

Academy of Science of South Africa Institutional Review Synthesis Report 2016

Acknowledgments

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1. Executive summary

There is broad acknowledgement of the excellent work done by ASSAf from inception to date and the Academy is encouraged to retain this standard as a minimum. In the past five years ASSAf has gone from strength to strength and solidified as a fiercely independent organisation. It is an entity of importance in the contemporary South African science and technology landscape.

Feedback received during the interviews with stakeholders was overwhelmingly positive on leadership, programmes and outputs. The interviewees commended the Academy on its commitment to quality. The organisation was repeatedly recognised as credible nationally, regionally and globally. ASSAf is seen by many as a benchmark for African academies with good infrastructure and a competent secretariat working beyond its capacity.

ASSAf has clearly defined for itself the boundaries of its role as a science advisor. The Academy is careful to provide advice on the science that should underlie policy choices by government. It is viewed as doing this well. ASSAf does not take on the government's role of making actual policy decisions. This is important for ensuring the Academy remains valued by government.

There is an emerging appreciation within South Africa of the value of both ASSAf and science-based decision-making in general. Key parts of government understand the role of the Academy and support its continued growth and development. The combination of strong support from the government, exceptional leadership, and excellent and motivated staff has meant that ASSAf has managed to take on an increasingly large and complex portfolio of projects and has secured a recognised place for itself in the national system.

Positioning ASSAf in a complex statutory advisory terrain nevertheless remains an ongoing key challenge. Although most believe that the advisory roles of the National Advisory Council on Innovation (NACI) and ASSAf are clearly differentiated, the potential for overlap that creates confusion should not be discounted, particularly when it comes to advising on national policy for science, technology and innovation.

Despite being held in high esteem by the Department of Science and Technology (DST) specifically, there is scope for ASSAf to play a stronger role in providing evidence-based advice more widely across government. The Academy is strongly urged to do even more to align its strategic objectives with the government's triple national priorities of addressing poverty, unemployment and inequality and with the achievement of the global sustainable development goals (SDGs).

ASSAf's methodology for offering advice to the country – via the depth and breadth of its consensus reports and via its Members – is its greatest strength. ASSAf's consensus studies and advisory reports are of a consistently high standard. Interviewees felt that ASSAf needs to implement more inclusive ways of selecting priority topics and should carefully consider South Africa's priorities when selecting the questions asked in consensus studies. A question was raised about how ASSAf might play a stronger role in facilitating the implementation of recommendations from consensus studies. The Review panel heard that all government departments – and the South African public – need to be made even more aware of these outputs and activities, especially the consensus studies.

ASSAf seeks to develop and maintain productive partnerships with international partners that include other academies and their networks. Overall the Academy was lauded for maintaining

ongoing, increasing and effective relations with strategic international stakeholders. There is broad acknowledgement of the leadership and mentorship role of ASSAf on the African continent. ASSAf is recognised specifically for its contribution to capacity development through activities across the continent and its programmatic component that contributes to the development of science academies in Africa. Interviewees told the Review Panel that internationally, ASSAf should be saluted for its efforts in engaging on the continent.

There is a need for greater awareness within ASSAf of the cultural complexity of interactions at continental level (e.g. ASSAf is advised to build trust through more personal contact and communication). ASSAf should always engage with other academies in a culturally sensitive and diplomatic manner.

ASSAf is considered to be well connected, with a strong voice among the international network of academies included in the IAP membership. These international networks are essential as they provide for useful exchanges that are not dominated by any one group, such as the nations that enjoy the greatest resources for science.

Although it has done an excellent job of being an active participant in the international community of academies of science, ASSAf could look at aligning itself more strategically with academies in other important groupings such as the Brazil, India, China and South Africa (BRICS) group.

ASSAf's contribution to improving and supporting scholarly publishing in multiple ways, is seen as a ground breaking initiative. There was universal agreement among those interviewed that the Scholarly Publishing Programme is a flagship of the Academy. However, there is always room for improvement and this *Review Report* touches on possible opportunities to get even more mileage out of the excellent reputation produced by ASSAf's scholarly publishing activities. The Review Panel recommends that ASSAf consider ways of investing more in this programme.

A number of important challenges were raised during interviews and primary among them are the transformation challenges that include the under-representation in the membership of black, African scientists and women, as well as scientists from the humanities and social sciences. The transformation challenge is indeed a very real threat to the Academy. Improved and accelerated transformation would greatly improve ASSAf's standing, impact and its work. The Panel urges ASSAf to interrogate both the nomination and the voting processes and be innovative in promoting transformative election of its membership. The Academy, Council and Members are encouraged to play an active role in correcting the distortions in membership.

ASSAf was strongly advised to pursue transformation seriously, purposefully, vigorously, and do so in an intellectual manner and to be bold in tackling controversial issues.

The Academy makes very efficient use of its still limited resource base, infrastructure and overall human capacity. There is overwhelmingly positive feedback on leadership from inception, on programmes and on outputs. The Review Panel recommends that ASSAf implement a succession planning process to ensure continuity in critical leadership positions. ASSAf should consider restructuring the Secretariat and appointing a senior level academic to provide strategic support to the CEO.

ASSAf runs a lean staff team and is struggling to meet the overwhelming weight of compliance related to the non-financial aspects of the Public Finance Management Act (PFMA). The Review Panel urges DST to intervene and provide additional support to assist the Academy.

ASSAf is still largely dependent on DST for its core funding and more needs to be done to diversify sources of funding in order to ensure stability and sustainability in the context of independence. The Review Panel heard that the Academy should consider exploring resource diversification and mobilisation by taking a continental perspective; by leveraging corporate social investment related to proposed consensus studies and by tapping into private sector funding for core support.

There is broad acknowledgement of the leadership and mentorship role of the South African Young Academy of Science (SAYAS) nationally and on the African continent. The organisation has several flagship activities that contribute to ASSAf's overall objectives. The panel heard that SAYAS is doing excellent work and therefore ASSAf should continue to nurture the young academy, fortify the administrative support provided to it and increase their funding to allow them to better realise their self-determined strategic goals. The Academy should tap into the excellent group of young scientists in SAYAS when gathering and preparing effective, evidence-based scientific advice as well, as they have lots of new and innovative ideas.

SAYAS helps young scientists to contribute towards finding solutions to national and global challenges facing society; it represents the voice of young scientists in South Africa and provides a platform for young scientists to influence policy decisions. SAYAS can play a key role in transformation and leadership on the continent. Therefore their funding should be boosted in order that they may continue to produce these useful outputs. The Review Panel interviews suggested that a request for additional resources would be strongly considered at the highest level.

More detailed observations and recommendations aimed at addressing the challenges posed to the Academy are outlined in sections 6 and 7 of this report.

2. Recommendations summary

2.1 Policy: mandate, aims, objectives

2.1.1 National

- Maintain ASSAf's hard won independence to continue to advise the nation on critical issues
- Assume leadership role in promoting cooperation and coordination within National System of Innovation (NSI)
- Engage with the Department of Science and Technology (DST), National Research Foundation (NRF) and National Advisory Council on Innovation (NACI) on the role of ASSAf in the NSI
- Play a broader role and provide advice across government departments and the science ecosystem
- More closely align ASSAf policies with the National Development Plan (NDP)
- Articulate how ASSAf's work contributes to solving issues of poverty and inequality
- Increase awareness and visibility of the value proposition offered by ASSAf
- Find ways to make it easier for government, membership and even the public to suggest topics for consensus studies
- Codify the relationship with DST by way of a charter to ensure sustainability of ASSAf

2.1.2 International

- Foster a clear cooperative relationship on a continental scale
- Consult more with other African academies and develop formal collaborative programmes through MOUs
- Build greater awareness within ASSAf of the cultural complexity of interactions at continental level
- Keep the Academy's focus on issues and challenges pertinent to African countries
- Identify and address gaps in international engagement
- Establish stronger relationship with Brazil, Russia, India, China and South Africa (BRICS) groupings

2.2 Outputs: products and services resulting from activities and inputs

2.2.1 Science advice

- Implement more inclusive ways of selecting priority topics and carefully consider South Africa's priorities when selecting the questions asked in consensus studies
- Consider a more structured way of generating the questions ASSAf asks
- Make it easier for government, membership and even the public to suggest topics for consensus studies
- ASSAf has the ability to produce reports that can feed into the global Sustainable Development Goals (SDGs), pay closer attention to the SDGs and explore the opportunities presented by focusing on these global goals
- Tap into the full range and depth of intellectual capital held within Academy membership when considering science advice and don't rely on a small group via Council only
- Tap into the excellent group of young scientists in SAYAS

- Revisit dissemination strategies and customise the dissemination of each consensus report to ensure traction

2.2.2 Scholarly Publishing

- Explore the possibility of investing more in scholarly publishing, as it builds the science system
- Advance the creation of a research ethos and continue to facilitate high-quality research in South Africa
- Lead the effort in South Africa's scholarly publishing sector, to strive to make the gold route to open access mandatory, as it is the most sustainable in the long run
- Outsource some activities – e.g. online training of editors

2.2.3 Other outputs

- The Academy needs to communicate much more about what it is doing
- Consider the creation of additional channels of communication and dissemination
- Consider the creation of 'ASSAf Professorial Chairs' and enhance targeted communication that markets the ASSAf brand to individuals, universities, scholarly societies and the private sector
- Carefully prepare general communication documents and disseminate in additional ways – such as social media to communicate to the youth
- Strengthen ASSAf's science engagement and education (science-for-society) roles as an academic enterprise

2.4 Outcomes: intended effects on stakeholders

- Maintain ASSAf's independence
- Clarify its role and establish in the South African advisory space a clear indication of ASSAf's success and how it differentiates itself from others
- Remind stakeholders that the Academy cannot be everything to everyone
- ASSAf produces high quality, credible and professional consensus reviews but is encouraged to play a stronger role in facilitating the implementation of recommendations
- Find a way to ensure feedback on the advice dispensed
- Approach DST to mediate among other relevant government departments to see if ASSAf's work is being taken up
- Pursue transformation seriously, purposefully, vigorously, and do so in an intellectual manner
- Be bold in tackling controversial issues
- Build strong partnerships with the rest of the system at home and on the continent
- Avail ASSAf to higher education leaders as a channel through which they can reach government

2.5 Structure/process: governance, management, membership

2.5.1 Transformation

- ASSAf was strongly advised to make gender and ethnicity cross-cutting, spanning all activities

- Ensure demographic representivity on Council, panels, standing committees and in working groups
- Members should go the extra mile to mentor emerging scientists from the under-represented groups
- Implement a directed process to solicit nominations of a broader range of individuals
- President of ASSAf could write personally to strong candidates for election, to ask if they are willing to be elected and to help identify nominators
- Review election processes at nomination and election levels with a view to broader interpretation of the Act
- ASSAf urged to interrogate nomination and voting processes and be innovative in promoting transformative election of its membership
- Academy, Council and Members encouraged to play an active role in correcting distortions in membership
- Extend existing database of scientists by engaging with the science councils and others to access their databases
- Find a mechanism to draw NRF rated scientists into the Academy
- Create a database of potential new Members based on the DHET list of productive/prolific researchers
- Reach out to other existing academies in South Africa for their lists of scientists and embark on a process of consolidating all the above databases of scientists and work through the lists to identify worthy candidates
- Look at creating chapters of ASSAf at provincial and/or university campus levels
- Engage all players in the science and higher education systems to look at boosting the pool of black and women postgraduate students as well as the number of humanities and social sciences postgraduates
- Increase the level of participation of Members in voting
- Enhance the integration of the social sciences and humanities by taking up suggestions that emerged from the *Consensus Study on the State of Humanities in South Africa*

2.5.2 Structure/process

- Implement some changes to ensure continuity in critical leadership positions
- Consider restructuring the Secretariat and appointing a senior level academic to provide strategic support to the Chief Executive Officer (CEO)
- Institute a formal succession planning process for the CEO
- In order to assist ASSAf to comply with the Public Finance Management Act (PFMA), it is recommended that DST intervene and provide additional support to assist the Academy
- The possibility of using the NRF's supply chain management (SCM) unit to provide procurement support should be considered
- Fast track implementation and roll-out proposed formal Monitoring and Evaluation (M&E) function to ensure that the impact and value of programmes and activities are clearly demonstrated

2.6 Resources

- Develop ASSAf's value proposition, diversify its funding base and mobilise additional resources for core support

- Showcase the Academy's value proposition to the private sector
- Approach the private sector and convince them to invest in ASSAf
- Set up the proposed Academy/science/industry forum to engage with business in an advisory capacity, particularly over fundraising
- Consider approaching philanthropies and development agencies for additional funding
- Seek funding from development banks and foundations for long-term engagements such as joint academy work with other science academies on the continent
- Consider investing more in the scholarly publishing area
- Approach the universities to help fund additional investments in scholarly publishing via a shared journal process

2.7 SAYAS

- Tap into the excellent group of young scientists in SAYAS, who are known to have lots of new and innovative ideas
- SAYAS is doing excellent work, reinforce their administrative support and increase their funding to allow them to better realise their self-determined strategic goals
- Continue to nurture SAYAS because the organisation helps young scientists contribute towards finding solutions to national and global challenges
- Provide a platform for young scientists to influence policy decisions and play a key role in transformation and leadership on the continent
- The panel heard that a request for additional resources for SAYAS would be strongly considered at the highest level
- Actively develop the next generation of Members
- Reach out to young people, support their development and ensure their voices are heard
- Involve SAYAS help mobilise existing capacity and expand the pool of young scientists in the country
- SAYAS and ASSAf were advised to make a concerted effort to reach out to all universities, including rural universities, to ensure the right people are being recognised
- ASSAf should consider requesting an additional ring-fenced budget from DST for SAYAS, as it can play a key role in transformation and leadership on the continent

3. Background

The Academy of Science of South Africa (ASSAf), is the only national science academy that is officially recognised by the South African government through the ASSAf Act (Act No 67 of 2001), as amended, and is mandated to provide evidence-based scientific advice on issues of public interest to government and other stakeholders. ASSAf regularly publishes its findings and recommendations and also acknowledges the achievements of South African scientists in order to develop the intellectual capacity of the nation and promote innovative scholarly thinking. The Academy enjoys regular interaction and knowledge exchange with other national science academies throughout the Southern African Development Community (SADC) region and the African continent, and it is a valued partner within the global scientific community through the Trieste-based InterAcademy Partnership (IAP).

The strategic intent of the Academy is to be acknowledged, both nationally and internationally, as a credible, professional and respected collective voice representing the national interests of the full spectrum of scientific fields, to policy and decision-makers, the private sector, science community and the public – thereby helping to produce an ever-more successful South African nation.

Vision

The Academy of Science of South Africa aspires to be the apex organisation for science and scholarship in South Africa, recognised and connected both nationally and internationally. Through its membership, which represents the collective voice of the most active scholars in all fields of scholarly enquiry, ASSAf aims to generate evidence-based solutions to national problems.

Objectives

The key objective of the Academy is to promote and apply scientific thinking in the service of society.

Structure

The activities of the Academy are structured for budgetary and reporting purposes into five programmes:

- Administration and Governance
- Policy Advice
- Scholarly Publishing
- Liaison
- Communication and Publications.

Values

The values of the Academy are to remain independent of government and sectoral lobbies; to use the best-available evidence and scientific knowledge to recommend solutions to national problems; and to apply multidisciplinary and consilience in its approach. ASSAf aspires to adhere to the highest ethical and moral standards; recognise the essentially developmental nature of South African society and the importance of the natural environment, both for their own sake and from a human and utilitarian perspective.

4. Introduction

ASSAf was inaugurated in May 1996 by the former President of South Africa and patron of the Academy, Nelson Mandela. It was formed in response to the need for an academy of science congruent with the dawn of democracy in South Africa - activist in its mission of using science for the benefit of society.

The mandate of the Academy encompasses all fields of scientific enquiry and its membership includes the full diversity of South Africa's distinguished scientists. The Parliament of South Africa passed the *Academy of Science of South Africa Act (Act 67 of 2001)*, as amended, which came into operation in May 2002.

ASSAf is the official national Academy of Science of South Africa and represents the country in the international community of science academies.

4.1 Purpose and scope of the Institutional Review

The Minister of Science and Technology has legal responsibility for the governance and resourcing of a set of national public entities including the Academy. Institutional Reviews are conducted as an additional oversight to evaluate if organisations are meeting their mandate and objectives. They are not a statutory requirement. Their aim instead is to reflect on the operations of an organisation in order to independently assess its strengths and weaknesses, to benchmark, and to determine if organisational structures, policies and programmes are fit for purpose.

During 2016, ASSAf celebrates the 20th year of its existence. Since its inception, ASSAf has grown from a small, emergent organisation into a well-established academy. It was therefore determined that this is an opportune moment to reflect on its performance in terms of its mandate and strategic objectives. During 2015, the Council of ASSAf appointed an Institutional Review Panel to provide a retrospective view on the performance of the Academy, focusing specifically on activities over the past five years, and also reflecting briefly on the evolution of the organisation during its twenty-year existence.

The Panel was tasked with reflecting on ASSAf's achievements and making recommendations to improve the organisation in a continuous quality improvement paradigm. This *Review Report* additionally provides critical views on possible gaps not addressed by the Academy in terms of the ASSAf Act within the National System of Innovation (NSI) and it makes recommendations regarding the future strategic direction and operational execution of the ASSAf mandate.

The Institutional Review interrogated the period 1 April 2010 to 31 March 2015 and covered the strategic goals of the Academy namely:

- Recognition and reward of excellence
- Promotion of innovation and scholarly activity
- Promotion of effective, evidence-based scientific advice
- Promotion of public interest in and awareness of science and science education
- Promotion of national, regional and international linkages.

The Review Panel was provided with *Terms of Reference* as well as relevant planning and reporting documents (Annexure A). Historical information was provided as background and to introduce the

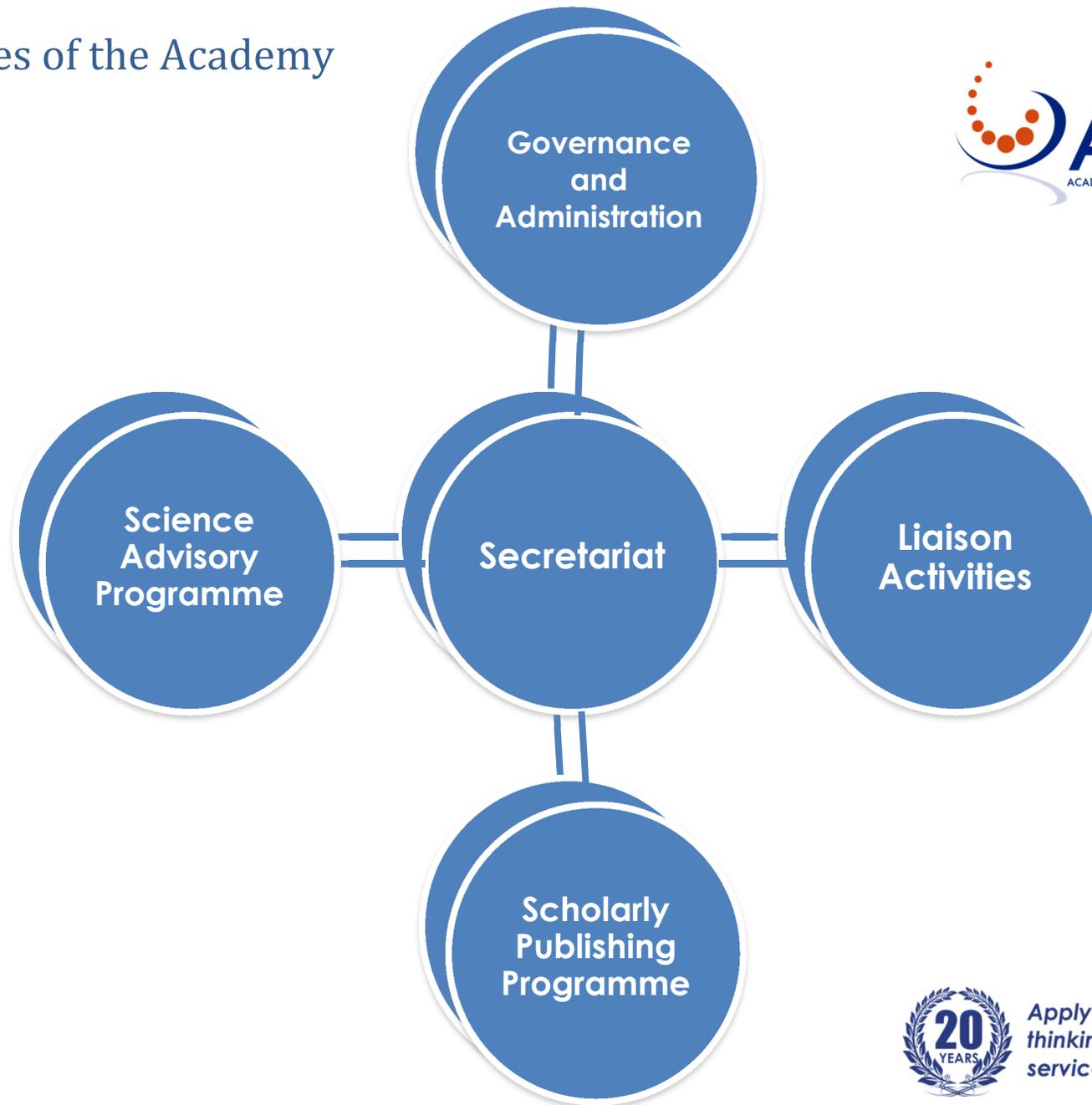
broader context in which ASSAf operates. Developments that took place after March 2015 are briefly mentioned where applicable.

4.2 Review Panel members

The members of the Institutional Review Panel comprised Co-Chairs Prof Dan J Ncayiyana, Emeritus Professor, University of Cape Town and Dr Heide Hackmann, Executive Director of the International Council for Science (ICSU); as well as Dr Bruce Alberts, Professor of Science and Education at the University of California, San Francisco and a former President of the US National Academy of Sciences; Prof Sabiha Essack, South African Research Chair in Antibiotic Resistance and One Health and Professor of Pharmaceutical Sciences; Prof Mohamed Hassan, Co-Chair, InterAcademy Partnership (IAP) and Dr David Woods, former Vice-Chancellor of Rhodes University.

The panel was appointed by the ASSAf Council who endeavoured to constitute a panel of local and international experts from a range of disciplines. The panel met in person over a period of several days during February and March 2016 to conduct in-depth, semi-structured interviews with 28 stakeholders from government, higher education and other sectors, as well as role players in the South African and regional science and innovation system, and staff members. They also subsequently convened via teleconference to finalise this *Review Report*. Short biosketches for each of the panellists can be found in Annexure B.

Programmes of the Academy



Applying scientific thinking in the service of society

5 The programmes of ASSAf

The key objective of the Academy is to promote and apply scientific thinking in the service of society. It achieves this by using scientific knowledge and activity, and by recognising excellence in people who have reached their intellectual potential. ASSAf endeavours to inspire, promote and recognise excellence. It investigates and publicly reports on various matters, at its own discretion or at the request of government or organisations in civil society. The Academy promotes science education and the value of science in the population at large. It maintains strict independence while consulting other organisations and individuals in the widest manner possible.

5.1 Governance and Administration

This programme is responsible for all reporting and compliance. The unit also promotes good governance through the ASSAf Council and oversees the election of new Council members, new office-bearers and Members of standing committees of Council. It oversees the performance evaluation of outgoing Council and inducts new Council members. Additional sub-programmes include Finance and Risk, Human Resources, Knowledge Management and Communication necessary for the routine operations of the entity. The Communication sub-programme helps maintain the ASSAf brand, and publishes the E-newsletter *Science for Society* and evidence-based reports.

5.2 Scholarly Publishing

The Scholarly Publishing Programme is regarded as a major intervention within the National System of Innovation (NSI) in South Africa. Its strategic goal is to enhance the national capacity to produce and publish research, on the one hand, and to increase the quality and visibility of South African research publications, on the other. The programme is overseen by the Academy's Standing Committee on Scholarly Publishing in South Africa.

5.3 Science Advice

ASSAf plays a critical science advisory role in the country, spearheading consensus and assessment studies and producing policymakers' booklets on key topics and commentaries on national policies. Evidence-based studies form the core of the Academy's function and are aimed at providing science advice to government on a range of topics to support policy development. Activities are guided by standing committees on Health; Scholarly Publishing; Science, Technology, Engineering and Mathematics (STEM) Education; Biosafety and Biosecurity; Humanities; and Science for the Reduction of Poverty and Inequality.

5.4 Liaison

The purpose of this programme is to establish and maintain effective relations with strategic national and international stakeholders. The national liaison programme aims to establish, strengthen and enhance interactions with key stakeholders, such as national government departments, policymakers and relevant national organisations. The programme is also responsible for capacity enhancement, implementing the Academy's young and women scientists' activities, as well as ensuring that South African scientists are exposed to opportunities available within and outside South Africa. The international liaison programme establishes, strengthens and enhances the Academy's bilateral, trilateral and multilateral relationships in Africa and elsewhere in the world

with organisations such as national science academies, academy networks, and other global scientific organisations.

6 The observations and recommendations of the Review Panel

The observations and recommendations of the Review Panel are captured according to an “Evaluation Matrix” and are reported on in this document according to that matrix. Where necessary the report lists sub-headings so that each observation is followed by a relevant and related recommendation.

Methodology of the Review

The Review Panel used an “Evaluation Matrix” to review the activities of ASSAf according to **five interrelated aspects** namely:

1. Policy (mandate, aims, objectives)
2. Outputs (products and services resulting from activities and inputs)
3. Outcomes (intended effects on stakeholders)
4. Structure/process (governance, management)
5. Resources.

For each aspect, the Panel interrogated the quality or appropriateness and effectiveness thereof. They also requested each interviewee to identify possible improvements (if deemed necessary). The responses are delineated below and arranged according to the five aspects in the matrix.

6.1 Policy: mandate, aims, objectives

When examining this topic, the Review Panel interrogated interviewees about the Academy’s overall mandate, status within the country’s NSI, engagement and synergies with the Department of Science and Technology (DST), government in the broader sense, other agencies in the science system and stakeholders in general.

This section of our report also explores the state of ASSAf’s national and international linkages.

6.1.1 Observations: National

The Academy is playing an increasing role in providing independent, evidence-based, and trusted advice to government. The panel was informed that there is an increasing role for the academy, due to a growing appreciation among stakeholders in South Africa of the benefits of decision-making that is based on evidence and analysis. By focusing on harnessing all relevant disciplines to provide objective advice that is strictly science-based, the Academy has secured a recognised place for itself in the national system.

Positioning ASSAf in a complex statutory advisory body/policy advice terrain nevertheless remains an ongoing key challenge. Although most believe that the advisory roles of the National Advisory Council on Innovation (NACI) and ASSAf are clearly differentiated, the potential for overlap that creates confusion should not be discounted, particularly when it comes to advising on national policy for science, technology and innovation.

Another challenge is maintaining ASSAf’s independence while retaining its relevance to government. ASSAf, like most science academies around the world, has to maintain its state funding while

insisting on providing honest, independent advice, although the extent to which this is achieved is often a matter of perception.

The relationship between ASSAf and the current administration in DST is good. However, it was suggested that ASSAf codify its relationship with the department by way of a charter to ensure the Academy's self-determined agenda, independence and sustainability beyond current personalities and the good relationships between existing individuals in leadership.

Beyond DST, ASSAf works well with the Departments of Health, Environmental Affairs and Energy. It is beginning to partner with the Department of Trade and Industry and has a good relationship with the Department of Higher Education and Training (DHET). There is scope for ASSAf to play a stronger role in providing evidence-based advice more widely across government.

Overall the Academy was lauded for maintaining effective relations with strategic national and international stakeholders. However, some interviewees felt there is a lack of awareness/visibility of the value proposition offered by ASSAf beyond its primary stakeholders and specifically beyond DST. Not just other government departments, but the public too needs to be made more aware of ASSAf outputs and activities and especially important reports such as consensus studies.

The Academy is therefore encouraged to be fast, diligent and proactive in addressing the science issues of the day.

*“ASSAf should continue to speak science truth to power and not be seen as an extension of the state.”
–interviewee*

ASSAf believes the biggest opportunity ahead lies in addressing issues of relevance to the country as outlined in the National Development Plan (NDP). One of ASSAf's strategic objectives is to facilitate scholarly engagement around and improve understanding of key national challenges. The Review Panel noted in particular that ASSAf is strongly urged to do more to align its strategic objectives with the government's triple national priorities of addressing poverty, unemployment and inequality. These cross-cutting priorities are also of highest importance to the rest of Africa.

6.1.2 Recommendations: National

ASSAf was repeatedly advised, by several stakeholders interviewed, to maintain its hard won independence in order to continue to advise the nation on critical issues.

There were some who suggested to the panel that ASSAf assume a leadership role in promoting cooperation and coordination within the NSI. The advice was for ASSAf to engage with the DST, the National Research Foundation (NRF) and NACI on the role of ASSAf in the NSI, and to suggest to DST to explore ways that DST could coordinate the activities of the NSI across other ministries. (There was even a suggestion by one panellist that DST should be a cross-cutting ministry in order to ensure that the NSI is coordinated across government.)

This would greatly assist ASSAf to play a broader role and provide advice across government departments and the science ecosystem – as per *The PhD Study* which informed not only DST, but

DHET, the Department of Basic Education (DBE) and the National Research Foundation (NRF) among others.

Some added that ASSAf should more closely align its policies with the NDP, and pay particular attention to articulating how ASSAf's work contributes to solving issues of poverty and inequality.

Many advised that the Academy should offer its advisory services to a wider array of government departments. By negotiating a space for dispensing advice beyond the DST, ASSAf could be giving advice to a whole range of departments, even beyond the Departments of Health, Environmental Affairs and Energy as well.

By increasing awareness and visibility of the value proposition offered by ASSAf, the Academy will be able to offer its advisory services more widely and it will draw more stakeholders into its other activities and outputs. The panel heard that ASSAf, for example, needs to find ways to make it easier for government, membership and even the public to suggest topics for consensus studies.

Once it enjoys greater awareness in the national consciousness, the Academy can then in turn play a stronger role in facilitating the implementation of recommendations from consensus studies.

Finally, we again emphasise the need to ensure that the relationship of trust and respect with DST is maintained by codifying the relationship with DST by way of a charter to ensure sustainability.

6.1.3 Observations: International

ASSAf seeks to develop and maintain productive partnerships with international partners that include other academies and their networks. The South African Academy serves and contributes to international strategic partnerships that include the IAP and its regional networks. ASSAf has signed memoranda of understanding (MoUs) with several other national science academies and has held joint workshops and conferences with international academies.

Although it has done an excellent job of being an active participant in the international community of academies of science, ASSAf could look at aligning itself with academies in other important groupings such as BRICS.

There is broad acknowledgement of the leadership and mentorship role of ASSAf on the African continent. Since 2008, ASSAf has engaged in collaborative and academy development work with various national science academies on the continent. Interviewees told the Review Panel that internationally, ASSAf should be saluted for its efforts in trying to engage with others across Africa. There were some concerns about the manner in which ASSAf is perceived by its sister academies in Africa, with some commenting that ASSAf can sometimes come across as being dogmatic.

ASSAf is recognised specifically for its contribution to capacity development through activities across the continent, its recognition of excellence, fund raising and its programmatic component that contributes to the development of science academies in Africa. The Review Panel was assured that other African academies admire and attempt to emulate what ASSAf does, even though most of them have much less supportive governments. The South African Academy plays a key role in mentorship, of less endowed academies; it steps up to the call and encourages constructive competition between academies when cooperating on projects. People from within ASSAf are also proud of the Academy's achievements in terms of African collaboration.

There are 21 academies of science on the African continent. All are members of the Network of African Science Academies (NASAC) headquartered in Nairobi, Kenya. ASSAf played a role in the establishment of NASAC, serves as the Secretary General thereof and enjoys a good relationship with the body.

Several academies of science on the continent, including ASSAf, have produced Africa's Science Academy Development Agenda (ASADA). Its vision is to have strong national science academies in Africa supported by their governments and playing an important role in their national science systems. Through a strong and financially sustainable network of regional academies (NASAC), African academies hope to be able to fulfil their role as advisor to the African Union (AU) and to facilitate co-operative activities among academies.

ASADA succeeds the major 11-year African Science Academy Development Initiative (ASADI) – led by the US National Academies and funded by the Gates Foundation – that formally ended in 2015. It is named ASADA in recognition of this second phase of academy development on the continent, which is distinguished from its predecessor in having been created and led from within the African academies of science themselves. There was a suggestion to the Review Panel that ASSAf, in collaboration with its NASAC partners, rename ASADA to emphasise that this initiative emerged from within the African academies.

ASSAf is well appreciated and there is acknowledgement of its valuable ideas and contributions. ASSAf's capacity building work is important, and the South African Academy, along with the other players, should continue to pursue the ideals of ASADA – be it via NASAC or via a renamed ASADA.

“We (African academies) have to stop talking and start doing. We need to be more inclusive, beyond the Big 5 plus Cameroon, and we have to undertake more bilateral work.” –interviewee

ASSAf has signed agreements with the science academies of India, China and Russia, but not yet Brazil. The South African Academy has indicated a desire to be part of a BRICS academy grouping, but this is something that has to follow process.

ASSAf is considered to be well connected, with a strong voice among the international network of academies included in the IAP membership. These international networks are essential as they provide for useful exchanges that are not dominated by any one group, such as the nations that enjoy the greatest resources for science.

There are perceptions of ASSAf being elitist – although some would argue that by nature academies of science are elitist. Grasping the cultural complexities of operating in continental and international contexts is therefore important. There is a need to find appropriate ways to interact as an "equal partner", even in those cases where the other partner is in reality relatively weak.

ASSAf has hosted the South African Chapter of the Organisation of Women in Science for the Developing World (OWSD) since 2009. OWSD international offers OWSD fellowships to women in

developing countries and South Africa hosts the largest number of OWSD fellowship holders of any country in the world. OWSD SA believes that if it were not for ASSAf support it would not be where it is today.

ASSAf working groups have minimal representation of women. OWSD has extensive experience in enhancing and promoting female participation in science and technology professions, in scientific leadership, and in the decision-making processes at the national level and can therefore assist the Academy to increase the number of women involved in working groups.

In 2014, ASSAf was awarded the bid as a focal point of GenderInSITE Southern Africa. GenderInSITE is an international initiative to raise awareness among decision-makers on the gender and SITE (Science, Innovation, Technology and Engineering) dimensions of development. In 2015, The World Academy of Sciences (TWAS) Regional Office for Sub-Saharan Africa, also known as TWAS-ROSSA, moved to ASSAf headquarters in Pretoria, as did the Regional Office of the International Council for Science (ICSU), which was previously hosted by the NRF, reiterating the centrality of ASSAf in the African region.

6.1.4 Recommendations: International

Although recognised for its leadership role among science academies on the continent, ASSAf needs to do more to foster a clear cooperative relationship on a continental scale. This can be achieved by consulting more with the other African academies and developing collaborative programmes through MOUs.

There is a need for greater awareness within ASSAf of the cultural complexity of interactions at continental level (e.g. ASSAf is advised to build trust through more personal contact and communication). ASSAf should always engage with other academies in a culturally sensitive and diplomatic manner.

ASSAf should keep its focus on issues and challenges that are pertinent to African countries. It should focus more on the collective with a common purpose “us” and “Southern” as opposed to South Africa (this refers to activities internationally).

“Provide humble leadership for the benefit of all, especially on the continent and continue to vigorously support the development of African academies.” –interviewee

ASSAf should also identify gaps in its international engagement and pursue ways to address these. One possibility could be to establish a relationship with the Brazil, Russia, India, China and South Africa (BRICS) research centre located at the Human Sciences Research Council (HSRC) and to explore creating a BRICS grouping of academies to advise on issues relevant to BRICS.

ASSAf could suggest aligning formal meetings of the BRICS grouping of academies with the annual BRICS summits. This would ensure regular contact and offer a natural networking opportunity with policymakers and other high-level decision makers in BRICS.

6.2 Outputs: products and services resulting from activities and inputs

This section of the report looks at ASSAf's various roles, activities and related outputs. It interrogates the appropriateness of activities and asks whether they speak to the objectives of the organisation and to broader public policy objectives.

The Review Panel also asked if there was any activity that should be stopped.

6.2.1 Observations: Science advice

The consistently high quality of the advisory reports issued by ASSAf has secured an important niche in the South African policy advisory space, which is that of providing independent, scientific advice via large-scale, multidisciplinary, evidence-based studies. The advisory function is also performed in various other ways. Participatory forum-style workshops on problem areas provide a relatively quick indication of a 'beginning consensus' on priorities and possible solutions. 'Informed high-level consensus' opinions on key government strategies are generated by well-constituted expert panels if required urgently. Concise position papers are released on matters of public controversy or confusion. If required, ASSAf is able to channel within the country the dissemination of consensus reports and advisories emanating from regional or global academy groupings or agencies. The ASSAf Council is charged with the final approval-and-release decisions and is publicly accountable for maintaining the good reputation of ASSAf, but it does not 'second-guess' the findings and recommendations of its appointed panels.

Interviewees repeatedly commended ASSAf for producing high quality, credible, and professional policy-related reports that resonate with policymakers. Several of ASSAf's consensus reviews have informed government policy, in some instances, not just those of the South African government, but the policies of other governments in Africa too. The ASSAf consensus studies have shaped fields of endeavour and, in the case of the consensus report on gender orientation in Africa – prepared in partnership with the Ugandan Academy of Sciences – drawn frontline international attention in leading journals. This latter has started to have an impact policy on the continent.

Other reports, despite being scientifically sound, have not gained traction and almost disappear without being properly disseminated. This indicates a possible need for more careful consideration of the questions ASSAf asks, as well as its dissemination strategies. Some of the interviewees felt that ASSAf needs to consult more widely about the topics of consensus studies. In addition, some interviewees felt there was a need for better follow-up and requests for feedback from stakeholders about the impact of studies.

Interviewees informed the Review Panel that ASSAf should be open to taking on other modalities of issuing advice.

ASSAf is well regarded among the other African academies of science, especially in terms of its science advice activities.

6.2.2 Recommendations: Science advice

Interviewees felt that ASSAf needs to implement more inclusive ways of selecting priority topics and should carefully consider South Africa's priorities when selecting the questions asked in consensus studies.

The Academy should consider a more structured way of generating the questions it asks. It needs to make it easier for government, membership and even the public to suggest topics for consensus studies.

As part of the above-mentioned process of exploring a more structured way of generating consensus reports, ASSAf should also look at paying closer attention to the global Sustainable Development Goals (SDGs). At the United Nations Sustainable Development Summit on 25 September 2015, world leaders adopted the *2030 Agenda for Sustainable Development*, which includes a set of 17 SDGs to end poverty, fight inequality and injustice, and tackle climate change by 2030. The panel heard that the South African Academy has the ability to produce reports that can feed into the SDGs and should certainly explore the opportunities presented by focusing on these global goals.

The Academy should tap into the full range and depth of intellectual capital held in its membership when considering science advice and shouldn't rely on a small group via Council only. Beyond Members, it should tap into the excellent group of young scientists in SAYAS as well, as they have lots of new and innovative ideas.

It was suggested that ASSAf revisit its dissemination strategies and customise the dissemination of each consensus report to ensure it gains traction.

A question was raised about how ASSAf might play a stronger role in facilitating the implementation of recommendations from consensus studies.

6.2.3 Observations: Scholarly publishing

The Scholarly Publishing Programme, which improves and supports scholarly publishing in multiple ways, is seen as a ground breaking initiative with some unexpected spinoffs such as community building. SciELO SA, the Academy's fully indexed, open-access e-platform, already renders global access to publications in South African journals, increasing both their quality and their standing globally. Currently 60 local journals are presented on SciELO. ASSAf's ultimate target is 180. Some journals that have been turned down in the past, implemented improvements and have since been included.

There was universal agreement among those interviewed that the Scholarly Publishing Programme is a flagship of the Academy. This Programme, according to some commentators interviewed, has in fact turned around the sector.¹

There is an opportunity to get even more leverage out of the excellent reputation produced by ASSAf's scholarly publishing activities and ASSAf should consider ways of investing more in this Programme. At the same time, the Academy should re-evaluate activities to ensure they are all still necessary or whether certain activities such as the Editor training could be outsourced.

ASSAf has published the century-old *South African Journal of Science (SAJS)* since 2002, and launched its science magazine *Quest* a few years later; both are multidisciplinary, and in their different ways key vehicles for promoting the same cohesive principle espoused by ASSAf in its science-for-society mission. The *SAJS* is considered a useful tool for promoting the visibility and impact of African

¹ Gevers W. ASSAf turns 20: Young enough to be dynamic and old enough to be trusted with its mission. *S Afr J Sci.* 2016;112(1/2), Art. #a0133, 2 pages. <http://dx.doi.org/10.17159/sajs.2016/a0133one>

research. Great appreciation was expressed by interviewees for the publishing of *Quest* which is designed to promote awareness of science among the youth.

The Review Panel heard that there is also great appreciation for the international exposure that South African research receives as a result of ASSAf's efforts to promote and facilitate open access publishing.

ASSAf strives for public science to be accessible to the world through promoting the accessibility of SA journals through open access publishing. The Scientific Electronic Library Online (SciELO) SA is South Africa's premier open-access (free to access and free to publish) searchable full-text journal database in service of the South African research community. The database covers a selected collection of peer-reviewed South African scholarly journals and forms an integral part of the SciELO Brazil project. SciELO SA is managed by ASSAf, funded by the South African Department of Science and Technology (DST) and endorsed by the South African Department of Higher Education and Training (DHET).

Journals are considered for inclusion in the SciELO SA database when they have received a favourable evaluation from ASSAf's journal quality peer-review panel. Through the committee on publishing, ASSAf has a formal system for the recognition of journals, making them part of the accreditation system and ensuring their uploading onto the SciELO platform. The criteria are rigid, but those that make the grade, are drawn into the wider Web of Science grouping and this results in increased international exposure.

6.2.4 Recommendations: Scholarly publishing

ASSAf should explore the possibility of investing more in scholarly publishing, as it builds the science system. ASSAf should further advance the creation of a research ethos and continue to facilitate high-quality research in South Africa.

ASSAf should lead the effort in South Africa's scholarly publishing sector, to strive to make the gold route to open access mandatory, as it is the most sustainable in the long run.

The Academy is encouraged to outsource some activities – e.g. online training of editors.

6.2.5 Observations: Other outputs

The Academy's public engagement and science promotion activities centre on press releases and media interviews, as well as public symposia presented by ASSAf-appointed panels to make the public aware of the outcomes of reports and studies.

The objective of ASSAf's science engagement sub-programme is to help develop a relationship between science and society, and thus create 'a scientifically-engaged South Africa'. ASSAf does this through providing high-level science-based scholarly advisory reports to the government; through fostering relationships with science organisations; non-governmental organisations (NGOs) and industry groups; and stimulating community thinking on the NDP challenges. DST's Science Engagement Framework lists ASSAf along with the other science entities.

The visiting scholars' seminars that travel around the country have not taken off quite as well as hoped. ASSAf plans to do more with these activities in future.

The honorific role of ASSAf remains an important one and it was suggested that ASSAf consider rotating the venue for its awards ceremonies. By doing so, the Academy's communication with the academic community at large could be vastly improved; as would the creation of ASSAf regional chapters. (The panel heard that although important ASSAf should remember to go beyond its honorific role and facilitate the active participation of Members in ASSAf activities especially related to transformation.)

The ASSAf brand is enjoying improved visibility via media releases, the website and newsletters. Representatives of African academies said the ASSAf website is their benchmark; it's what they try to emulate. The achievements of ASSAf and its Members are increasingly better known. However, it was felt that overall communication products and activities were not sufficiently targeted to support the Academy vision. ASSAf should address the broader South African public and win their confidence in order to help the country solve societal and other challenges.

There are certain activities that should be dropped or assigned to other entities in the science system.

One of the activities identified as not being used – despite being necessary, as there is no other postgraduate support of this kind – was ASSAf's online writing course.

6.2.6 Recommendations: Other outputs

As mentioned earlier in this document, interviewees told the Review Panel that there is a need for greater awareness of the ASSAf brand and value proposition. The Academy needs to communicate much more about what it is doing. With regard to outputs, they suggested that this may require the creation of additional channels of communication and dissemination.

Another way to create greater awareness of and enhance the value proposition would be to create 'ASSAf Professorial Chairs' and enhance targeted communication that markets the ASSAf brand to individuals, universities, scholarly societies and the private sector.

ASSAf is encouraged to carefully prepare general communication documents and disseminate in additional ways – such as social media to communicate to the youth. It was further advised to strengthen its roles in science engagement and in education (science-for-society) as an academic enterprise.

6.3 Outcomes: intended effects on stakeholders

The Review Panel asked interviewees to identify ASSAf's most important achievements – and their impacts – to date and to identify its strengths, weaknesses, opportunities and threats. They were also asked to provide advice going forward.

6.3.1 Observations

In the past five years ASSAf has gone from strength to strength and solidified as a fiercely independent organisation. It is an entity of importance in contemporary South Africa. The Academy organises and mobilises the country's brains trust.

ASSAf's methodology for offering advice to the country – via the depth and breadth of its consensus reports and via its Members – is its greatest strength. The Academy may need to reconsider its

definition of science advice versus policy advice to ensure it is applying South Africa's brains trust in the most appropriate manner.

The relationship of trust and collegiality that ASSAf has built with DST is highly regarded and should be maintained. ASSAf's independence and insistence on working on its own terms should continue.

The Academy's insufficient resources are a threat and it needs to diversify its resource base.

The Academy needs to find better channels to speak directly to policy makers in a coherent way e.g. via an effective forum. There is also a need to better monitor and promote feedback on uptake of policy advice. Closing the feedback loop may require ASSAf to actively follow-up or facilitate implementation of the advice it dispenses. ASSAf's new Monitoring and Evaluation Framework does monitor uptake of its products, which will significantly enhance future reporting and assessment of the Academy's impact.

The Academy needs to be closer to the ground and get more in touch with South African society. It needs to become more visible. Simply put, ASSAf should come to understand the social condition in which the debates and developments are playing out. Transformation is key to addressing these issues. Ultimately, in order to be effective and be recognised, the Academy membership should reflect the society it serves.

6.3.2 Recommendations

Maintain ASSAf's independence, clarify its role and establish in the South African advisory space a clear indication of ASSAf's success and how it differentiates itself from others. Remind stakeholders that the Academy cannot be everything to everyone.

The Review Panel was repeatedly reminded that ASSAf produces high quality, credible and professional consensus reviews. However the Academy is encouraged to play a stronger role in facilitating the implementation of recommendations from these consensus studies. ASSAf is challenged to find a way to ensure feedback on the advice dispensed.

It was suggested that ASSAf could approach DST to mediate among other relevant government departments to see if ASSAf's work is being taken up.

ASSAf was strongly advised to pursue transformation seriously, purposefully, vigorously, and do so in an intellectual manner and to be bold in tackling controversial issues.

It was further encouraged to build strong partnerships with the rest of the system both at home and on the continent.

“Drop your guard and be open to developing real relationships. Get feedback and guidance on how to do it. Open up the conversation and place everything on the table, even the Academy's operational model. Expand the flexibility of the operational model to enable greater relevance to South African society (and the continent) and contextual versatility.” – interviewee

The panel heard that the Academy needs to avail itself to the leaders in higher education as a channel through which they can reach government.

All of the above suggestions could assist in mobilising the additional resources that are needed.

6.4 Structure/process: governance, management, membership

Governance, administration, reporting and compliance processes are central to the efficient functioning of the Academy. The Panel asked interviewees to comment on efficiency and effectiveness in ASSAf and to identify obstacles to achieving its aims and objectives. Interviewees were also asked for their comments on membership.

6.4.1 Observations

ASSAf's basic governance structure has not changed much, but in the past few years its staff component has grown (from eight in 2008 to 34 in 2016). The Academy makes very efficient use of its still limited resource base, infrastructure and overall human capacity. There is overwhelmingly positive feedback on leadership from inception, on programmes and on outputs.

“The good people of ASSAf deserve ongoing support!” – interviewee

The core asset of science academies is their membership and their ability to draw on highly qualified scientists from a large range of disciplines to assist in the science advisory role. In terms of membership, ASSAf has established itself as a prestigious body that recognises excellence. There is broad recognition for and inclusion of the humanities and social sciences and this is unusual for a science academy. The Academy is encouraged to build on these successes.

In its criteria for membership, ASSAf places particular emphasis on the application of scientific thinking to the problems and challenges facing South African society. It draws its membership from all population groups and from all scientific disciplines. It recognises the need to do more to increase the proportions of women and black Members and Members from the social and human sciences.

6.4.2 Observations: Transformation

Transformation remains a major challenge. The under-representation in the membership of black African scientists and women, as well as scientists from the humanities and social sciences was repeatedly raised. The exceedingly low number of Members from the human and social sciences reflects an ongoing and self-perpetuating problem with the nomination and election process.

At 24%, ASSAf is in the top five of academies globally in terms of female membership. However, ASSAf is urged to strive for a critical mass of at least 30%, regarded as the threshold at which a group is no longer considered a minority. Black membership is at 28%.

“It is essential that the Academy build a membership that better reflects the society it serves. It must address and counter the perception of ASSAf as elitist and an ‘old boys club’.” –interviewee

The challenge of transformation is not unique to ASSAf – it's the country's challenge, a challenge for science as a whole and a challenge for all science institutions.

ASSAf's current election system doesn't favour transformation and the Academy has to explore other ways to bring about change. There are inherent biases in systems that are not addressed by strategic plans. These biases need different instruments. Sectoral committees, for example, could screen and prune the nominations to achieve transformation objectives.

Some of those interviewed by the Review Panel feel that Council is failing to realise the impact of ASSAf's insufficient transformation. It is in fact a very real threat to the Academy. Improved and accelerated transformation would greatly improve ASSAf's standing, impact and its work. A science academy is meant to comprise a diversity of Members who provide comprehensive perspectives, informed by all the different ways of seeing things.

In addition, in order to fast track transformation, the Academy needs to find ways to work with other bodies in the science system. It needs to actively develop the next generation of Members. This means reaching young people, supporting their development and ensuring their voices are heard. SAYAS is an important asset for ASSAf. SAYAS Members participate in several ASSAf standing committees and support policy advice in that way. The proposed additional funding would assist the organisation to mobilise existing capacity and expand the pool of young scientists in the country. SAYAS and ASSAf were advised to make a concerted effort to reach out to all universities, including rural universities, to ensure the right people are being recognised.

6.4.3 Recommendations: Transformation

ASSAf was strongly advised to make gender and ethnicity cross-cutting, spanning all activities and to ensure demographic representivity on Council, panels, standing committees and in working groups.

Individual Members should go the extra mile to mentor emerging scientists from the under-represented groups and draw them into the Academy milieu.

ASSAf needs to implement a directed process to solicit nominations of a broader range of individuals. It was suggested that the President of ASSAf could write personally to strong candidates for election, to ask if they are willing to be elected and to help identify nominators.

The election processes could be reviewed at nomination and election levels with a view to broader interpretation of the Act (e.g. targeted nominations and screening and solicitation of nominees by discipline experts). Another way to address transformation would be to review the interpretation of neutral votes.

Improved and accelerated transformation would greatly improve ASSAf's standing, impact and its work. ASSAf repeatedly cited the voting requirement in the Act as a constraint vis-a-vis transformation. The Panel urges ASSAf to interrogate both the nomination and the voting processes and be innovative in promoting transformative elections of its membership.

“Ultimately, if the Act has to be changed to ensure transformation then this is what should be done.” – interviewee

The Academy, Council and Members are encouraged to play an active role in correcting the distortions in membership.

It was suggested that the Academy extend its existing database of scientists by engaging with the science councils and others to access their databases. ASSAf should also find a mechanism to draw NRF rated scientists into the Academy. A suggestion was for ASSAf to create a database of potential new Members based on the DHET list of productive/prolific researchers. Another suggestion was for the Academy to reach out to other existing academies in South Africa for their lists of scientists. ASSAf could then embark on a process of consolidating all the above databases of scientists and work through the lists to identify worthy candidates.

It could also look at creating chapters of ASSAf at provincial and/or university campus levels.

ASSAf is encouraged to engage all players in the science and higher education systems to look at boosting the pool of black and women postgraduate students as well as the number of humanities and social sciences postgraduates.

The Review Panel heard that currently, only 10-12% of the membership is voting at election time. It is therefore critical that the Academy also increase the level of participation in voting. The Review panel suggests that ASSAf alter the methodology to increase the level of participation in voting.

The issue of transformation is considered so important that one interviewee even suggested ASSAf commission a consensus report on the Transformation of the South African Science System.

A possible way of enhancing the visibility and integration of the social sciences and humanities could be the uptake of suggestions that emerged from the *Consensus Study on the State of Humanities in South Africa*.

6.4.4 Observations: Structure/process

A second major structural/process challenge identified by the Review Panel is the overwhelming weight of compliance related to the non-financial aspects of the Public Finance Management Act (PFMA). Meeting these requirements is becoming increasingly burdensome.

ASSAf runs a lean staff team and does not have the infrastructure to meet some of the requirements. It has therefore engaged the Minister on this issue.

Another identified risk is the shortage of intellectual leadership and strategic support to the Chief Executive Officer (CEO) within ASSAf. It is clear that the CEO needs the assistance of a high level, deputy to run with projects – a strategic thinker who understands the world of science and policy. DST is encouraged to provide the needed funding to ensure that this position can be created and filled.

In order to ensure the sustainability of ASSAf, the body needs to think about how it is going to grow into the future. And for this purpose it has identified a need for a formal monitoring and evaluation programme.

6.4.5 Recommendations: Structure/process

While the overall structure of the Academy is deemed to be good, ASSAf is advised to implement some changes to ensure continuity in critical leadership positions. The Review Panel was informed that ASSAf should consider restructuring the Secretariat and appointing a senior level academic to provide strategic support to the CEO. Additionally, the Academy is advised to institute a formal succession planning process for the CEO.

In order to assist ASSAf to comply with the PFMA, it is recommended that DST intervene and provide additional support to assist the Academy. The possibility of using the National Research Foundation's supply chain management (SCM) unit to provide procurement support should be considered.

An M&E component was added to ASSAf's Administration and Governance Programme during the 2014/15 financial. The Review Panel suggests that the implementation and roll-out the proposed formal M&E function needs to be fast-tracked to ensure that the impact and value of programmes and activities are clearly demonstrated.

6.5 Resources

The Review Panel questioned whether resources are adequate and if the resources are efficiently used. Interviewees were asked to comment on the stability and sustainability of ASSAf. They were asked to propose other potential sources of funding for the Academy.

6.5.1 Observations

ASSAf is still largely dependent on DST for its core funding and more needs to be done to diversify sources of funding in order to ensure stability and sustainability in the context of independence. In order to avoid plateauing, the Academy should aim for a top class secretariat with two or three senior people to support the CEO.

Fund raising is done collectively by ASSAf management as the opportunity arises. It has been successful at raising project funding but not as successful at raising core funding. Building a relationship with the private sector features strongly in the *Strategic Concept Document: The niche and role of ASSAf in the National Science System (October 2015)*. The Academy is considering a joint academia/private sector think tank, at a high level, to get things off the ground. The panel heard that private sector funding would be for specific activities that do not bring its independence into question – such as human capital development.

The Review Panel heard that the Academy should consider exploring resource diversification and mobilisation by taking a continental perspective; by leveraging corporate social investment (CSI) related to proposed consensus studies and by tapping into private sector funding. In addition, ASSAf needs to build relationships with other potential stakeholders in the government who have a need for high-quality independent scientific advice.

ASSAf has a proud record of public accountability and good governance. Its integrated approach to strategic planning and performance management has enabled it to focus on its key strategic objectives. Concern was expressed however that the increasing cost of meeting non-financial

compliance requirements, such as supply chain management (SCM) procedures, may mean that resources will have to be diverted from the core programmes of the Academy. This should not be allowed to happen.

ASSAf is deemed to be ‘small’, relatively speaking,” in the DST framework in terms of funding, but the Review Panel heard that it does make very efficient use of its limited resource base. ASSAf is under-resourced for the profile of activities it maintains – and this creates a fundamental weakness. There were calls therefore for ASSAf to diversify its funding base and address its reliance on government funding.

“International funders are realising that they don’t have to go to South Africa all the time, as there are other options.” –interviewee

The Academy is known for employing and developing excellent staff members who are sometimes headhunted into government and even into the international academy system. This is seen as something to be proud of as opposed to a threat.

6.5.2 Recommendations

Develop ASSAf’s value proposition, diversify its funding base and mobilise additional resources for core support.

“Don’t let the budget dictate your activities, if you have a strong plan, present it and see what happens.” –interviewee

The Academy’s value proposition should be showcased to the private sector. It is suggested that the Academy approach the private sector and convince them to invest in ASSAf. The Academy is encouraged to pursue the existing plan to set up an Academy/science/industry forum to engage with business in an advisory capacity, particularly over fundraising.

ASSAf should consider approaching philanthropies and development agencies for additional funding. There are opportunities for long-term engagements such as joint academy work with other science academies on the continent and seek funding for this work from development banks and foundations.

In terms of resources the panel reiterates the statement earlier that ASSAf is encouraged to consider investing more in the scholarly publishing area (it builds the system and is informed by the expertise that is assisting the academy). This could include approaching the universities to help fund additional investments in scholarly publishing via a shared journal process.

7 SAYAS

The Review Panel felt that the South African Young Academy of Science (SAYAS) plays an important role across all aspects in the “Evaluation Matrix” that was used in this review of the activities of ASSAf. The Panel has therefore added this distinct section to properly represent the opportunities offered to ASSAf by SAYAS.

SAYAS is the voice of young scientists in South Africa. It aims to contribute towards solutions to national and global challenges facing society; provide a platform for young scientists to influence policy decisions; contribute towards the development of scientific capacity in South Africa through mentoring and role-modeling of future scientists; and foster opportunities for interdisciplinary collaborations amongst young scientists.

In terms of outputs, SAYAS runs symposia, carries out science for policy projects, does schools outreach work and produces publications. The organisation has several flagship activities that contribute to ASSAf’s overall objectives and are worthy of mention according to interviewees. These include the science for society workshops (schoolchildren who attended and interacted still talk about it six months later), the blogs and the social media online interactions with young people. They include the ‘Science Spaza’ project, the science kit (developed with a specialist media company) for secondary school learners, and the highly successful ‘1000 girls, 1000 futures’ project.

7.1 Observations

As with ASSAf, there is broad acknowledgement of the leadership and mentorship role that the South African Young Academy of Science (SAYAS) plays both nationally and on the African continent.

Transformation remains a major challenge for ASSAf and the under-representation in the membership of black African scientists and women, as well as scientists from the humanities and social sciences was repeatedly raised.

In terms of resources, currently SAYAS relies on a shared administrative person to provide support for the body and its funding is limited. These constraints are holding it back from achieving even more than it is currently doing.

7.2 Recommendations

The Review Panel was told that ASSAf should consider a more structured way of generating the questions it asks. It needs to make it easier for various role-players to suggest topics for consensus studies and as such the Academy should tap into the full range and depth of intellectual capital held in its membership. This process should include a concerted effort to tap into the excellent group of young scientists in SAYAS who are known to have lots of new and innovative ideas.

SAYAS is doing excellent work. Their administrative support by ASSAf should be reinforced and funding increased to allow SAYAS to better realise their self-determined strategic goals.

In terms of outputs, ASSAf should continue to nurture SAYAS because the organisation helps young scientists to contribute towards finding solutions to national and global challenges facing society.

“Tap into the top notch group of young scientists in SAYAS, they have lots of energy.” –interviewee

Since it represents the voice of young scientists in South Africa and provides a platform for young scientists to influence policy decisions there is a strong case for increasing support to the young academy.

SAYAS helps young scientists to contribute towards finding solutions to national and global challenges facing society. It represents the voice of young scientists in South Africa and provides a platform for young scientists to influence policy decisions. SAYAS can play a key role in transformation and leadership on the continent. Therefore their funding should be increased in order that they may continue to produce these useful outputs. The Review Panel interviews suggested that a request for additional resources would be strongly considered at the highest level.

In order to fast track transformation, the Academy needs to find ways to work with other bodies in the science system and it needs to actively develop the next generation of Members. This means reaching out to young people, supporting their development and ensuring their voices are heard. SAYAS is an important asset for ASSAf. SAYAS Members participate in several ASSAf standing committees and support policy advice in that way. During interviews, the Review Panel heard several calls for SAYAS funding to be boosted, as the organisation can mobilise existing capacity and expand the pool of young scientists in the country. SAYAS and ASSAf were advised to make a concerted effort to reach out to all universities, including rural universities, to ensure the right people are being recognised.

Because of the excellent work they are doing on a minimal budget and their impact nationally and internationally, ASSAf should mobilise additional resources for SAYAS. ASSAf should consider requesting an additional ring-fenced budget from DST for SAYAS, as it can play a key role in transformation and leadership on the continent.

8 Vote of thanks

The Review Panel would like to thank the ASSAf leadership and staff (past and present) for their enthusiasm and participation. Appreciation is extended to all participants – from the Minister to Members and external stakeholders. The team in Science Liaison is thanked for the flawless organisation and logistics. A special vote of thanks is extended to Renate Venier for going the extra mile to ensure everything ran smoothly.

9 Advice for future reviews

Involve the review panel in advance on expectations related to the *Terms of Reference* and stakeholders to be interviewed. Ensure that all panel members are available all of the time.

Acronyms

AAS	African Academy of Science
ASADA	Africa's Science Academy Development Agenda
ASADI	African Science Academy Development Initiative
ASSAf	Academy of Science of South Africa
AU	African Union
BRICS	Brazil, Russia, India, China and South Africa
CEO	Chief Executive Officer
CSI	corporate social investment
DBE	Department of Basic Education
DHET	Department of Higher Education and Training
DST	Department of Science and Technology
HSRC	Human Sciences Research Council
IAP	InterAcademy Partnership
ICSU	International Council for Science
M&E	monitoring and evaluation
MOU	memorandum of understanding
NACI	National Advisory Council on Innovation
NASAC	Network of African Science Academies
NDP	National Development Plan
NGO	non-governmental organisation
NRF	National Research Foundation
NSI	National System of Innovation
OWSD	Organisation of Women in Science for the Developing World
PFMA	Public Finance Management Act
RU	Rhodes University
SAASTA	South African Agency for Science and Technology Advancement
SADC	Southern African Development Community
SAJS	<i>South African Journal of Science</i>
SAYAS	South African Young Academy of Science
SciELO	Scientific Electronic Library Online
SCM	supply chain management
SDGs	Sustainable Development Goals
STEM	Science, Technology, Engineering and Mathematics
TWAS-ROSSA	The World Academy of Sciences (TWAS) Regional Office for Sub-Saharan Africa
UCT	University of Cape Town

Annexure A: List of supporting documents

- *Terms of Reference: ASSAf Institutional Review 2016*
- *ASSAf M&E Framework*
- *Strategic Concept Document: The niche and role of ASSAf in the National Science System (October 2015)*
- *ASSAf Annual Performance Plan (2016-2017)*
- *ASSAf Strategic Plan (2016-2020)*
- *Africa's Science Academy Development Agenda. PART A: Strategic Plan (2015-2019)*
- *South African Journal of Science (SAJS) Business Strategy*
- *IAC ASADI Final Evaluation*
- *Collegial Review of ASSAf: March 15-17, 2010 by Barney Cohen and Michael Clegg*

Annexure B: Short biosketches of Review Panel members

Prof Dan J. Ncayiyana

Prof Ncayiyana is emeritus professor at the University of Cape Town, and was editor of the *South African Medical Journal* for twenty years. He was born and raised in KwaZulu-Natal, South Africa, obtained his primary medical degree in the Netherlands and postgraduate qualifications at New York University. He has served as a consultant to the World Health Organisation, United States Agency for International Development, the Ford Foundation and other international agencies in the areas of public health, university governance and community-based medical education. He has served as professor in obstetrics and gynaecology, medical school dean and vice chancellor at two South African universities. He is honorary Fellow of the Colleges of Medicine of South Africa, and an elected Member of the Academy of Science of South Africa. He is currently a research associate at the Human Sciences Research Council, and is president-elect of the South African Medical Association.

Dr Heide Hackmann

Dr Hackmann is the Executive Director of the International Council for Science, following eight years as Executive Director of the International Social Science Council. Dr Hackmann holds an MPhil in contemporary social theory from the University of Cambridge, United Kingdom, and a PhD in science and technology studies from the University of Twente in the Netherlands. Before moving into the world of the international councils, she worked as a science policy maker and researcher in the Netherlands, Germany, the United Kingdom and South Africa. Dr Hackmann holds membership of several international advisory committees and boards, including the Scientific Advisory Board of the Potsdam Institute for Climate Impact Research in Germany and the Swedish Research Council's Committee for Development Research. She co-chairs the United Nation's 10-member group supporting the Technology Facilitation Mechanism on the Sustainable Development Goals.

Dr Bruce M. Alberts

Dr Alberts is a United States National Medal of Science awardee (2014). He has served as Editor-in-Chief of the journal *Science* (2008-2013) and as one of President Obama's first three United States Science Envoys (2009-2011). Alberts holds the Chancellor's Leadership Chair in Biochemistry and Biophysics for Science and Education at the University of California, San Francisco, to which he returned after serving two six-year terms as the president of the National Academy of Sciences. Dr Alberts is noted as one of the original authors of *The Molecular Biology of the Cell*, a pre-eminent textbook in the field now in its sixth edition. Dr Alberts has earned many honours and awards, including 16 honorary degrees. He currently serves on the advisory boards of more than 20 non-profit institutions, including the Gordon and Betty Moore Foundation and the Strategic Education Research Partnership.

Professor Sabiha Essack

Prof Essack, Professor in Pharmaceutical Sciences at the University of KwaZulu-Natal, is the South African Research Chair in Antibiotic Resistance and One Health and a Wellcome Trust Research

Fellow who completed research towards her PhD in Pharmaceutical Microbiology at St Bartholomew's and the Royal London School of Medicine and Dentistry in the United Kingdom. She received several prestigious scholarships and bursaries from the Wellcome Trust, the Medical Research Council, the National Research Foundation and the University of Durban-Westville during the course of her postgraduate studies. Her research has been published in several journals and has been presented at national and international conferences. Prof Essack is an expert consultant on antimicrobial resistance to international agencies and a member of international working groups on antimicrobial resistance. She is a co-founder of the South African Committee of Health Sciences Deans and a Ministerial appointee on the Board of the Office of Health Standards Compliance. Prof Essack has served on a number of professional councils and societies. She is an elected Member of the Academy of Science of South Africa.

Prof Mohamed H.A. Hassan

Prof Hassan is Co-Chair of the InterAcademy Partnership, the global network of science academies, and Chairman of the Council of the United Nations University. He also serves on a number of Boards of international organisations worldwide, including Board of Directors of global change SysTem for Analysis, Research and Training, Washington, United States, the Board of Trustees of Bibliotheca Alexandrina, Egypt; the Council of Science and Technology in Society Forum, Japan; the Board of the International Science Programme, Sweden; the Board of the Science Initiative Group, United States; and the International Advisory Board of the Centre for International Development, Germany. After obtaining his DPhil in Mathematics from the University of Oxford he returned to Sudan as Lecturer in the University of Khartoum, and later became Professor and Dean of the School of Mathematical Sciences. Prof. Hassan has a long list of publications in Theoretical Plasma Physics and Fusion Energy; Wind Erosion, Dust and Sand Transport in Dry Lands. He also published several articles on Science and Technology in the Developing World.

Prof Hassan was founding Executive Director of The World Academy of Sciences (TWAS), President of the African Academy of Sciences and chairman, Honorary Presidential Advisory Council for Science and Technology, Nigeria. Among his honours: Comendator, Grand Cross, and National Order of Scientific Merit, Brazil; and Officer, Order of Merit of the Italian Republic. He is a member of several merit-based academies of science, including, TWAS, the African Academy of Sciences; Islamic World Academy of Sciences; Academia Colombiana de Ciencias Exactas, Físicas y Naturales; Académie Royale des Sciences d'Outre-Mer, Belgium; Pakistan Academy of Sciences; Academy of Sciences of Lebanon; Cuban Academy of Sciences; and Academy of Science of South Africa.

Prof Dave Woods

Prof Woods obtained the BSc Hons Degree from Rhodes University (RU) and as a Rhodes Scholar the DPhil Degree from Oxford University. He was Professor and Head of the Department of Microbiology at RU before moving to the same position at the University of Cape Town (UCT) in 1980. He was appointed as a Deputy Vice Chancellor at UCT in 1988 and as Vice Chancellor of Rhodes University from 1996 to 2006. Prof Woods was an A-Rated scientist, a Research Fellow at the Institute Pasteur, a Royal Norwegian CSIR Post-Doctoral Fellow, Trondheim and held the RF Cherry Chair for Distinguished Teaching at Baylor University, USA. He was awarded Gold Medals by the SA Microbiology Society and the SA Society for the Advancement of Science, the John FW Herschell Medal for Outstanding Research of the Royal Society of South Africa and the C Leon Foundation

Award for Distinguished Research. He was chair of the Bacteriology and Applied Microbiology Division of the International Union of Microbiological Sciences. He was awarded the Degrees of Doctor of Laws, *honoris causa*, by Oxford University (2003) and RU (2007). He is an elected Member of the Academy of Science of South Africa.