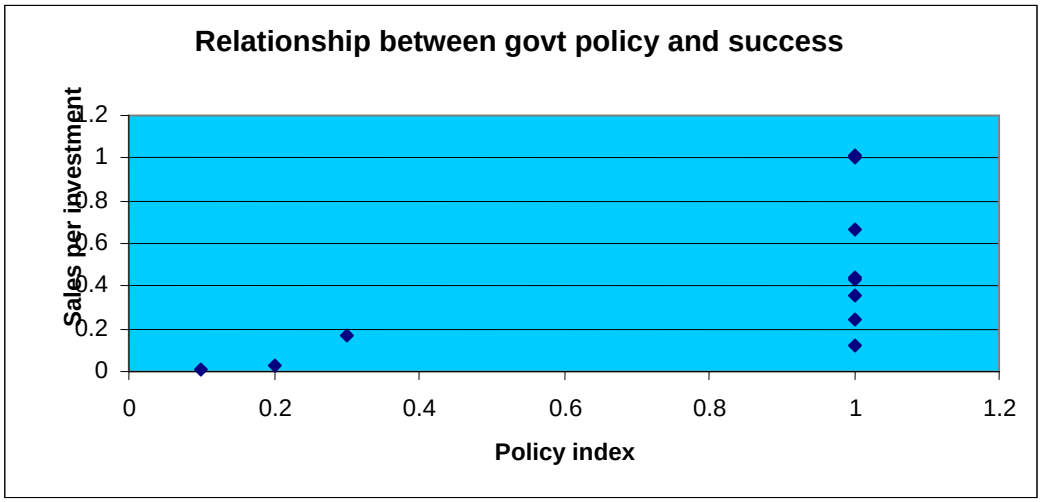


Fig. 89: An illustration of the relationship between government policy and success

8. H1 Those incubators that have successful incubatees and graduates have a better chance of success than otherwise.

H0 There is no relationship between successful incubatees and graduates and success

From the analysis in Annexure D, the hypothesis is rejected because results show an insignificant relationship between the two variables, using the Mann-Whitney test (p-value = 0.6656).

From further analysis in Annexure E, the hypothesis is rejected because results show a very weak positive relationship between the two variables (Spearman correlation co-efficient = 0.02).

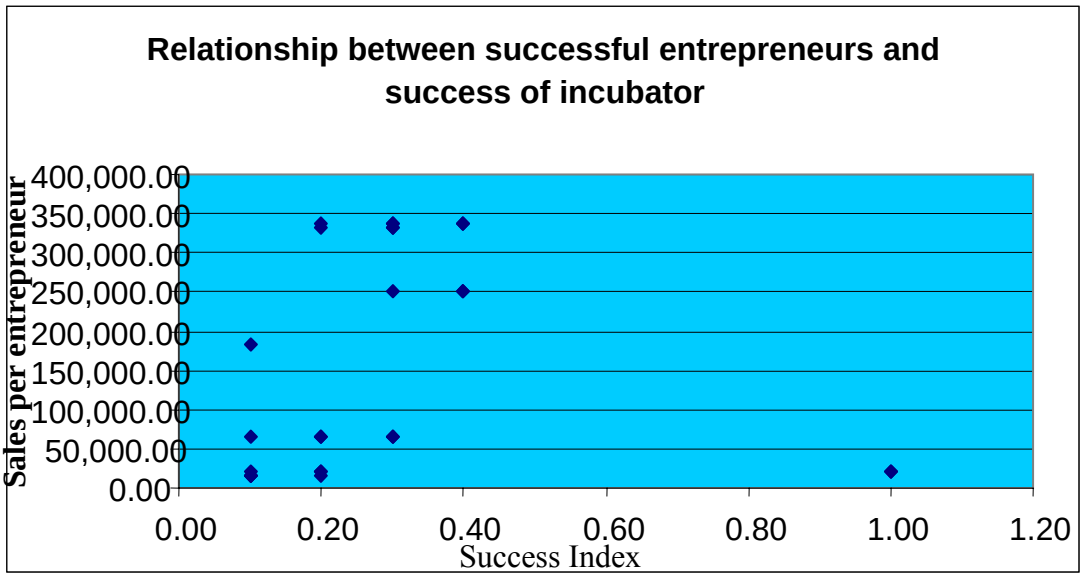


Fig. 90: An illustration of the relationship between successful entrepreneurs and success

9. H1 Competent and properly incentivised incubator management leads to the success of incubator centres

H0 There is no relationship between competency and remuneration of incubator management and success

From the analysis in Annexure D, the hypothesis is accepted since there is a significant relationship between the two variables and success [p-value = 0.0062 (competence) and 0.0143 (proper incentive)] using the Mann-Whitney test.

From further analysis in Annexure E, the hypothesis is accepted since there is a positive relationship between the two variables and success [Spearman correlation co-efficient =0.801 (competency) and 0.642(proper incentive)].

Competent and properly incentivised incubator management is therefore one of the success factors for incubation in South Africa.

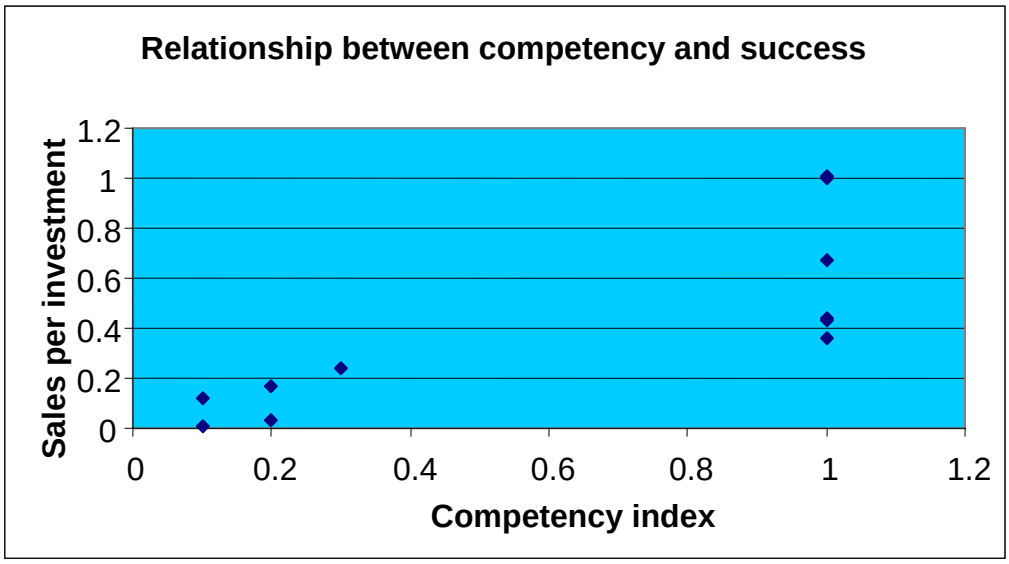


Fig. 91: An illustration of the relationship between competency and success

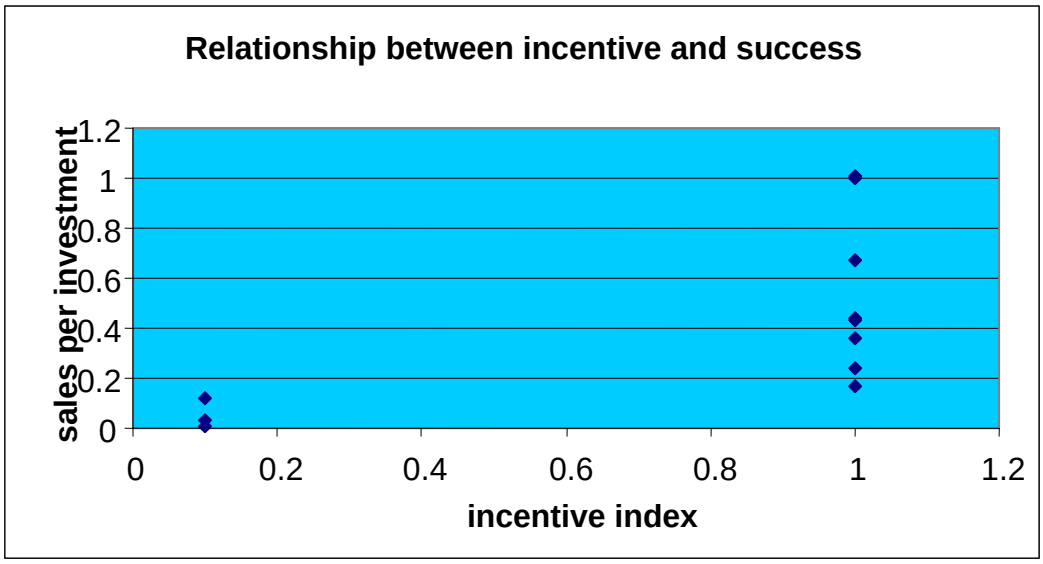


Fig. 92: An illustration of the relationship between proper incentive and success

10. H1 Those incubators that have sustainability plans are more successful than those which do not have.

H0 There is no relationship between incubator success and sustainability plans

From the analysis in Annexure D, statistical evidence shows that there is a significant relationship between sustainability plans and success. (p-value = 0.0339) using the Mann-Whitney test.

From further analysis in Annexure E, the hypothesis is accepted because there is a positive relationship between sustainability plans and success. (Spearman correlation co-efficient = 0.541)

Sustainability is therefore one of the success factors for incubation in South Africa.

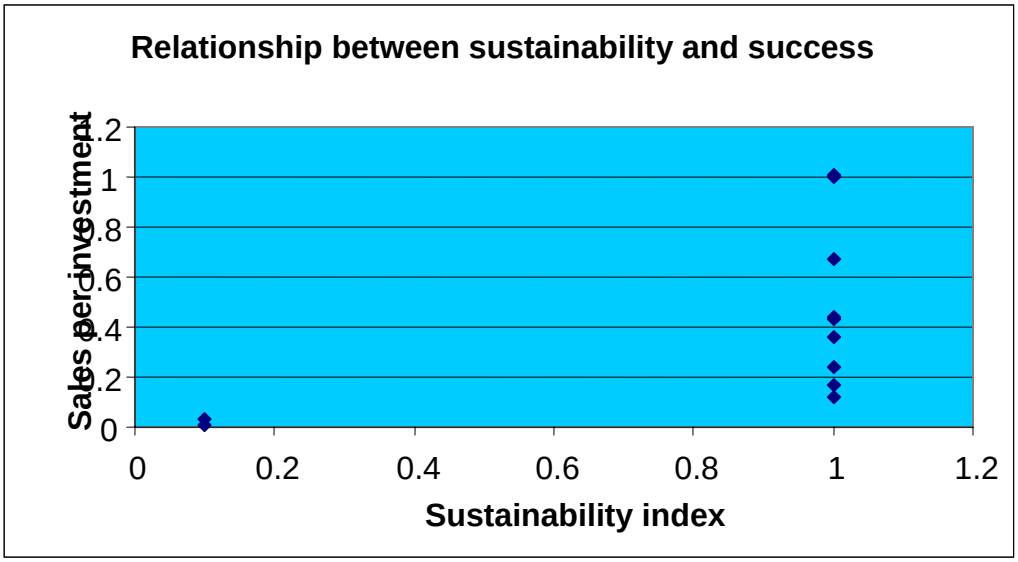


Fig. 93: An illustration of the relationship between sustainability plans and success

11. H1 It is irrelevant to the success of incubators whether board members strongly support them or not

H0 Willing board members have a positive influence on the success of incubators.

From the analysis in Annexure D, the hypothesis is accepted since the relationship between the two variables was insignificant p-value = 0.1306) using the Mann-Whitney test.

From further analysis in Annexure E, the hypothesis is accepted since there is a weak positive relationship between board willingness and success (Spearman correlation co-efficient = 0.199).

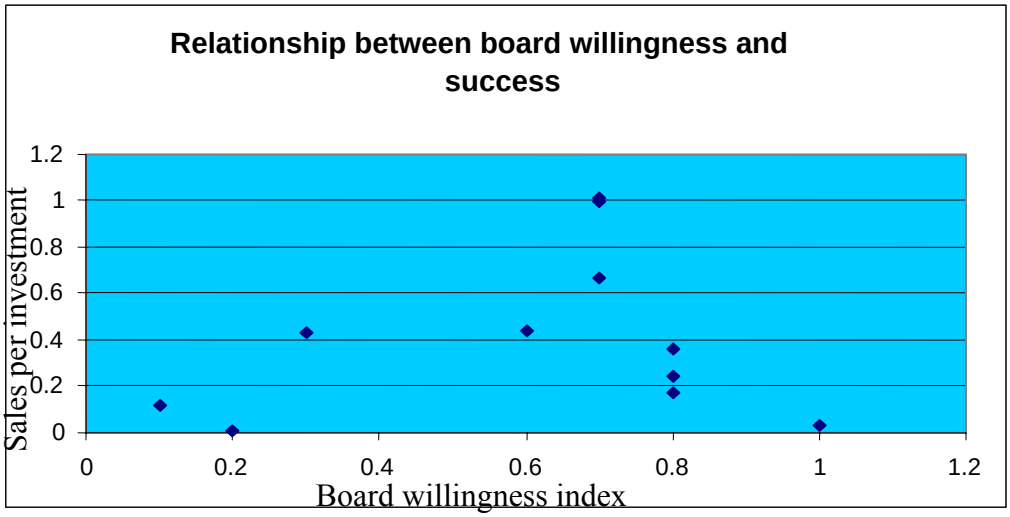


Fig. 94: An illustration of the relationship between board willingness and success

12. H1 Networking leads to the success of incubation

H0 There is no relationship between networking and success of incubation

From the analysis in Annexure D, there is a significant relationship between networking and success (p-value = 0.0176) using the Mann-Whitney test.

From further analysis in Annexure E, the hypothesis is accepted since there is a strong positive relationship between networking and success (Spearman correlation co-efficient = 0.729).

Networking is therefore one of the success factors for incubation in South Africa.

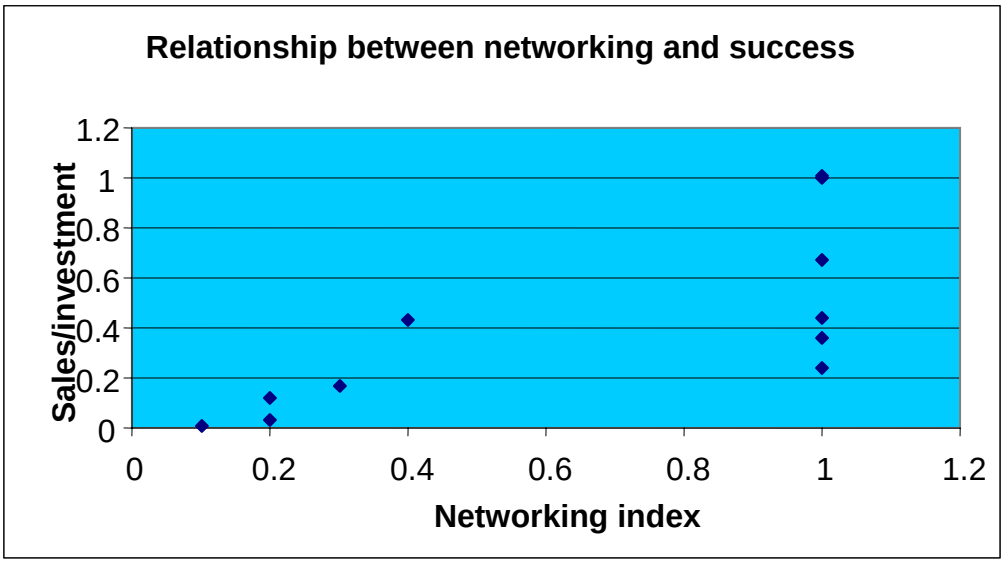


Fig. 95: An illustration of the relationship between networking and success

CHAPTER VI: CONCLUSIONS AND RECOMMENDATIONS

6.1 Research results

It was established that those incubators that are closer to universities tend to be more successful than otherwise. This also applied to the Godisa case study.

It was surprisingly discovered that conducting a feasibility study is not essential for success in Godisa incubators.

Availability of funding, as was expected was discovered to be of critical importance for incubators in the Godisa set-up. All avenues of funding must be exploited for the sake of entrepreneurs. This will assist them to concentrate on their technical work and be more successful than worrying about finances.

Stringent selection criteria did not seem to be of much importance at the present moment for incubators in the Godisa initiative nor was quality of entrepreneurs.

Stakeholders do need to have clarity of roles for the success of incubators even at this early stage.

Policies at provincial and local levels need to be integrated with incubator policies at national levels. Those centres in which this is the case tend to be more successful.

What has been established is that in order to succeed incubators need to have competent and properly incentivised management. For anyone, who would like to start an incubator, it is advisable to keep this in mind.

Incubators must not rely on government funding for all time but they must have their own sustainability plans for the future.

Stakeholders involved in these economic development initiatives need to have their roles clearly defined because any fight over roles may lead to failure of such initiatives.

Networking is important for any business; incubators are no different in this regard.

6.1.1. Answering the research questions

a. What are the success factors for incubation internationally?

The success factors that were identified from international experience and tested in South African conditions are as follows:

- Proximity to a University/research park
- Feasibility
- Stringent selection criteria
- Availability of funding
- Quality of entrepreneurs
- Successful incubatees and graduates
- Supportive government policies
- Competent and properly incentivised management
- A willing advisory board
- Networking
- Stakeholder Consensus
- Financial Sustainability

b. Are these factors applicable to South African conditions?

Some of the factors are applicable to the Godisa case study, while others are not. Those that are applicable include: Financial sustainability, stakeholder consensus, networking, competent and properly incentivised management, supportive government policies, availability of funding and proximity to a university or research park. Therefore seven out of twelve factors are applicable to South Africa.

c. What are the main similarities and differences between the local and international models?

The main differences are in the success factors that are not applicable to South Africa including feasibility study, successful incubatees and graduates, quality of entrepreneurs, a willing advisory board and stringent selection criteria.

6.2 Implications for and or contributions to theory and practise

It has been established that not all the success factors that are applicable in the international literature are also applicable to South Africa specifically to the Godisa case study. This might be due to the age of business incubation and the fact that the business situation in South Africa is different from that of the international arena. Some of the findings were expected while others came as a surprise.

The finding that proximity to a University or Research Park is one of the success factors for incubation in South Africa came as no surprise because availability of hi-tech machinery and facilities which could otherwise be very expensive for the incubator itself can only help bring success to any incubator of any age and situated anywhere in the country.

The finding that conducting a feasibility study was not one of the success factors for incubation in South Africa was not expected because at this early stage that is when the effect of a feasibility study would be expected to make a difference. Those centres that conducted a feasibility study are expected to be more successful because they would have identified any loopholes and addressed these before establishing the incubator.

The finding that stringent selection criteria were not one of the success factors for incubation in South Africa was expected because at this very early stage all that is needed is some selection criteria but not very stringent because everyone is still learning.

It came as no surprise that availability of funding is one of the success factors for incubation in South Africa. Under-capitalisation is a feature that is always quoted as hindrance for the success of any small business that is operational in this day and age. Incubators are no different in this regard. Incubators should also in turn be in a position to assist their entrepreneurs with funding in various forms even if this means incubators being

the consultants for other funding facilities, which are outside the incubator. It was, however noted with concern that none of the incubatees quoted banks to be one of their sources for funding. This came as a bit of a surprise although it is well-known that banks do not believe in supporting the risky stages in business.

It came as a surprise that quality of entrepreneurs was not one of the success factors for incubation in South Africa. Actually the one aspect that was indicative of success was that of background and motivation. Entrepreneurs who have an enabling background and good motivation tended to be more successful than otherwise. The aspect of education came as a surprise that there seemed to be no significant relationship between education and success. One would imagine that entrepreneurs who entered incubators as graduates would tend to be more successful than those who entered as matriculants. In any case the majority of entrepreneurs were matriculants.

It came as a surprise that stakeholder consensus became one of the success factors for incubation in South Africa. This was not expected since it is still very early, all are prepared to co-operate to ensure success of this new initiative rather than compete for clarity of roles.

It came as no surprise that government supportive policy became one of the success factors for incubation in South Africa. Integration of government initiatives at national, provincial and local levels is very crucial for any economic development effort. It is not desirable to have a municipal by-law or a provincial regulation that will defeat the purpose of what national government is trying to establish at provincial or local levels. In fact the ideal state is that of the three levels of government to work together for any initiative before implementation, to avoid duplication and conflicts.

It came as a surprise that successful incubatees and graduates did not come as one of the success factors for incubation in South Africa. It could be expected that the incubatees and graduates who service the export market would have a higher success rate than otherwise. It was observed with amazement that there seemed to be no significant relationship between exporters and success.

It came as no surprise that competent and properly incentivised management became one of the success factors for incubation in South Africa. This is because more competent and properly incentivised managers tend to be more diligent because of the motivation, they stay for a long time, they are less insecure and thereby contribute to the long-term success of the incubator.

Incubation in South Africa is not for profit reasons as it is in other developed countries, since the country has its own challenges including poverty, lack of skills and lack of employment. Most of the Godisa incubators are meant to address these challenges rather than making profit for themselves. This is also the reason why it seems impossible for any of them to attain financial self-sustainability in the first three years. In this regard, sustainability would not have been expected to be one of the success factors. An unexpected finding, however was that those centres that have sustainability plans tend to have higher average return on investment that those which do not have them.

It came as a surprise that board member willingness became one of the success factors for incubation in South Africa. Just like stakeholder consensus, it was expected that during these early stages everyone is still learning therefore the roles of different stakeholders do not really matter.

Networking becoming one of the success factors for incubation in South Africa did not come as a surprise. Even at these early stages, learning from other partners is very crucial. Not only from the success of others but also from failures so that they cannot be repeated.

In relation to the theory, the study fits in very well with the Incubator Assessment Overview as in Figure 1 in Chapter 3.

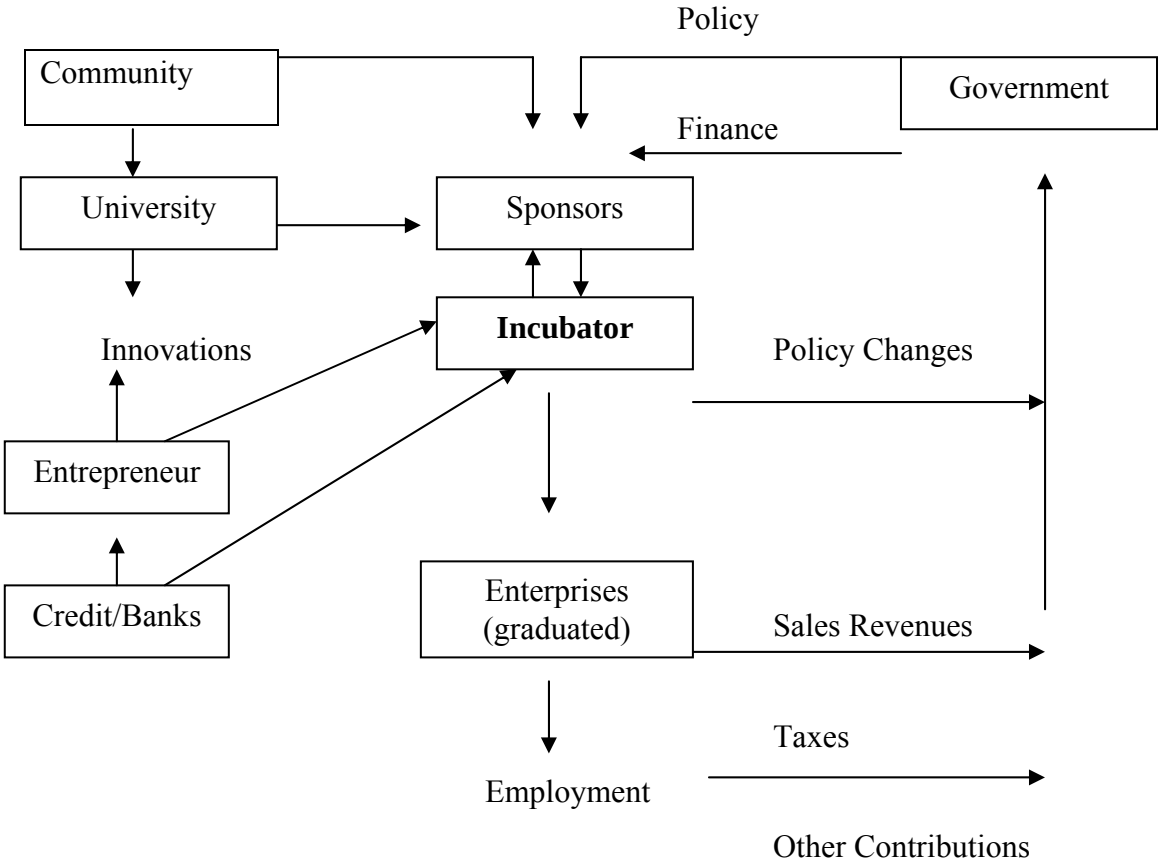
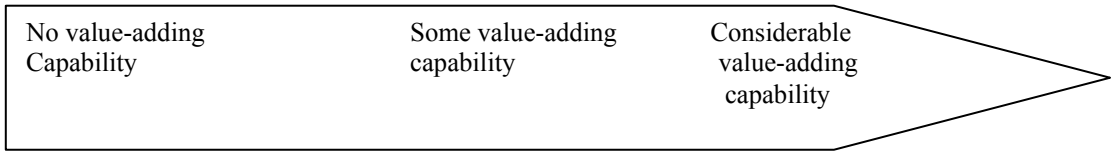


Figure 96: Relationship between the international assessment and case study

In relation to Barrow's summary (figure 3 in chapter 3), the Godisa incubators only fitted some of the areas and not others as follows:

	For profit property development incubators	Non-profit development corporation incubators	University incubators	For-profit investment incubators	Corporate venture incubators
Main goals	Property appreciation, Maximise occupancy Sell services to clients	Job creation Encourage entrepreneurship Diversify economic base	Faculty-industry collaboration Commercialise university research	Make substantial capital gain, quickly	Get into related markets quickly and inexpensively Have a window on related

					technologies
Subsidiary goals	Create investment opportunities for more property	Generate sustainable income to break-even point. Use vacant premises	Exploit investment opportunities Create goodwill in local community	Develop synergies in investment portfolio	Provide entrepreneurial opportunities for staff Make money.



Godisa Incubators

	Non-profit development corporation incubators	University incubators
Main goals	Job creation Encourage entrepreneurship Diversify economic base	Faculty-industry collaboration Commercialise university research
Subsidiary goals	Generate sustainable income to break-even point. Use vacant premises	Exploit investment opportunities Create goodwill in local community

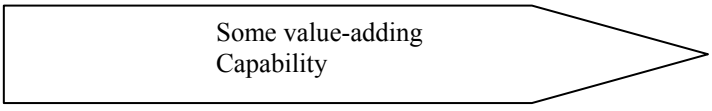


Fig.97: Relating case study to different models, goals and services of incubators

In relation to Figure 6 in chapter 3, (Incubator models emerging in South Africa), the Godisa case related as follows:

Objectives	Value Added to Community and Society		Economic Value to specific Stakeholder Groups	
	Non Profit Enterprise Development Incubators	Public Private Partnerships (PPP)	For Profit Corporate Incubators: Venture Capital / Private Equity	For Profit Real Estate Incubator
	Venture Creation	Innovation and Technology Commercialisation	Capitalise investment opportunity	Real Estate Appreciation
Primary Objective	Job Creation	Economic development of a region	Outsource functions to employees	
	Enhance Entrepreneurial Culture	Faculty Industry Collaboration	Opportunities through downsizing	
	Diversify economic base of an area	Regional reputation within a sector	Contribute to the economic development of the sector	Create investment opportunity
Secondary Objective	Generate sustainable income for incubator	Capitalise investment opportunity	Create goodwill within the community	
	Utilise vacant facilities	Instructional mission(Technology Transfer)		
	Empowerment objective	Empowerment objective	Empowerment objective	

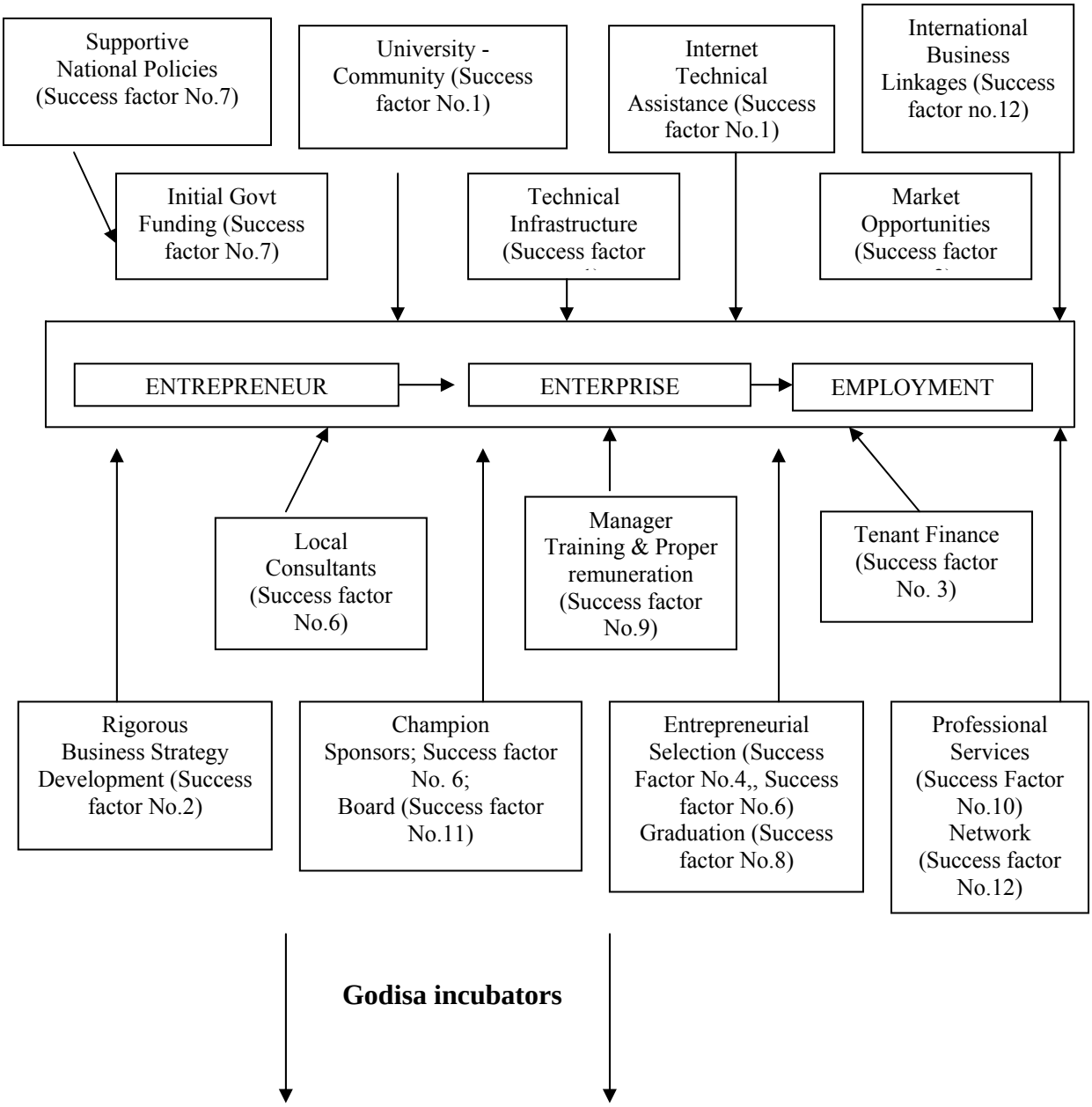
Godisa Incubators

Objectives	Value Added to Community and Society

	Non Profit Enterprise Development Incubators	Public Private Partnerships (PPP)
	Venture Creation	Innovation and Technology Commercialisation
Primary Objective	Job Creation	Economic development of a region
	Enhance Entrepreneurial Culture	Faculty Industry Collaboration
	Diversify economic base of an area	Regional reputation within a sector
Secondary Objective	Generate sustainable income for incubator	Capitalise investment opportunity
	Utilise vacant facilities	Instructional mission(Technology Transfer)
	Empowerment objective	Empowerment objective

Fig. 98: Relating case study to incubator models emerging in South Africa

In relation to the study model (figure 7 in chapter 3), Godisa incubators have contributed as follows:



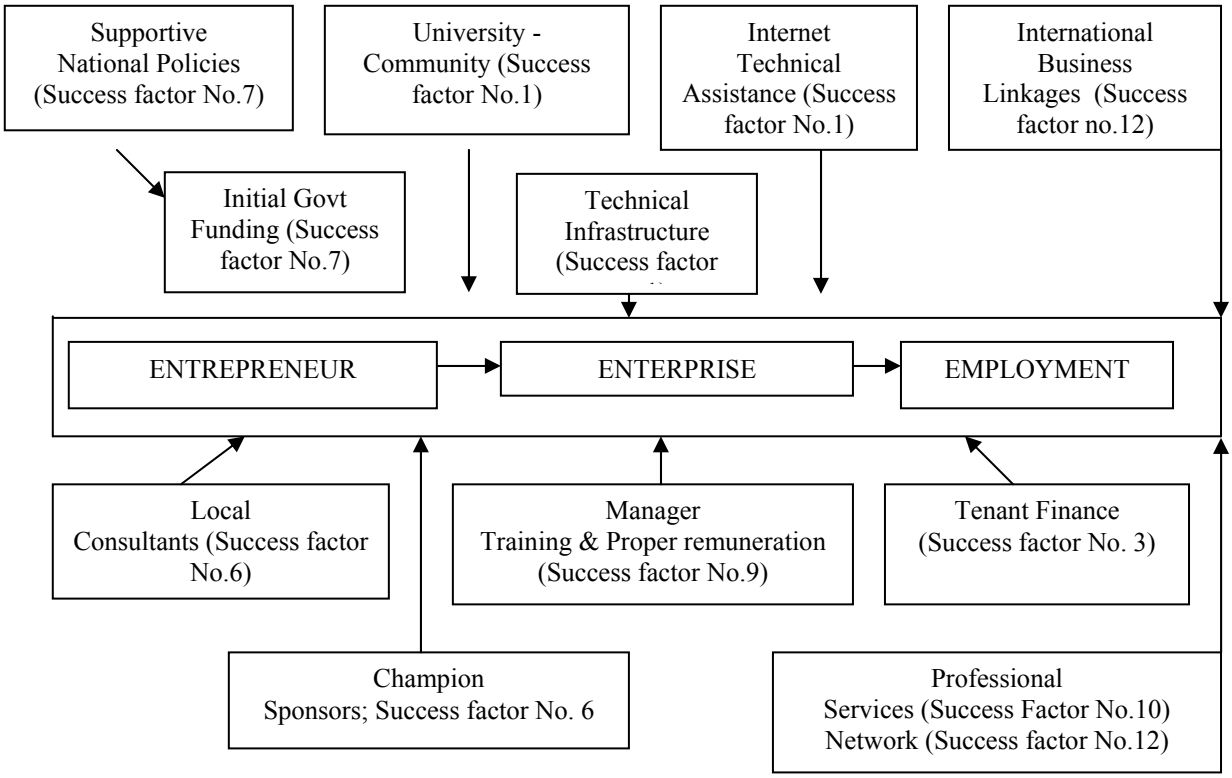


Fig. 99: Relating the case study to the research model

6.3 Self-assessment

Initially, the researcher believed that conducting the study would be a very easy task because of her involvement. As the study continued with incubator centres from the side of **DTI**, it became obvious that there were certain challenges that needed to be overcome including the following:

- Promotion to another section in DTI, which then led to difficulty in easily accessing information that was previously easily accessible
- Well-developed contacts were those in the centres that were supported by DTI alone, which were previously not part of Godisa. There were some of the Godisa centres that were sceptical of participating in the research. After negotiations, tremendous co-operation was received from eleven of the twelve centres

Otherwise the information contained in this study will hopefully assist Godisa and DTI in channelling their policies in the right direction. It will also help in the pool of knowledge by academia.

In relation to the results the following limitations can be cited:

For incubators, it was difficult to make any concrete conclusions statistically because the sample was very small i.e. eleven. For any statistical evidence to be reliable at least a minimum of thirty observations is required. In this case this was impossible because in the Godisa case study there are only twelve incubator centres. It would be interesting to note how the results would look like if there were more centres to be observed. The tests of significance were used in the study, but strictly speaking, were only appropriate if they are used to extend observed correlations beyond the immediate set of data to the research population. This was not the case with this study. Specifically, the following can be highlighted:

- For Proximity, much as the sample size was low at least the results were evenly distributed between the two possible observations (i.e. Yes (6) and No (5)) and therefore the results are more credible.
- For Feasibility the observations were more biased towards No (9), with Yes (2), having very few observations. The results are therefore less credible.
- For Selection Criteria the observations were also not evenly distributed (Higher (3) and Lower (8)) making the results less credible.
- For Availability of Funding, the results were evenly distributed between the two observations (Yes (6), No (5)), making the results more credible.
- For Stakeholder Consensus, the results are also not evenly distributed (skewed towards the High (8), and Low (3)), which makes the results less credible.
- For Supportive Government Policy, the results are also skewed towards the Yes (8) observation with No only having 3, making the results less credible.
- For Competence among incubator managers, the observations were evenly distributed between the High (6) and Average (5) competence, with the results becoming more credible.
- For proper remuneration, the results are more skewed towards the Yes (8), than the No (3) observation, making results less credible.
- For Sustainability, results are more skewed towards the Yes (9) observation than the No (2) observation causing the results to be less credible.

- For the Board Willingness observation, the initial plan was to have three categories, Low, Medium and High. However, there was only one observation in the High Category, which was then combined with the Medium Category. The observations were still skewed towards the Medium/High category (7) more than the Low category (4), leading to less credibility of the results.
- For Networking, the initial plan was to have three categories, High, Medium and Low. Due to the low number of observations in the medium Category (2), these were combined with the low category. The observations were therefore evenly distributed between the two categories (High (6) and Low/Medium (5)) making the results more credible.

For entrepreneurs, the sample size was much better compared to the incubators, although it was still below the minimum thirty for statistical analysis. It is believed that for further studies this figure can be improved upon because there is a lot of entrepreneurs and graduates in the Godisa case study. Specific limitations on the results are as follows:

- For Availability of Funding, the observations were almost evenly distributed between the two categories (Yes (11) and No (15)), making the results more credible.
- For Background and Motivation (Quality of entrepreneurs), the observations were skewed towards the Yes category (17) more than the No category (9), leading to less credibility of the results.
- For Education (Quality of Entrepreneurs), the observations were not evenly distributed (Low (10), Medium (12), High (4)), leading to less credibility of the results.
- For successful incubatees and graduates, the observations were more skewed towards the local selling category (22), than the exporters (4), leading to less credibility of the results.

6.4 Recommendations

While it is important for us to learn from international models for incubators; it is essential to diagnose our own local conditions first before implementing any model.

It is essential to look at the issue of supporting incubators very seriously because if we do not have policies in place such as tax benefits etc to support incubators; we are setting our own initiatives for failure. We need to create conditions conducive for these initiatives to succeed.

For further studies, a critical list of success factors specifically for South Africa needs to be established, a suitable model needs to be developed and a linkage between incubators and other initiatives needs to be established

Any available incentive schemes (e.g. DTI grants and other available government resources) should be vastly advertised to both incubators and entrepreneurs.

Other providers like the banks can play an important part in incubators. From the policy level, it is essential to engage these parties so as to further ensure the success of our initiatives. It is clear from the entrepreneurs' responses that banks are not yet playing the part they should be playing in developing our entrepreneurs. This also applies to development agencies across the country.

The private sector is already playing a critical role in incubation. This should be encouraged and be extended in other incubators where the private sector is not yet active. It would be beneficial if private sector could also be involved at Godisa level on advisory capacity and also part of funding.

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ANNEXURE A

QUESTIONNAIRE FOR THE GODISA MANAGER

Please note that for some of the following questions; more than one answer may be selected. Please indicate your selection by placing a tick (√) next to the appropriate number.

A. THE MANAGER

1. Please select the qualifications that you possess:
   (a) Business degree/Diploma (b) Entrepreneurship degree/Diploma
   (c) Science/ Technology degree Diploma (d) Other (Please State)_____

2. Please select the previous experience gained:
   (a) Entrepreneurship (b) Business Management
   (c) Training (d) Other (Please State) _____

3. Are you presently furthering your Education? Yes/No. If Yes, in which field?
   (a) Project Management (b) Business Management
   (c) Entrepreneurship (d) Other (Please State) _____

B. THE PROGRAMME

4. Which categories of stakeholders are involved in the programme?
   (a) Provincial and/local govt (b) National government
   (c) International governments (agencies) (d) Private sector
   (e) Others (Please State)_____

5. What are the roles of stakeholders?
   (a) Planning (b) Funding
   (c) Infrastructure donations (d) Other (Please State)_____

6. How does government policy influence Entrepreneurship and incubation?
   (a) De-regulation (b) Providing funding for incubators
   (c) Providing funding to incubatees (d)Other (Please State)_____

7. Are there any funding mechanisms for future? Please select the sources:
   (a) Donor funds (b) Government
   (c) Private Sector (d) Other (Please State)_____

8. What are the roles of board members?
   (a) Advice to incubator CEO's (b) Policy and planning
   (c) Mentoring to incubatees (d) Other (Please State)_____

9. Are there Training programmes in place for Programme Managers? Yes/No
   (a) Workshops (b)Seminars
   (c) Entrepreneurship programmes (d) Others (Please State)_____

10. What are the criteria employed in selecting incubators?
    (a) Good Business plans (b) Feasibility Study
    (c) Technology Focus (d) Others (Please State)_____

11. How does incubation integrate with other economic development initiatives?
    (a) Community involvement (b) Sharing funding
    (c) Overlap with other govt incentives (d) Filling a specific gap
    (e) Other (Please State)_____

12. Does Godisa have network partners? Yes/No. If Yes, which categories of partners?
    (a) Private sector (b) Government
    (c) Local Communities (d) International Partners
    (e) Others (Please State) _____

13. Is Godisa a member of Incubation Association/s? Yes/No. If Yes:
    (a) South African Associations (b) International Associations
    (c) Other (Please State)_____

14. Are there Plans or Policies for sustainability of incubators? Yes/No. If Yes, how
    (a) Negotiations for tax rebates (b) Further funding /subsidies
    (c) Donor Funding (d) Other (Please State)_____

ANNEXURE B

QUESTIONNAIRE FOR THE INCUBATOR/CENTRE MANAGERS

Please note that for some of the following questions more than one answer may be selected.

A. THE MANAGER

1. Please select the qualifications that you possess:

(a) Business degree/Diploma (b) Entrepreneurship degree/Diploma

(c) Science/ Technology degree Diploma (d) Other (Please State)_____

2. Please select the previous experience gained:

(a) Entrepreneurship (b) Business Management

(c)Training (d) Other (Please State) _____

3. How are you remunerated?

(a) Fixed salary only (b) Performance related salary

(c) Fixed salary + Performance bonus (d) Other (Please State)_____

4. Are you presently furthering your Education? Yes/No. If Yes, in which field?

(a) Project Management (b) Business Management

(c) Entrepreneurship (d) Other (Please State)_____

B. THE INCUBATOR

(i) PREPARATORY PHASE

5. What were the categories of the initial sponsors?

(a) Government (b) Private Sector

(c) International Donors (d) Other (Please State)_____

6 What were the categories of other stakeholders involved in the project?

(a) Local government
(b) Provincial Government
(c) National Government
(d) Local communities
(e) Tertiary Institutions
(f) Private Sector
(g) Others (Please State)_____

7. What were the roles of the stakeholders

(a) Funding
(b) Planning
(c) Advice
(d) Donation of infrastructure/land
(e) Others (Please State)_____

8. Was there a Feasibility Study (Building, proximity to university/research institute/ demand for clients etc) conducted? Yes/No. If Yes, Please attach the report.

9. Are there any supportive government policies in place in your area? Yes/No. If Yes, how do they benefit the incubator?

(a) Tax rebates for the incubator
(b) Funding for the incubator
(c) Funding for the incubatees
(d) De-regulation
(e) Other (Please State)_____

(ii) IMPLEMENTATION PHASE

10. What are the categories of board members?

(a)Government
(b) Private Sector
(c) Tertiary Institutions
(d) Others (Please State)_____

11. What are the roles of the board members?

(a) Advising entrepreneurs
(b) Advising the CEO
(c) Policy inputs
(d) Other (Please State)_____

12. Criteria used for management team selection :

(a) Entrepreneurial/coaching/Education
(b) Previous relevant experience
(c) Other Experience or Education (Please State)_____

13. Are there any Training programmes in place to develop the management team?

(a) Entrepreneurship (b) Project Management

(c)Business Management (d) Other (Please State)_____

14. What are the Entry Criteria employed for tenants

(a)Level of education (b) Product/process feasibility

(c) Financial health (d) Previous experience

(e) Others (Please State)_____

What is the involvement of the local community in the project?

15. (a) Support (b) Promotion

(c) Marketing (d) Tenants

(e) Other (Please State)_____

(iii) OPERATIONS

16.How does the incubator benefit from the tenants

(a)Equity, (b) Royalties

(c) Charge per use (d) Other (Please State)_____

17. Does the incubator provide credit facilities to tenants? If yes, what type?

(a) Revolving credit loans (b) Bank guarantees

(c) long-term loans (d) Other (Please State)_____

18.What is the role of large private sector companies or associations in the incubator?

(a) Subcontracting (b) Funding (training etc)

(c) Employing some graduates (d) Other (Please State)_____

19.Does the incubator have networking partners? Yes/No. If Yes are they from:

(a) Private Sector? (b) Other incubators?

(c) International communities? (d) Local communities?

(e) Other? (Please State) _____

20.Is the incubator a member of incubation associations? Yes/No. If Yes, are they:

(a) Local? (b) International?

(c) Other? (Please State)_____

Please give the totals of these figures since the inception of the incubator:

21.Number of entrepreneurs in training :

22.Number of entrepreneurs in incubation

23No. of entrepreneurs graduated:

24. No. o entrepreneurs completed courses:

25. Sales generated by entrepreneurs:

26. Number of jobs created by entrepreneurs while in the incubator:

27. Number of jobs created after graduating:

(d) SUSTAINABILITY

28.What are the main markets for incubator products?

(a) Local (b) Export

(c) Other (Please State)_____

29.Sales generated by the incubator through (since inception)

a. Training:
b. Consulting:
c. Demonstration:
d. Rentals (space and machines)
e. Post incubation consulting

30.What are the plans for future financial sustainability of the incubator?

(a) Donor funding (b) Continued government subsidy

(c) Private Sector Funds (d) Other (Please State) _____

ANNEXURE C

QUESTIONNAIRE FOR ENTREPRENEURS

Please Note that for some of the following questions more than one answer may be selected. Please indicate your selection by placing a tick (√) next to the appropriate number.

A. ENTREPRENEUR

1. Please select your Education level before incubation/training:

(a) Below Matric (b) Matric

(d) University Graduate (e) Other (Please State)_____

2. Did you have any previous knowledge on the product/Course? Yes/No. If Yes, what category?

(a) Technical (b) Business

(c) Marketing (d) Distribution

(e) Other (Please State) _____

3. Did you have any previous experience on the products/processes? Yes/No. If Yes, what category?

(a) Technical (b) Business

(c) Marketing (d) Distribution

(e) Other (Please State) _____

4. What was your family background?

(a) Wealthy family (b) Average family

(c) Poor family (d) Educated family

(e) Uneducated family (f) Other (Please State)_____

5. Who motivated you to join the incubator?

(a) Family (b) Own drive

(c) Incubator Management (d) Other (Please State)_____

6. What was your employment status before incubation/training?

(a) Employed (b) Unemployed

(c) At school (d) Other (Please State)_____

7. If applicable, what is your employment status after incubation/training?

(a) Employed (b) Unemployed

(c) At school (d) Other (Please State)_____

B. THE BUSINESS

8. What is the legal status of your business?

(a) Close corporation (b) Pty Limited

(c) Section 21 (d) Other (Please State)_____

9. Where did you obtain your initial capital?

(a) Family (b) Bank loans

(c) Government grants (d) Other (Please State)_____

10. Presently, do you have any access to grants and loans? If Yes, what types?

(a) Government grants (b) Bank loans

(c) Revolving credit from incubator (d) Equity/venture capital

(e) Other (Please State)_____

11. Are you involved with large private sector companies? Yes/No. If Yes, how?

(a) Sub-contracting (b) Partial funding

(c) Equity (d) Other (Please State)_____

12. Where are your main customers located?

(a) Local (b) Abroad

(c) Other (Please State)_____

13. Are you utilising /do you envisage utilising incubator consulting after graduation? Yes/No. If Yes, which services?

(a) Demonstration

(b) Further training

(c) Partial space for your employees

(d) Other (Please State)_____