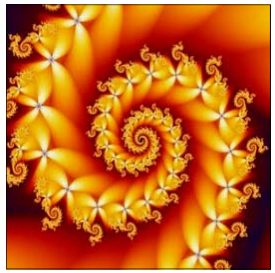

3.1 Objective

The aim of this study is to make a contribution to the urban landscape of Tshwane by allowing access to facilities in which training in mathematics and computer science can be achieved to allow individuals to come to a place of self-actualisation, in which they can express themselves and grow. Self-actualisation is not defined as a state of not lacking, but rather as an internal need for growth that is associated with the acquisition of skills and abilities (Westen, 1996: 376).

The programme further aims to address the growing problem of *Digital Divide* in undeveloped countries.

3.2 Motivation

3.2.1 The Digital Divide remedied through a Cybercafé

The *Digital Divide* refers to "the gap between those who benefit from digital technology and those who do not…" (ITU, 2001). When one talks about the *Digital divide* one immediately thinks that it refers to the accessibility of computers.

This opinion is false, in that the computer itself is only a tool and it is the inaccessibility to their benefits that constitute the *Digital Divide*. The cause of the divide can be explained by the following paragraph:

> *"The poor are ignored because market forces assume that designing solutions for them will not be profitable. The result is that even where the poor are provided access to digital technology, it is low-quality and merely 'localized' versions of products and services intended for the rich. Furthermore, the digital technologies they do have access to, such as those that lure innocent rural dwellers into vapid pop culture, could be harmful rather than beneficial."* (Digital Divide, 2009).

It is therefore important to understand that a mass distribution of computers to those who did not have access will not necessarily close the gap. South Africa finds itself in an interesting situation, where it is classified as an anomaly among undeveloped countries, because of access to most of the digital amenities of the developed world, but only recently being recognised as an industrialised nation.

Table 3-1: Internet users and population statistics for Africa *(Source: IWS, 2009)*

AFRICA REGION	Population size (2008)	Portion in world (%)	Internet users	Penetration of population (%)	User growth (2000-2008)	Users in world (%)
Total for Africa	975,330,899	14.5 %	54,171,500	5.6 %	1 100.0 %	3.4 %
Rest of World	5,734,698,171	85.5 %	1,527,400,089	26.6 %	328.5 %	96.6 %
WORLD TOTAL	6,710,029,070	100.0%	1,581,571,589	23.6 %	338.1 %	100.0 %

It is interesting to look at the amount of people that utilise the internet within South-Africa, as summarised in Table 3-1:

- At the end of 2008, there was an estimated 4.59 million South African internet users, compared to only 2.4 million in December 2000;
- Online advertisment revenues grew 27% in 2007 and 32% in 2008; and
- The number of broadband users has increased from 15 700 in 2003 to 1 058 000 in 2008.

According to South African e-Marketing specialist Dave Duarte[1]:

- Approximately 62% of South Africans with access to the internet do so from their workplace with a further 27% accessing from home, 6% from educational facilities and 3% from public Internet cafés;
- 27% of Internet access is in Johannesburg, 12% from Pretoria, 16% from Cape Town and 6% from Durban;
- The Northern Province and the Northern Cape account for a total of 1% (Burke, 2009).

South-Africa constitutes only 8.5% of Africa's access numbers, the fourth largest contributor on the continent after Egypt, Nigeria and Morocco (IWS, 2009).

[1]Dave Duarte is an online and mobile marketing specialist, based in Cape Town. He is involved with educating and inspiring people to be better marketers using technology. He also lectures in the Executive MBA programme at UCT GSB.

It is clear that there is a large possibility for growth in South Africa with respect to internet usage, especially if one were to compare the country's statistics to that of Morocco. The Moroccan population is approximately 25% smaller than that of South Africa, but has 2.2 million more internet users than South-Africa (IWS, 2009).

This project could counter the problems associated with the lack of internet access by enabling public access on a broad scale through its facilities and siting. It is the intent to tie this in with a strong educational co-habitor that will provide training and be responsible of the internet facilities.

3.2.2 The problem of Mathematics education in South Africa

In the words of the South African Mathematics Foundation...

> *"Our country faces many challenges, the main focus being that of economic development. An accelerated economic development should be spearheaded by appropriate technological innovations and advancement. For this to happen there is general consensus that the quality of teaching and learning mathematics is central to any curriculum."* (SAMF, 2009).

One of the biggest challenges in the current education system of South Africa is the issue surrounding Mathematics education. The SAMF are of the opinion that the future prosperity of South Africa is dependent on increased numbers of mathematically qualified persons.

The two professional societies for mathematics in South Africa, the South African Mathematical Society (SAMS) and the Association for Mathematics Education of South Africa (AMESA) have combined their resources to address their common areas of operation in mathematics development and education in South Africa.

The SAMF has identified the following challenges:

- Few learners do mathematics at Further Education and Training (FET) level;
- The need for mathematical literacy;
- Poor public image of the state of mathematics;
- Shortage of appropriately equipped teachers of mathematics;
- Lack of appreciation and acknowledgement of mathematics as the basis for scientific and technological advancement; and
- The concern of stakeholders of the competency level of our learners in mathematics (SAMF, 2009).

Both these societies have been run by mathematicians or mathematics educators in their spare time. University and other tertiary educators, as well as school educators have been doing this without remuneration. With limited resources the foundation have so far been remarkably successful in their efforts, but it has now become clear that both these societies have reached a point where no further significant contribution towards a solution to the problem can be made in their current capacity (SAMF, 2009).

Through a national office situated in Pretoria, it will be possible to create awareness and have the infrastructure to extend a number of their existing initiatives and embark on new projects. It can be seen that it is a very difficult, if not impossible task to accomplish while working as a virtual office of volunteers and unpaid staff.

3.3 The client

The National Research Foundation (NRF) is the government's national agency responsible for promoting and supporting basic and applied research and innovation, The NRF provides services and grants to support research and postgraduate research training, vital to the development of South Africa. It is the NRF's vision to be a key role player in the creation of an innovative, knowledge-driven society where all citizens are empowered to contribute to a globally competitive and prosperous country (NRF, 2009).

One of the seven research themes that are outlined by the NRF is that of Science, Technology and Mathematics Education, or also called STME. According to the NRF a review of recent trends in mathematics and science, school level science and mathematics education plays an important role in societal development of a country. It is the base upon which expertise in technological development and deployment exists. The NRF states that school science and mathematics enhance the scientific literacy of citizens which empowers them to participate in decisions that affect their lives. This need for a new emphasis on mathematics and science education is recognised worldwide.

South Africa has a comprehensive science and technology policy, but there is concern that it lacks specific focus on science and mathematics education. The distressing reality is that South African students perform poorly in terms of international comparisons regarding achievements in mathematics and science. Pass rates in science and mathematics are generally poor and student enrolments at tertiary educational institutions are decreasing in science and engineering related fields.

Research has shown that schools lack adequately qualified mathematics and science educators, and that there is some indication of poor preparation during undergraduate and postgraduate training (NRF, 2009).

Funding from the NRF is mostly directed towards academic research, developing high-level human resources, and supporting national research facilities. The NRF strives is to improve research in all fields including natural sciences, engineering, and technology. By forging strategic partnerships locally and internationally, it extends the resources that researchers need to foster and expand South Africa's research capabilities and, ultimately, to improve the quality of life for all (NRF, 2009).

It is proposed for the purpose of this study that one such strategic partnership is with the SAMF and as such the client is defined as a strategic partnership between the NRF and the SAMF.

Although the main focus of the project is the flagship office of the SAMF, it is also recognised that that the cybercafé would need to be sublet to a competent tenant. It is suggested that a partnership is embarked upon by the SAMF and an existing franchise that may be interested in such a high profile project due to its purpose and also proximity to the Gautrain station.

3.4 Areas allocated

After making contact with the American Mathematical Society (AMS) as a model of how the SAMF could operate in the future, a Schedule of Areas was developed.

Table 3-2: Schedule of areas

Basement -2	Basement -1	Ground Floor	First Floor	Second Floor
Lift	Lift	Lift	Lift	Lift
Stairs	Stairs	Stairs	Stairs	Stairs
Fire Escape	Fire Escape	Fire Escape	Fire Escape	Fire Escape
		Water Storage	Water Storage	Water Storage
Access Roads	Access Roads	Access Roads		
Parking	Parking	Parking		
	Disabled Parking	Disabled Parking		
	Deliviries Parking			
	Miscellaneous Store Room 16.10 m²			
	Sanitary Store Room 10.20 m²			
	HV & LV Room 12.30 m²			
	HVAC Plant room 12.30 m²			
	Security Office 11.70 m²			

SAMF		SAMF		SAMF	
Ablution	32.89 m²	Ablution	25.97 m²	Ablution	25.97 m²
Ablution for Disabled Persons	3.50 m²	Sound Lobby	5.38 m²	Library	38.79 m²
Reception	5.75 m²	Auditorium	73.46 m²	Audio Visual cubicles	44.60 m²
Waiting Area	24.70 m²	Exhibition Space	46.58 m²	Pause Areas	14.38 m²
Facilities-Manager Office	10.29 m²	Lecture Rooms	102.47 m²	Staff Board Room	36.36 m²
Store-Room	2.26 m²	Computer lab	71.85 m²	Staff Kitchen	8.32 m²
Book Shop	41.83 m²	Pause Area	14.89 m²	Server & Patch Room	7.39 m²
Store Room for Bookshop	2.90 m²	Balcony	9.60 m²	Offices-Open Plan	80.93 m²
Cyber Café		Balcony	13.70 m²	Offices-Private	4.93 m²
Reception	5.20 m²	Balcony	15.16 m²	Balcony	9.60 m²
Seating Area's	41.35 m²			Balcony	13.70 m²
Server & Patch Room	11.14 m²			Balcony	15.16 m²
Equipment Store	3.18 m²				
Kitchen & Scullery Area	24.12 m²				