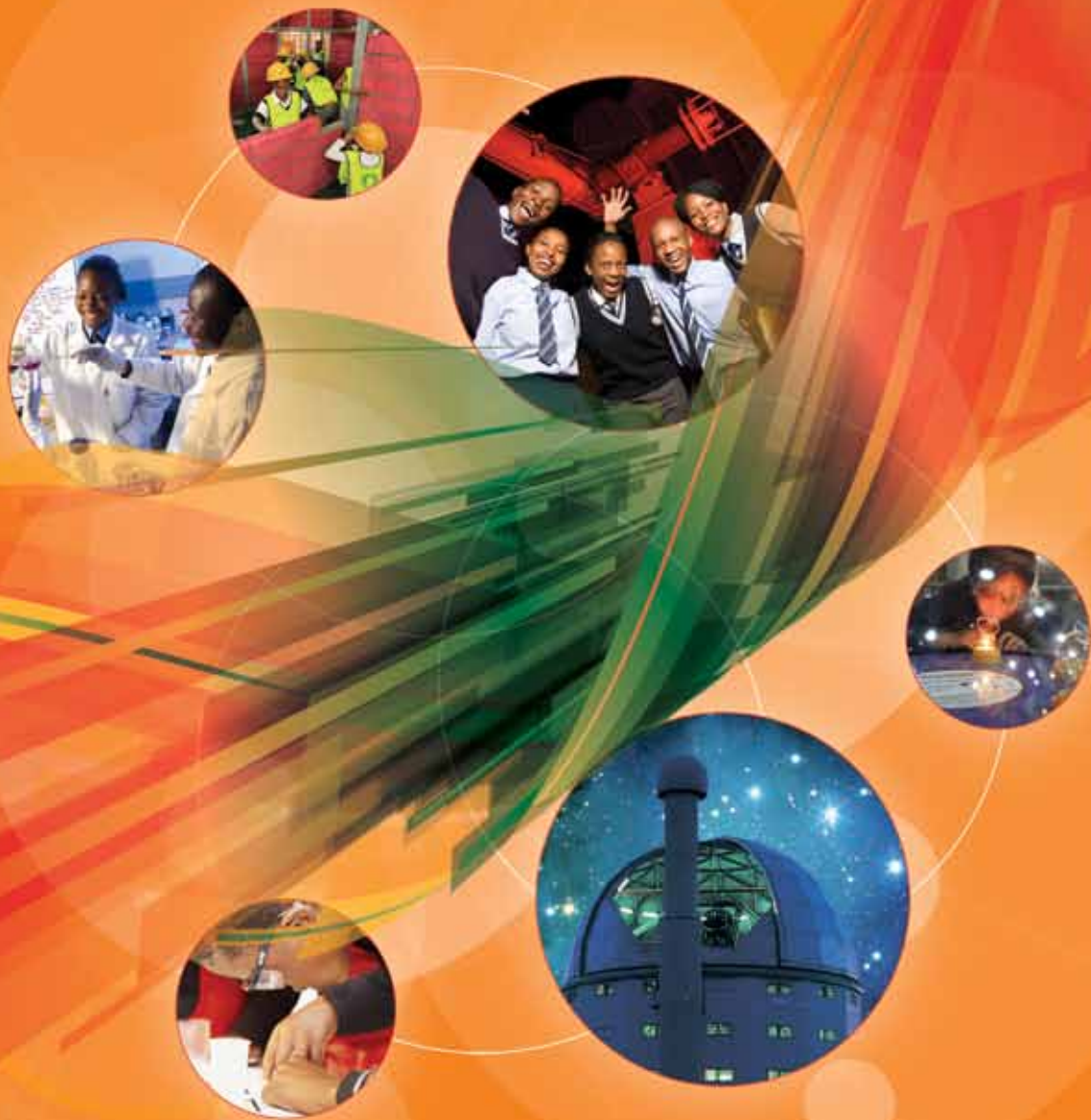# Framework for the Promotion of Excellence in a National Network of Science Centres

science
& technology

Department:
Science and Technology
REPUBLIC OF SOUTH AFRICA

MINISTER'S FOREWORD

South Africa's participation in the 2004 International Workshop on "The Changing Role of Science Centres and Museums in Developing Countries" in Hanoi, Vietnam, under the auspices of the Centre for Science and Technology of the Non-aligned and Other Developing Countries, reinforced our understanding that science centres should be sensitive to the needs of their communities. In 2005, the Department of Science and Technology, together with the local science centre community, therefore formulated four strategic focus areas through which science centres in South Africa respond to the needs of the local communities, namely, the promotion of science awareness among learners and the general public; contributing to the learning and teaching of mathematics, science and technology; the promotion of science, engineering and technology careers; and contributing to the identification and nurturing learners with talent and potential.

As South African science centres respond in their different ways to the varying needs of their communities, there is a need to be mindful of the quality of service they offer. *The Framework for the Promotion of Excellence in a National Network of Science Centres* seeks to encourage local science centres to be conscious of service quality and the need of service quality. The peer-review approach used by the framework creates an opportunity for science centres to learn best practices from one another, as well as a sense of belonging in all science centres.

The framework recognises that if science centres are to define and develop programmes that respond adequately to their objectives, the principle of responsible and value-based corporate governance will need to be upheld. Such organisational behaviour is a non-negotiable, given that science centres in South Africa receive significant external funding support from both the public and the corporate sectors. Science centres should therefore be financially and operationally accountable, with the necessary financial and administrative systems, as well as systems to measure the impact of their programmes.

I urge the local science centre community to use this framework, as it will be helpful in establishing a customised development programme for each science centre, and in ensuring that South Africa has a network of diverse science centres.

DEREK HANEKOM, MP
MINISTER OF SCIENCE AND TECHNOLOGY

CONTENTS

1. BACKGROUND

The White Paper on Science and Technology (1996) seeks to build a healthy National System of Innovation (NSI) that advances the social and economic development priorities of the country. Building an effective and successful NSI requires a society that to some extent understands science, engineering and technology (SET), and that values the critical role they play in ensuring national prosperity and a sustainable environment. The White Paper advocates a two-tier campaign to promote awareness and understanding of SET, namely, (a) promoting science and technology literacy, and (b) promoting awareness of the power of science and technology.

Through the Department of Science and Technology (DST), the government of the Republic of South Africa instituted the delivery of SET awareness campaigns in collaboration with various institutions, including science centres. Using interactive and/or hands-on exhibits and related programmes, science centres provide a platform for society to engage with SET. Science centre programmes also complement formal teaching and learning of mathematics and science. These subjects are critical in the development of SET human capital,

which is also an enabler for the building of a healthy NSI. The DST contributes to the development of an effective NSI through various strategic interventions, including science centre-driven initiatives targeting both the general public and the youth.

Against this background, the DST approved the *National Norms and Standards for a Network of Science Centres in South Africa*, which articulates the following four goals for science centres in South Africa:

• To promote science and technology literacy among young people and general public.
• To contribute to the enhancement of learner participation and performance in science, technology engineering and mathematics (STEM).
• To identify and nurture youth talent and potential in STEM.
• To provide career education in STEM-based disciplines.

In its pursuit of the above four goals, the DST regards a national network of science centres as the ideal infrastructure for the delivery of SET public awareness and SET youth development programmes.

This framework uses accreditation and quality assurance to guide the establishment and maintenance of a national network of science centres.

The framework recognises the **potential benefits** of rigorous accreditation practices for members of the network:

- Accreditation against a clear set of criteria would lend credibility to a science centre. This would have many benefits, including indicating to potential sponsors that the centre is worthy of support.
- Benchmarking could support the development of existing science centres and guidelines for the establishment of new science centres.
- Accreditation would develop a useful database of contact details and services (including exhibitions and programmes) and would provide a platform for communication and the sharing of relevant information, ideas and expertise among accredited science centres within the science centre community in South Africa and with other countries.
- Accredited centres would qualify to apply for financial grants, support and/or subsidies from the DST.
- Accredited centres would qualify to make use of a pool of exhibit expertise and travelling exhibits, training and shared programmes.
- Accreditation would provide a platform for international recognition.

The framework acknowledges the need to minimise the **potential constraints** inherent in any form of regulation. Implementation plans such as the Quality Assurance Manual for the Promotion of Excellence in a National Network of Science Centres (Annexure 1) and the Accreditation Criteria for the Promotion of Excellence in a National Network of Science Centres (Annexure 2) should be developed with end-users in mind and with ease of use and accessibility as key criteria for its approval.

An accreditation approach will be used to admit individual science centres to the network. This statement needs to be placed in perspective. A mechanistic accreditation approach could have a range of unintended consequences. A checklist-driven accreditation approach should be avoided as it could focus the science centre community on compliance with minimum externally set requirements rather than on continuous improvement towards a centre's own mission-appropriate goals.

3. POLICY DESIGN AND APPROVAL PROCESS

In 1999, the then Department of Arts, Culture, Science and Technology conducted a study to inform the development of an effective infrastructure that would be used to implement strategies of the Department to support science centres. This would be coordinated centrally under a representative umbrella body linked to education at both national and provincial levels. It was also advised that the proposed body should be government-funded and officially mandated to carry out its duties and to raise additional funding from the private sector.

In 2005, the DST approved a policy framework for a network of science centres in South Africa (referred to as the *National Norms and Standards for a Network of Science Centres in South Africa*).

The DST intends to create an environment for science centres to function optimally and improve target audiences' access to services rendered by these science centres. This will include establishing a national network of science centres. Against the above background, the DST embarked on a process to develop this *Framework for the Promotion of Excellence in a National Network of Science Centres*, which uses the accreditation approach to admit science centres to the envisaged national network of science centres in South Africa.

4. DEFINITION OF CONCEPTS

- A *national network of science centres* in the context of this framework refers to a group of science centres to which membership may be gained through a process of accreditation.
- A duly mandated *accreditation body* will make recommendations on accreditation and maintenance of membership of the network to the DST. The body is the custodian of the accreditation process, and is as such responsible for advice to candidate and member centres with regard to the accreditation process.
- A *science centre* is a permanently established educational facility that offers an informal educational experience in STEM through interactive exhibits and/or displays and/or interactive programmes.
- A *member science centre* is a science centre which has been admitted to the network through a process of accreditation, and whose accreditation is current. Member science centres are aligned to and supported by the DST.
- A *candidate science centre* is a science centre which has submitted a formal application for accreditation, but has not yet received formal accreditation.
- The *Quality Assurance Manual* contains the criteria for the accreditation and continued membership of science centres, describes the various steps in the accreditation

and peer-evaluation processes, and contains the protocols and templates for the various steps to be followed when planning and executing the peer-evaluation site visit. These include protocols for the selection of panels, the format of preparatory documents (including the standard accreditation application form with supporting documents), a pro-forma site visit programme, generic terms of reference guiding the self-evaluation, and a site-visit and peer-evaluation report (to be customised for each site visit). The processes described in the manual also inform the design specification of the electronic information management system and contain standard operating procedures for all core work processes (manual and electronic) that support the implementation of the framework and associated procedures. The Quality Assurance Manual is an annexure to the framework, but will be available separately in hard copy, in digital format and online.

- The *Accreditation Criteria* document has been developed as a separate document, as an Annexure to the framework. It contains the criteria to be used for self-evaluation of a science centre and will also be the basis for the peer-evaluation panel to use during an external evaluation. It will be available in hard copy, in digital format and online.

5. PURPOSE

This framework aims to establish a national network of science centres to which science centres voluntarily subject themselves, by –

- assigning responsibility for articulating the process and developing minimum criteria (compliance) for admission of a science centre to the network and for developing the criteria for self and peer evaluation (developmental approach) to maintain membership status.
- establishing a mechanism and implementation capacity (within the South African legislative environment) to make and report on accreditation decisions, and to maintain the process for ongoing monitoring and evaluation.
- articulating the need for appropriate information-management procedures and a supporting electronic

system to be developed and maintained by the accreditation body.

The framework makes provision for the admission and the management of ongoing membership of a diverse range of science centres. The framework acknowledges the diversity of science centres with regard to their areas of specific focus, developmental stage, and resourcing.

The intention is not to create a one-size-fits-all system. The implementation mechanisms for this framework are designed to accommodate diversity of service offerings by centres, but with the explicit proviso that all member centres should demonstrate a commitment to continuous improvement.

6. ARTICULATING PRINCIPLES AND VALUES

The DST intends to create an enabling environment for science centres in the network to function optimally and improve target audiences' access to services rendered by the national network of science centres.

The underpinning principle for this framework is to design and implement a developmental approach that will support continuous improvement rather than compliance with minimum requirements.

A fair and transparent process based on peer evaluation will afford participating science centres the opportunity to share best practices by –

- demonstrating standards and practices that other science centres can aspire towards;
- articulating the criteria against which science centres can be funded;
- providing a benchmark against which the success of science centres can be measured.

A developmental approach would require a *candidate centre* to demonstrate that –

- its mission statement supports one or more of the goals articulated in the National Norms and Standards;
- the mission is appropriate to the specific centre;
- a clearly articulated implementation plan serves to guide the centre to achieve the objectives articulated in its mission statement.

Continued membership would require the *member centre* to –

- have a clearly articulated and appropriate strategy for continuous improvement towards the realisation of its own mission;
- demonstrate that it is making satisfactory progress towards implementation of its strategy.

7. ACCREDITING BODY

It is the responsibility of the DST to establish and maintain an appropriate accreditation body in consultation with the science centre community.

The accreditation body will have two roles:

- Through its accreditation process, it will admit science centres to the national network of science centres. A fitness-for-purpose approach will ensure that a centre admitted to the network shares the DST's vision as set out in the four goals articulated in the National Norms and Standards.
- In support of its quality assurance activities, it will facilitate a peer-evaluation process to monitor continuous improvement towards mission-appropriate goals, with fitness for purpose being the key driver.

The accreditation body will be responsible for overseeing the implementation of the Quality Assurance Manual and the Accreditation Criteria document to support the above roles. Provision is to be made for two types of panels, with the appropriate support, to assist the accreditation body:

- The accreditation committee will consist of a minimum of three and a maximum of four members. It will include at least one person representing the local community of science centres, at least one third-party member who is not closely associated with a South African science centre, and at least one representative designated by the DST. The accreditation committee may co-opt persons to assist it in its work. The members of the accreditation committee are selected for a fixed term of 36 months, and may be reselected for a second term.
- The members of a *peer-evaluation panel* are selected for each site visit. The protocol for the selection and confirmation of the panel is described in the Quality Assurance Manual. The panel will consist of a minimum of three and a maximum of four members. It will include at least one member representing the local community of science centres, at least one third-party member who is not a member of the science centre community, and at least one representative designated by the DST. If possible, a panel member from abroad will be selected for each peer-evaluation site visit. The intention is two-fold:

o   To create an opportunity for input by credible peers from outside South Africa with a view to continuous improvement.

o   To familiarise peers from abroad with the operational standards upheld by South Africa's national network of science centres.

The DST will appoint a custodian for the accreditation body, which will be appropriately resourced to manage the process.

The accreditation body will be charged with receiving applications for accreditation from candidate science centres, managing the approved processes in respect of such applications, maintaining accreditation, facilitating the logistics and report writing for peer-evaluation visits, and managing the information associated with the processes.

As the custodian of the process of accreditation and maintenance of membership, the accreditation body will also have the following responsibilities and tasks:

•   Liaising with role players on all matters related to accreditation (including national authorities and other relevant accreditation bodies).

•   Representing the local science community on all matters related to accreditation and membership of the national network of science centres.

•   Providing advice to candidate science centres on the accreditation process.

•   Engaging with member science centres on the development, continuous improvement and implementation of the Quality Assurance Manual and the Accreditation Criteria document.

•   Assisting fledgling centres to incorporate appropriate quality management practices into their planning and operational activities, and promote the sharing of good practice. (This is to be done in a capacity-building role rather than as a form of inspection.)

•   Providing a records management service on the accreditation status of members and the tracking of the accreditation applications of candidate centres.

•   Providing administrative and logistical support with regard to peer-evaluation processes, including site visits.

•   Developing and maintaining the database and its user interface.

All applications for accreditation will be processed by the accreditation body, which will make recommendations to the accreditation committee in this regard. If and when approved by the accreditation committee, the accreditation body will submit recommendations for accreditation to the DST for a final decision.

8. DEVELOPMENT OF A NATIONAL ROLL/DATABASE OF SCIENCE CENTRES IN THE NETWORK

•   The specifications for the database are derived from the roles of the accreditation body and specific tasks allocated to it.

•   The database should support workflow and reporting capabilities, as well as automated feed to a website to ensure appropriate access to accreditation-related information by the envisaged network of science centres, the DST and the general public.

•   The database for the network should not be just a list, but should be designed to manage the initial accreditation (listing of centres that meet minimum requirements, in categories as set out in the National Norms and Standards) and the process flow related to the initial listing, as well as all quality management activities associated with maintaining accreditation status. The system should be designed to serve as a tracking system for accreditation applications and other processes

related to quality management. The output of the system should be accessible to member science centres and the general public via the websites of the Southern African Association for Science and Technology Centres (SAASTEC), the South African Agency for Science and Technology Advancement (SAASTA) and the DST.

•   The database should, in addition to the above functionalities, enable the public to search for existing members of the network and, among other things, check the status of member science centres with regard to the minimum recommended specifications for the relevant category or type of science centre.

•   Categories of information to be collected and housed in the database will be identified early in the design phase of the system and agreed upon by stakeholders before inclusion in the signed off system design specification.

The following processes are recommended for science centres that wish to apply for accreditation. Time frames for these are articulated clearly in the Quality Assurance Manual.

9.1 Application process

- Science centres that wish to apply for accreditation will submit a completed standard application form with supporting documents.

- Forms will be available in hard copy, in digital format and online on a website established and maintained for the purpose. Applications will be accepted through all three of these media.

- On receipt of an application form, the accreditation body will acknowledge receipt and assign a reference number to the application, after which the accreditation official will liaise with the candidate science centre and formally initiate the accreditation procedure.

- The accreditation procedure will involve an analysis of the application form and support documents, and a site visit by an accreditation panel convened by the accreditation body.

- The accreditation body will develop and run periodic accreditation training courses for science centre staff who, once trained, will be eligible to serve on peer-evaluation panels.

- There will be multiple categories of accreditation, defined broadly by the size and scope of services offered by science centres. The accreditation categories and the criteria governing the accreditation of science centres will be agreed upon and included in the Accreditation Criteria document and the Quality Assurance Manual.

- The categories of accreditation will be determined by the following criteria, which will be included in the Accreditation Criteria document and the Quality Assurance Manual:

  o Alignment of the vision and mission with the four goals articulated in the National Norms and Standards and other appropriate objectives.
  o Governance structure.
  o Sustainability planning.
  o Systems and procedures for data collection and impact assessment.

  o Total budget of the centre, including income and expenditure.
  o Size of staff (full-time and part-time staff).
  o Physical size of the centre.
  o Number and nature of exhibitions, exhibits and displays.
  o Scale of centre-based STEM projects, programmes and events, and the budget, reach and impact of each.
  o Number and nature of visitors hosted in situ, categorised in groupings such as learners, educators, the general public, etc.
  o Scale and scope of outreach projects, programmes and events and the number of participants reached.
  o Extent of engagement with the provincial education department and local schools.
  o Accessibility for disabled visitors.
  o Health and safety policies, procedures, systems and monitoring.

- On receipt of an application for accreditation, the accreditation body will be required to convene a peer-evaluation panel in line with the guidelines outlined in the Quality Assurance Manual. The panel will be responsible for assessing the application and conducting a peer-evaluation site visit in line with the accreditation criteria. A full report will be drafted, indicating the findings and a recommendation. All criteria will be checked, and all decisions and recommendations will be based on verified evidence.

- The accreditation process for an application for membership will be completed within six months of the date the application is received by the accreditation body (except where an extension is mutually agreed to in writing to make provision for the inclusion of an appropriately qualified foreign panel member).

- The peer-evaluation process for the maintenance of membership is outlined in the Manual, and is maintained as a five-year rolling plan that is approved by the DST.

Science centres outside South Africa may apply to be accredited by the body, but the costs will be borne by the applying centre or its government and not by the DST. Accredited science centres outside South Africa will not be entitled to the benefits made available by the DST to local accredited science centres.

9.2 Renewal of accreditation

The Quality Assurance Manual contains the rules for how renewal of accreditation status should be handled. It is envisaged that science centres will be notified by the accreditation body six months before the end of a five-year cycle. Science centres that move from one category to another before the end of the five-year cycle would be entitled to request reassessment.

9.3 Accreditation decision process

The following steps will be followed by the accreditation body when arriving at a decision about whether a candidate science centre will be accredited.

The ideal expressed in the framework document is that this process will be managed online. Where possible the process will therefore be supported online for those candidate and member centres that have access to the necessary technology. A member or candidate centre will not be penalised for not having access to the online platform.

An application will be received and acknowledged by the accreditation body, after which the process below will be followed.

Step 1	The accreditation body will assign an application reference number and a deadline for concluding the accreditation procedure. This may be done electronically. The application will be reported on and recorded in the minutes of the following accreditation committee meeting.
Step 2	The accreditation body will convene an peer-evaluation panel and arrange for a site visit.
Step 3	The accreditation body will adopt a supportive approach to accreditation and will seek to assist and facilitate the accreditation of new science centres. During the period in which the application is being processed, the accreditation body will attempt to assist the candidate science centre to comply with the criteria for accreditation, should this be necessary.
Step 4	Once all investigations have been completed, a full accreditation report with recommendations will be drafted and submitted to the accreditation committee, which will consider the recommendations and make a decision. This will not necessarily be at a meeting, but may be done via email or teleconferencing.
Step 5	The accreditation body will then send a formal recommendation to the DST.
Step 6	The DST will respond by either accepting or rejecting the recommendation.
Step 7	If the DST approves a recommendation that a centre be accredited, it will instruct the accreditation body to accredit the centre. If the DST rejects a recommendation that a centre be accredited (for which written justification must be provided), or approves a recommendation that a centre not be accredited, it will instruct the accreditation body to respond to the candidate science centre either by rejecting the application or by awarding conditional accreditation, setting conditions and providing a support plan to assist the candidate science centre towards full accreditation. The default intention will be to assist the candidate centre to fulfil the requirements for accreditation.
Step 8	The accreditation body will proceed to respond to the candidate science centre.

9.4 Appeal of a decision

An appeals process will be available to any science centre which has an application rejected or which is awarded conditional accreditation pending compliance with conditions set for full accreditation. Appeals should be lodged within three months. Appeals should be lodged with the accreditation body, which will forward them to the DST. An appeals panel will be convened by the accreditation body. The panel will consist of a minimum of two people and a maximum of three people, none of whom was involved in the original application. It will include at least one member of the local community of science centres, at least one third-party member who is not a member of the science centre community, and at least one representative designated by the DST.

9.5 Redress

The procedures according to which complaints against accredited science centres or the accreditation body should be dealt with are contained in the Quality Assurance Manual.

9.6 Withdrawal from the accreditation process or from the network

Science centres may withdraw from the accredited network under the following conditions, in consultation with the accreditation body and on the recommendation of the accreditation committee:

- Lack of funding.
- Lease not being renewed/being terminated.
- Natural disaster or political unrest.

- Insufficient staff.
- Any other reason regarded as valid by the accreditation body.

The DST may, on the recommendation of the accreditation body, terminate a science centre's accreditation if the centre fails to maintain the norms, standards and criteria contained in the Quality Assurance Manual and the Accreditation Criteria document, or if it fails to meet conditions set for accreditation in a site visit report within the prescribed time.

9.7 Monitoring and evaluation guidelines

Protocols for monitoring and evaluating the performance of individual members and the whole national network of science centres, which were designed collaboratively by stakeholders, are set out in the Quality Assurance Manual. The monitoring and evaluating process will be facilitated by the accreditation body, and will be reviewed at least every five years by the DST or a body delegated by the DST. The process will have to be approved by the Minister.