

**FEASIBILITY STUDY  
FOR THE ESTABLISHMENT OF  
A NETWORK OF ARTS AND SCIENCE CENTRES  
IN SOUTH AFRICA**

**SUMMARY OF THE PHASE 1 REPORT**

**TO THE  
DEPARTMENT OF  
SCIENCE AND TECHNOLOGY**

**FROM  
ULWAZI**

**AUDIT OF EXISTING  
ARTS AND SCIENCE CENTRES  
IN SOUTH AFRICA**

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## **1. Introduction**

In February 2004, the Department of Science and Technology (DST) appointed Ulwazi to conduct a feasibility study on the establishment of a National Network of Arts and Science Centres that can provide unique interactive experiences in science and technology. This document provides a summary of Phase 1, the audit of existing arts and science centres, the field work for which was carried out in March and April 2004. In the subsequent phases of this study, Ulwazi proposes to develop alternative models for a network of science centres, analyse these models and recommend an ideal model.

## **2. Policy Context**

The proposed network of arts and science centres will support DST's mission to provide an enabling environment for innovation and research, an important component of which is building human capital in sciences, engineering and technology (SET). South Africa rates poorly in terms of its abilities and competitiveness in science and technology. Building human capital requires learners to become interested in SET as a career, which relies equally on formal and informal forms of education. Science centres present SET as interesting and fun, encourage personal engagement and contribute toward the cultivation of a much-needed science culture, particularly in disadvantaged communities. The network of arts and science centres will allow the interfaces between arts, science, culture and technology to be explored, demonstrate the relevance of SET and encourage creativity within and across disciplines.

## **3. Definitions**

For the purposes of this audit, science centres are divided into fixed facilities (true science "centres") and mobile resources. Science centres are defined as permanently established educational facilities that provide interactive exhibits and displays as well as interactive teaching and learning in science, engineering, technology, mathematics and related fields. Science centres may operate independently or as a division of another institution, such as a museum, university or research establishment.

Mobile Resources are defined as permanently established educational resources that provide interactive exhibits and displays at remote sites. Mobile resources include mini-buses, buses and articulated trailers that operate with the objectives of a science centre in mind. Excluded from this definition and from the audit are temporary events (such as science fairs), resource centres (lacking interactive exhibits), and travelling exhibits (which are not permanently established).

In regard to Arts Centres, Ulwazi was asked to focus on 42 Community Arts Centres (CACs) established through the Department of Arts Culture Science and Technology's "Culture in Community Programme" to provide opportunities for and training in arts, craft and culture. By this definition, Arts Centres do not include facilities such as art galleries and theatres.

## **4. Audit of Science Centres and Mobile Resources**

Using various sources, 45 science centres and mobile resources were listed for possible inclusion in the audit. Within the time frame and resources available, the objectives of the audit are seen as being to present information on science centres/mobile resources, but not to verify this information, nor to evaluate the performance of each centre, nor to compare science centres with other forms of informal SET education. To gather the information for the audit, Ulwazi developed a questionnaire, sought to have the questionnaire completed by a representative at each centre/mobile resource, and visited each centre to gather additional information.

Of the 45 centres/mobile resources approached and investigated, 25 were eliminated from the analysis, 11 because of insufficient information as they are only at a concept or feasibility study stage, six because they are either not operating or lack permanent interactive exhibits, and eight mobile resources for which insufficient information is available or the purpose of the mobile resource was found to be not that of a science centre. The remaining 20 facilities: 13 operating science centres, two science centres under construction and five mobile resources are included in the analysis (see Annexure 1).

## **5. Audit of Community Arts Centres**

Of the 42 Community Arts Centres, nine were selected for possible consideration in the audit based on a 2002 report "Toward Optimally Functioning Community Arts Centres in South Africa" and discussions with the authors. Ulwazi was able to visit six of these centres, as well as one other, the Kouga Cultural Centre, only recently built.

Based on these visits, Ulwazi determined not to proceed with further analysis of CACs at this stage as almost all were found to be marginal institutions, struggling to complete their existing mandate, poorly suited to house either permanent or temporary science exhibits, and poorly positioned with regard to access by school children. Bayworld (Port Elizabeth Museum) and Kouga Cultural Centre will be further considered in the subsequent stages of this study.

## **6. Location of Science Centres and Mobile Resources**

Science Centres/Mobile Resources are unevenly distributed within South Africa. Of the 20 facilities included in the analysis, seven are located in Gauteng, four in KwaZulu-Natal, two in each of Limpopo, Western Cape and Eastern Cape, and one in each of Mpumalanga, North West and Free State. There are no facilities in the Northern Cape.

Of the eleven proposed centres, five are in the Eastern Cape (four of which are in the Nelson Mandela Metropole), two in the Western Cape, and one in each of the Northern Cape, Gauteng, Limpopo and Free State (Annexure 2). In addition, a number of the centres that were excluded from this analysis could be resuscitated and/or expanded to include interactive exhibits and a number of mobile resources excluded due to a lack of information could also be considered as part of the network (Annexure 3). In some provinces, these new/revamped centres and mobile resources would fill in gaps but, in other provinces, they would only serve to accentuate the imbalance. This matter will require further attention in the subsequent phases of this study.

Organisationally, science centres are variably located: two are owned/managed by each of an educational institution, museum and shopping centre; and one is located in each of an office complex, theme park, research facility, entertainment/sporting complex, community complex and provincial park. Only one, Sci-bono Discovery Centre, is freestanding.

## **7. Objectives of Science Centres and Mobile Resources**

Within the overall vision of offering stimulating educational experiences, most centres list one or more particular missions such as promoting access to and enhancing the understanding of SET, supporting learners and educators working within the formal curriculum, and creating an interest in the pursuit of further education and careers in science.

The principal target is school age children, reached by encouraging visits by schools and other groups, individuals and families. The principal market is within the local communities, but some centres do attract visitors from elsewhere and some see themselves as a national resource and tourist attraction.

The variations in objectives and target may in part reflect the ownership of centres/mobiles, with 13 being publicly owned and seven being privately owned. Of the publicly owned centres/mobiles, five (25%) are being operated by a university and four (20%) by parastatals.

## **8. Start Up**

Of the 20 centres/mobiles included in the analysis, the majority (11 out of 20) are less than five years old, having been built/commenced construction since 2000; while five are 10 -15 years old and four are more than 15 years old. Centres range in size from 58 square metres (KwaZuzuluwazi) to about 4 200 square metres (MTN ScienCentre), while Sci-Bono will reach 11 000 square metres when complete. More than half the centres are less than 1 000 square metres in size.

Only four operating centres have an accurate record of their capital costs which, after adjusting for inflation, range from R 4,9 million (Unizul) to R 23,3 million (MTN ScienCentre). Development costs for these four centres ranged from about R 3 100 per square metre (Unizul) to R 8 900 per square metre (Olwazini). Sci Bono, which is currently being completed, is budgeted at R 150 million or R 13 600 per square metre.

However, it is unwise to regard these values as either representative or comparable: None of these centres required the construction of a new building and other variables are substantially different (such as the need for building renovations and whether the centre is required to pay a lease).

From information received from all 20 centres/mobiles, it would seem that the private and public sectors will have contributed about equally to their development: R 103 million vs. R 95 million (unadjusted for inflation).

## **9. Focus**

Although most centres provide general science exhibits, many have specific themes or foci relating either to society or a particular aspect of SET. For the most part, centres concentrate on the physical sciences reflecting the ease of developing this form of interactive exhibit and the background of the champion. Other sciences may form the substance of science shows and demonstrations.

Of the 15 centres, ten (66%) have fewer than 50 exhibits, while four centres list more than 200 exhibits. Only one centre identifies itself as specifically dealing with culture, but eight (more than 50%) have some cultural exhibits. Half the respondents indicated that 76% or more of their exhibits are interactive, while four centres/mobiles indicated that fewer than half their exhibits are interactive. The degree of sophistication of exhibits varies substantially.

Almost all centres provide unrestricted access to exhibits, guided use of exhibits, education programmes, on-site training of educators, and regular science shows; while most also participate in outreach, such as taking exhibits to schools and participation in exhibitions and science fairs.

## **10 Capacity**

Only five centres indicated that their space was fully utilised, although many suggest that they lack adequate facilities.

Staff employed by SA's science centres/mobile resources range from one person to 24 people. The 20 centres/mobiles employ a total of 159 people, but also make use of a further 190 volunteers. Most centres/mobiles regard their general management and education skills as being good, administration as being adequate, and fundraising and marketing as being adequate to poor. Only ten centres (50%) indicated that their staff are fully utilised, but a majority saw the need for more staff.

Only four centres keep a detailed attendance record. However, all but one centre was able to provide total attendance for 2003, which ranged from 142 000 (MTN ScienCentre) to 400 (Mobile Biology Laboratory). It is concluded that the 20 centres/mobiles reached a total of about 518 000 people in 2003, of whom about 335 000 (65%) were children. Improvements in recording attendance would be helpful to individual centres/mobiles, as well as those seeking an overview of the sector.

## **11 Operating Income and Expenditure**

Centres operate between five and seven days per week; while the schedule of mobile resources depends on school terms and other events.

Only six centres prepare an annual report, and only four centres and three mobile resources were able to provide a detailed breakdown of operating income and expenditure. The highest income earner is MTN ScienCentre (R 3,3 million), followed by Gateway (R 2,1 million) and Unizul and HartRAO (both with about R 0,6 million). Income is, in part, a reflection of entrance fees, which range from an upper level of R 24/R 20 for adults/children to a level of R 5 for adults/children. Two centres do not charge.

Overall, the private sector would appear to provide substantially more than the public sector to operating income (eleven of fourteen significant donations listed).

With regard to operating expenditure, science centres that form part of a museum, parastatal or university are not typically treated as a stand-alone cost centre/business unit. Major components (e.g. salaries, maintenance, and administration) are likely not to form part of a budget and are covered elsewhere in the institution.

Ulwazi would have wished to provide an analysis of income and expenditure, as well as comparisons with other variables, such as visitor attendance. However, such an analysis would be misleading due, firstly, to the paucity of data and, secondly, to difficulties comparing such data as is available.

It may be concluded that accurate financial information may not be of importance to many owners/operators of science centres. Such centres/mobiles are likely considered only as a part of, or add-on to, their main activities.

Many centres would indicate that they have never been funded adequately, that they need to scramble to secure additional support and that they are forced to curtail programming and staffing to make ends meet. However, in spite of these difficulties, their continued existence, often over many years, is evidence that most have, in fact, achieved a level of sustainability. Nevertheless, to fully assess the general viability and sustainability of science centres/mobile resources, it will be necessary to secure improvements in financial reporting.

## **12 Performance and Planning**

Only 50% of centres/mobiles undertake customers surveys, fewer than 30% undertake internal reviews and only one (MTN ScienCentre) has sought an independent assessment. It must be concluded that improvements should be achieved in these areas. Financial accountability is, however, strong with 80% employing an auditor.

The majority of centres/mobiles prepare a budget (70%) and a strategic/business plan (60%). However, few undertake market surveys or produce marketing plans. Most would like to expand, for example, to add an auditorium or planetarium, or to increase staff and the number/variety of exhibits.

The major problems facing science centres/mobile resources are described as being: financial sustainability, staff capacity, continuity, vandalism/theft and linguistic skills.

## **13. Partnerships and Networking**

Most centres have developed partnerships with other science centres, some nationally and many internationally. 14 of the centres/mobiles are members of SAASTEC, but costs preclude all but one from joining another international network.

Ten centres/mobiles indicated links and partnerships with other institutions, the most common being with a local university to assist with teacher training. However, links with arts and cultural organisations are limited, the majority being in KwaZulu-Natal and few centres involve the wider community in their operations.

### **ANNEXURE 1**

**SCIENCE CENTRES AND MOBILE RESOURCES  
INCLUDED IN THE ANALYSIS IN THE PHASE 1 AUDIT**

<b>Existing Centres</b>	<b>Location</b>	<b>Province</b>
1. Transvaal Museum Discovery Centre	Pretoria	GP
2. Discovery @ TUKS	Pretoria	GP
3. Museum of Science and Technology	Pretoria	GP
4. Exploratory at Gold Reef City	Johannesburg	GP
5. Sci-Bono	Johannesburg	GP
6. Hartebeesthoek Radio Astronomy Observatory	Hartebeesthoek	GP
7. University of the North Science Centre (UNIN)	Polakwane	LP
8. MTN ScienCentre	Cape Town	WC
9. Gateway Science Centre	Umhlanga	KZ
10. Kwazuzuluwazi, Durban Natural History Museum	Durban	KZ
11. Olwazini Discovery Centre	Pietermaritzburg	KZ
12. Unizul Science Centre	Richards Bay	KZ
13. Lydenburg Waterfocus Centre	Lydenburg	MP
<b>Centres Under Construction</b>	<b>Location</b>	<b>Province</b>
14. Potchefstroom Science Centre	Potchefstroom	NW
15. Boyden Science Centre	Bloemfontein	FS
<b>Mobile Resources</b>	<b>Base</b>	<b>Province</b>
16. Tsebo Koloing	Pretoria	GP
17. Discovery Centre	Cape Town	WC
18. Fantastic Fish Tank	Grahamstown	EC
19. Mobile Biology Laboratory	Grahamstown	EC
20. Giyani Science Centre	Giyani	LP

## ANNEXURE 2

### SCIENCE CENTRES IN THE PLANNING STAGES EXCLUDED FROM THE ANALYSIS IN THE PHASE 1 AUDIT DUE TO INSUFFICIENT INFORMATION BEING AVAILABLE AT THE TIME OF THE AUDIT

<b>Centre Province</b>	<b>Location</b>	
<b>Concepts</b>		
1. SALT Activity Centre	Sutherland	NC
2. Thesen Islands Environmental Centre	Knysna	WP
3. Inner City Science Centre	Port Elizabeth	EC
4. Madiba Bay Science Museum, Eduworld	Port Elizabeth	EC
5. Umtata Science and Technology Museum	Umtata	EC
<b>Feasibility Studies</b>		
6. Tswaing Crater Museum	Tswaing	GP
7. Bayworld	Port Elizabeth	EC
8. UDD TechnoCentre	Uitenhage	EC
9. Hermanus Science Centre	Hermanus	WC
10. Vuwani Science Resource Centre	Thohoyandou	LP
11. Metsimaholo	Sasolburg	FS

### ANNEXURE 3

#### DEVELOPED SCIENCE CENTRES AND MOBILE RESOURCES EXCLUDED FROM ANALYSIS IN THE PHASE 1 AUDIT

<b>Science Centre</b>	<b>Location</b>	<b>Province</b>	<b>Reason</b>
1. iThemba Labs	Cape Town	WC	no interactive exhibits
2. Malelane Career Resource Centre	Malelane	MP	not operational
3. Mhalala Science Centre	Thulamahase	MP	no interactive exhibits
4. Southern Cross Space Centre	Port Edward	KZ	five interactive exhibits
5. Kwa-Dukuza Resource Centre	Stanger	KZ	few permanent exhibits
6. VW/AUDI AutoPavilon	Uitenhage	EC	two interactive exhibits
<b>Mobile Resource</b>	<b>Base</b>	<b>Province</b>	<b>Reason</b>
7. University of the North	Polakwane	LP	not operational
8. Two Oceans Aquarium	Cape Town	WP	insufficient information
9. Unizul Trailer	Richard Bay	KZ	included as outreach
10. Albany Museum	Grahamstown	EC	mobile classroom
11. ISETT Technology Mobile	East London	EC	insufficient information
12. Computer Technology Mobiles	(8 buses)	EC	insufficient information no interactivity
13. Reptile World Mobile Snake Park		no home base	no interactivity
14. Intel Technology Mobile	Bloemfontein	FS	marketing rather than educational focus