SAON EXTERNAL REVIEW

Review Report

August 29, 2016

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Executive Summary

In accordance with the 2011 Terms of Reference of the Sustaining Arctic Observing Networks (SAON), the SAON Board convened an External Review Committee in 2016 to review the first five years of SAON's accomplishments and make recommendations for future directions. The Review Committee, consisting of five members representing countries around the Arctic as well as diverse expertise, met over a five-month period to conduct the Review. The Committee's findings and recommendations are detailed in this report. Based on these, the Committee concluded that SAON was valued by the Arctic observing community, but had yet to reach its full potential. With refinements to its Vision, Mission and Goals, improvements to its Organizational Structure, a new focus on funding and sustainability, and increased outreach and communication efforts, SAON should be able to make great strides in the next five years to enhance pan-Arctic observing networks to meet the needs of Arctic peoples.

The Review Committee relied on a wealth of advice and guidance received through its information gathering process, which consisted of the 331 responses from two stakeholder surveys and insights from 19 one-on-one interviews with persons that either had been, or continue to be, directly involved with SAON's development. Together with this input and their individual expertise, the Review Committee made a series of findings and recommendations. Some of these are viewed as more critical than others.

The Review Committee identified the following recommendations as the most critical:

<u>Critical Organizational Structure Recommendations:</u>

1) National SAON Coordination Committees need to be established in all SAON Member Countries. These Committees are critical to the success of SAON and need to be strengthened (or established in some cases) with the development of guidelines, mandates and terms of reference. The SAON Secretariat should be tasked with providing assistance to SAON Member Countries in establishing and supporting these National Committees. The Committees should reflect the inclusive nature of SAON.

2) The SAON Board needs ongoing and productive communication with the SAON Committees and within the Board itself, via regular teleconferences and face-to-face meetings. Productive discussions at the SAON Board level would be assisted with the development of specific SAON goals, and annual work plans with milestones and deliverables and review and reporting requirements.

3) SAON's role and interactions with its networks and programs need to be clarified and strengthened. The existing Arctic observing networks and activities are looking to SAON for it to help coordinate and facilitate observing activities, but not necessarily for SAON to have a role in actual implementation of observing activities. The SAON Board needs to address questions raised in the Review regarding what it means to be a SAON network and what the networks mean to SAON. This should be a priority for the SAON Board to address and underscores the need for increased dialogue between the SAON Board and the SAON networks.

Critical Recommendations for Fulfilment of SAON Vision, Mission and Goals:

4) SAON's Mission, Vision, and Goals must be clear, consistent, more explicitly pronounced in SAON documentation and more easily discoverable on the SAON website. SAON should develop a Strategic Plan that would more fully articulate the Vision, Mission and Goals and serve as a road map for SAON into the future. These all need to be reviewed on a regular basis as the Arctic political, environmental and economic landscape changes**.**

5) SAON must develop more task-oriented Goals that are reflective of the SAON Vision and Mission and are a key component of a newly developed Strategic Plan. Annual work plans for the SAON Committees should specify deliverables, milestones and annual review and reporting so as to demonstrate progress and success.

6) To increase its transparency, a Communications Plan should be developed by SAON that identifies its broad range of audiences, proposes strategies to reach out to these stakeholders and includes clear and consistence messaging. As well, the Arctic Observing Summit should be used more effectively as a mechanism to communicate about, and deliver on, SAON.

7) SAON should explore new, innovative forms of funding with a focus on additional resources for the SAON Committees. A key component of a proposed new SAON Strategic Plan should be a Funding Strategy that provides resources across national boundaries – either in the form of funding or in-kind personnel support - in support of the Vision, Mission and Goals.

Additional Recommendations to Strengthen SAON:

8). The SAON Committees have been a successful addition to the SAON organizational structure and ongoing guidance from the SAON Board and resourcing with funds or dedicated personnel should be made available.

9) SAON needs to capitalise on its strengths, including its position and unique nature as an organization with close ties to both the International Arctic Science Committee and the Arctic Council. SAON is well positioned at the international level to facilitate and coordinate Arctic observing activities. SAON complements and leverages the observing efforts of other organizations and initiatives and this strength should be further exploited.

1. Introduction

In accordance with the 2011 Terms of Reference of the Sustaining Arctic Observing Networks (SAON), the SAON Board convened an External Review Committee in 2016 to review the first five years of SAON's accomplishments and make recommendations for future directions. The Review Committee, consisting of five members representing countries around the Arctic as well as diverse expertise, met over a five-month period to conduct the Review. The process included two separate surveys with more than three hundred respondents, 19 in depth interviews of key informants, and a three-day in-person meeting of the committee in Copenhagen, Denmark. The four target areas of the review were: SAON's organizational structure, extent to which current SAON activities are fulfilling its original mission, outreach and communication, and funding and sustainability. The Committee's findings and recommendations are detailed in this report. Based on these, the Committee concluded that SAON was valued by the Arctic observing community, but had yet to reach its full potential. With refinements and recommendations as proposed within this Review, SAON should be able to make great strides in the next five years to enhance pan-Arctic observing networks to meet the needs of Arctic peoples.

2. SAON – History to date

a. Establishing SAON

Although humans have been observing and responding to changing conditions in the Arctic for thousands of years, only in the past two decades has there been a concentrated effort to improve research and observational capabilities at a pan-Arctic scale. A U.S. - led report "Toward an Integrated Arctic Observing Network" (2006)[1] and planning for the 2007-2008 International Polar Year (IPY) focused international discussions on how best to coordinate and enhance existing observing networks. Also in 2006 the Arctic Council's Salekhard Declaration (2006) urged member countries and partners to coordinate Arctic observations: "Urge all the Member countries to maintain and extend long term monitoring of change in all parts of the Arctic, and request AMAP (Arctic Monitoring Assessment Programme) to cooperate with other Arctic Council Working Groups, IASC (International Arctic Science Committee) and other partners in efforts to create a coordinated Arctic observing network, that meets identified societal needs". In response to that request in December 2008 a SAON Initiating Group published the report "Observing the Arctic", which included recommendations following three international workshops and two regional meetings broadly attended by representatives of the science community, operational government agencies and indigenous peoples.

In 2009, the Arctic Council agreed to lead the development of an organization to foster Arctic observing networks and established the Sustaining Arctic Observing Networks (SAON) Steering Group to do so. The Steering Group's report to the Arctic Council and the International Arctic Science Committee (IASC) on a "Plan for the Implementation Phase of SAON" was delivered in February 2011[2].

[1] http://www.nap.edu/read/11607/chapter/1#v
[2] http://www.arcticobserving.org/images/pdf/Background/saon_report_february_2011.pdf

SAON was formally established following the 2011 Arctic Council Nuuk Declaration[3]. The declaration text recognizes the "importance of the Sustaining Arctic Observing Networks (SAON) process as a major legacy of the International Polar Year for enhancing scientific observations and data-sharing". The declaration text gives details about the SAON governance structure, and determines that the AC will provide the chair of the SAON Board, while IASC will provide the vice-chair. The text also has wording on the role of the indigenous organizations that are Arctic Council Permanent Participants and decides that AMAP and IASC will jointly provide secretariat support to the SAON.

The SAON Board met for the first time in January 2012, and the SAON Terms of Reference were finalized in October 2012[4].

b. The SAON vision and goal

The vision and goal for SAON have been formulated in the 'Plan for the Implementation Phase of SAON'[5]:

"The SAON Vision is that users should have access to free, open and high quality data that will realize pan-Arctic and global value-added services and provide societal benefits. To attain that vision, SAON's goal is to enhance Arctic-wide observing activities by facilitating partnerships and synergies among existing 'building blocks', and promoting sharing and synthesis of data and information. To achieve that goal, SAON is a resource for a broad community that includes governments and operational agencies, scientific researchers, indigenous peoples and northern residents, other stakeholders and the general public."

c. Governance and membership

The SAON Terms of Reference define SAON's governance structure to include:

- A SAON Board, responsible for providing guidance and direction on programmatic operations, including science priorities, and project approval and integration; and
- A SAON Executive Committee, responsible for overall governance issues, including alignment of SAON strategic direction with the goals and objectives of both the Arctic Council and IASC.

Current members of the Board are the eight Arctic countries (Norway, Canada, Finland, U.S., Russia, Iceland, Kingdom of Denmark, and Sweden), with a number of non-Arctic countries (including China, Germany, Italy, Japan, Korea, Poland, and Spain) also frequently attending the Board meetings. The six Arctic Council Permanent Participants are 'born members' of the Board, and include the Aleut International Association, the Arctic Athabaskan Council, Gwich'in Council International, Inuit Circumpolar Council, Russian Association of Indigenous Peoples of the North and the Saami Council. Several international organizations (e.g. World Meteorological Organization, European Environment Agency, European Union, Group on Earth Observations, International Council for the Exploration of the Sea, International Permafrost Association,

[3] http://www.arcticobserving.org/images/pdf/Board_meetings/5th_tromso/nuuk_declaration_final.pdf
[4]http://www.arcticobserving.org/images/pdf/Board_meetings/4th_potsdam/34_saon%20terms%20of%20reference.doc
[5] http://www.arcticobserving.org/images/pdf/Background/saon_report_february_2011.pdf

International Study of Arctic Change, Pacific Arctic Group and Arctic Council working groups) have also attended Board meetings.

The SAON Board is currently chaired by Christine Daae Olseng, The Research Council of Norway, and Larry Hinzman, University of Alaska, Fairbanks.

d. The Committees and their activities

In 2014, the SAON Board finalized the implementation plan for SAON[6], including a decision to establish its two committees[7]. The committees were determined to be the home for the initial series of networks and projects defined as the SAON 'building blocks'. In addition, the committees were given a series of assignments as outlined below.

Arctic Data Committee (ADC)

The ADC[8] is currently chaired by Peter Pulsifer (National Snow and Ice Data Center, USA). The committee has identified these activities:

- Mapping the Arctic Data Ecosystem
- Common Metadata Elements
- Data Publication and Citation
- Network Building
- Outreach

Committee on Observations and Networks (CON)

CON is currently chaired by Lisa Loseto (Fisheries and Oceans Canada), with development of the CON Inventory Work Plan[9] as its primary product. The CON is establishing inventories of current Arctic observational assets (networks, platforms, programs, and projects), which will also be used as an input to EU-PolarNet[10].

e. Services and Outreach

SAON services include the SAON project directory[11], which provides access to overviews of Arctic observational activities. The Atlas of Community-Based Monitoring and Indigenous Knowledge in a Changing Arctic[12] is a SAON project.

The SAON website (http://www.arcticobserving.org/) is the primary outreach tool for SAON. The Arctic Observing Summit[13] (AOS) is a key SAON outreach event, originally defined as the venue for

[6] http://www.arcticobserving.org/images/pdf/Board_meetings/1st_helsinki/11_SAON_Implementation_v1.0.pdf
[7] http://www.arcticobserving.org/images/pdf/Board_meetings/1st_helsinki/12_Terms_of_Reference_for_SAON_Committees_v1.0.pdf
[8] http://arcticdc.org/
[9] http://www.arcticobserving.org/committees/con/con-inventory-work
[10] http://www.eu-polarnet.eu
[11] http://pusnes.grida.no/amap/amappd/?org=4
[12] http://www.arcticcbm.org/index.html
[13] http://www.arcticobservingsummit.org

the SAON networks and projects to meet and exchange outcomes and findings. AOS has been conducted three times (2013, 2014, and 2016) and is organized in cooperation with the International Study of Arctic Change (ISAC). SAON is also a co-sponsor of the Polar Data Forum (PDF).

f. Relationship with other organizations/initiatives

SAON's parent organizations are the Arctic Council (and its Working Groups) and International Arctic Science Committee (IASC). In addition, SAON has over the years established formal or informal relationships with among others the Group on Earth Observations, the European Commission, Global Ocean Observing System, the International Network for Terrestrial Research and Monitoring in the, EU-PolarNet, the Standing Committee on Antarctic Data Management, Southern Ocean Observing System, and the World Meteorological Organization (WMO). The WMO further demonstrated its support for SAON by endorsing SAON in 2007 as a legacy of IPY.

3. Purpose and Objectives of External Review

Following the Nuuk Declaration in 2011[14] and the establishment of SAON, the Senior Arctic Officials (SAOs) of the Arctic Council agreed that "The SAOs will review the SAON structure in two to four years' time and make any necessary adjustments to the structure at that time"[15].

Such a review is further detailed in the SAON Terms of Reference[16]: "In order to both ensure the success of SAON, as well as the effective implementation of its tasks, activities and related operations, an external body will review SAON on a periodic basis to be determined by the SAON Board in consultation with the Arctic Council and IASC. The SAON Board will develop details for implementation of, and response to, the review during and in between its formal meetings".

This report is the first review of SAON since its establishment five years ago in 2011. The review was conducted by an external Review Committee, and took place in 2016. The review had two goals: to look backward and investigate how SAON has met its mandate in the past, but also to look forward and give future directions on the development of SAON.

[14] http://www.arcticobserving.org/images/pdf/Board_meetings/5th_tromso/nuuk_declaration_final.pdf
[15] http://www.arcticobserving.org/images/pdf/Board_meetings/5th_tromso/sao_report_to_ministers_-_nuuk_ministerial_meeting_may_2011.pdf
[16] http://www.arcticobserving.org/images/pdf/Board_meetings/4th_potsdam/34_saon%20terms%20of%20reference.doc

Lessons were learned, and approaches to the review refined, from similar reviews conducted in the past on AMAP[17], IASC[18], the Association of Polar Early Career Scientists (APECS)[19], and the Scientific Committee on Antarctic Research (SCAR)[20].

The SAON External Review was completed by a five-member committee of experts of international recognition with a broad understanding of Arctic observations and policy. Committee members were selected by the SAON Executive. The members' expertise covered the whole perspective of SAON goals and objectives, taking into account geographical, age and gender balance, and included representatives of the scientific community, government agencies, indigenous and local residents, and global observing systems. Despite the efforts of the SAON Secretariat, the Review Committee was not able to include an available representative from industry.

The Review Committee was tasked with Terms of Reference for the SAON review that had a particular focus on:

- The organizational structure of SAON;
- The extent to which current SAON activities are fulfilling its original mission;
- The SAON outreach and communication activities;
- Suggestions for additional and future activities for SAON, including meeting frequencies and intersessional activities; and
- The question of funding and sustainability of SAON.

4. Information Gathering and Analysis Process:

The information gathering process for the SAON External Review took place using two stakeholder surveys and conducting 19 one-on-one interviews with persons that either had been, or continue to be, directly involved with SAON's development.

Surveys

The two surveys were designed according to the guidelines of the SAON External Review Plan (Appendix F). Both included the same 24 questions arranged under the headings: 1) Introductions, 2) The Need, 3) Outcomes, and 4) Awareness and Outreach. The directed, longer survey had 10 additional questions that addressed: 5) The SAON Committees and 6) The SAON Organizational Structure (Appendix G). Both surveys provided the respondents the opportunity to include any additional comments they wished the Review Committee to consider. Both also included an opportunity to skip any of the survey questions if the respondent so wished. Most of the respondents used this option at least once.

Invitations to participate in the shorter, open survey were sent out broadly to the Arctic observational community through websites, mailing lists, social media, etc. In order to facilitate

[17] External Review of the Arctic Monitoring and Assessment Strategy: http://www.amap.no/documents/download/985
[18] An International Review and Strategy for the IASC Council: http://iasc25.iasc.info/images/history/reviews/IASC-2007-Review-and-Strategy-Paper.pdf
[19] APECS Organizational Review (2015): http://www.apecs.is/who-we-are/organizational-review- 2015.html
[20] Survey on SCAR Organizational Structure (2015): https://www.facebook.com/permalink.php?id=282292838637823&story_fbid=351728355027604

circulation of the surveys among Russian stakeholders, a Russian translation of the surveys was made available on the survey webpage.

The directed, longer survey was made available only to persons that currently are or have been directly involved in SAON. This included current and past members of the SAON Board, SAON Project and Network leads, SAON Committees, SAON Steering Group, Arctic Council Permanent Participants active in SAON (Aleut International Association, Gwich'in Council International, Inuit Circumpolar Council, Saami Council), and Chairs and Executive Secretaries of AMAP and Conservation of Arctic Flora and Fauna (CAFF).

The survey data was examined and summarized for the External Review Committee by an external data analyst. The directed, longer survey had a total of 30 responses from 12 different countries. Most of these responses came from the United States (7), Canada (4), and Norway (4). The shorter, openly circulated survey garnered 301 responses from 21 countries, with the largest number of respondents from Italy (120), United States (74), and Russia (24). Given the large number of survey responses to the openly circulated survey from Italy and the United States, a separate analysis of these responses was conducted to determine if they skewed the overall survey results. It was found that there was very little deviation between the Italian and American responses and the overall trends of the sum total of all responses.

Interviews

Nineteen individual interviews were conducted with persons that either had been, or continue to be, directly involved with SAON's development. The interviews were conducted by the five External Review Committee members and the external data analyst. The list of persons interviewed (Appendix E) was developed by the SAON External Review Committee to capture a wide-ranging source of input and advice. It was not meant to include every person who had prior or current involvement, but rather, to reflect broad geographic coverage across the Arctic, representing Arctic and non-Arctic states as well as the Arctic Council Permanent Participants' organizations. The interviews were conducted according to an Interview Guide (Appendix A) that the External Review Committee designed after receiving preliminary results of the two surveys. The Guide consisted of 17 thematically arranged questions, which reflected the five areas that the External Review Committee had been asked to focus on in the "SAON External Review Mandate and Review Plan" (Appendix F).

The interviews were a great source of information for the SAON review as they provided an opportunity to delve into aspects of the evaluation that were not possible with the on-line survey.

It should be noted that the information gathered in both surveys and the one-on-one interviews have provided a wealth of advice and guidance that will be of tremendous value to SAON as it moves forward. The more detailed interview and survey records are attached as appendices to the report. It is hoped that SAON will be able to use the information from the surveys and interviews as additional input as it moves forward with its review of the Report's recommendations.

5. Analysis and Findings

A. FULFILMENT OF SAON'S MISSION, VISION AND GOALS

Finding #1: SAON's Mission, Vision and Goals as articulated in a variety of SAON documents over time are not always clear, consistent, or easily discoverable.

The SAON's Mission, Vision and Goals that were circulated for both the directed, longer and the shorter, openly circulated survey, as well as for the one-on-one interviews, were pulled from the 2011 SAON's "Report to the Arctic Council and the International Arctic Science Committee: Plan for the Implementation Phase of SAON"[21]. The Review Committee revamped this formulation somewhat for clarity. In the surveys the SAON Mission, Vision and Goals were stated to be:

- Support and strengthen the development of multinational engagement for sustained and coordinated pan-Arctic observing and data sharing systems that serve societal needs, particularly related to environmental, social, economic and cultural issues.
- Promote the Vision of well-defined observing networks that enable users to have access to high quality data that will realize pan-Arctic and global value-added services and provide societal benefits.
- Implement the Goal to enhance Arctic-wide observing activities by facilitating partnerships and synergies among existing observing and data networks ("building blocks") and promoting sharing and synthesis of data and information.

Most of the respondents to the two surveys, 83% of the shorter, openly circulated and 92 % of the longer, directed one, considered the SAON Mission, Vision, and Goals as described in the surveys to be a clear articulation of SAON's purpose (Figure 1). This view was also prominent among the interviewees.

[21] http://www.arcticobserving.org/images/pdf/Background/saon_report_february_2011.pdf

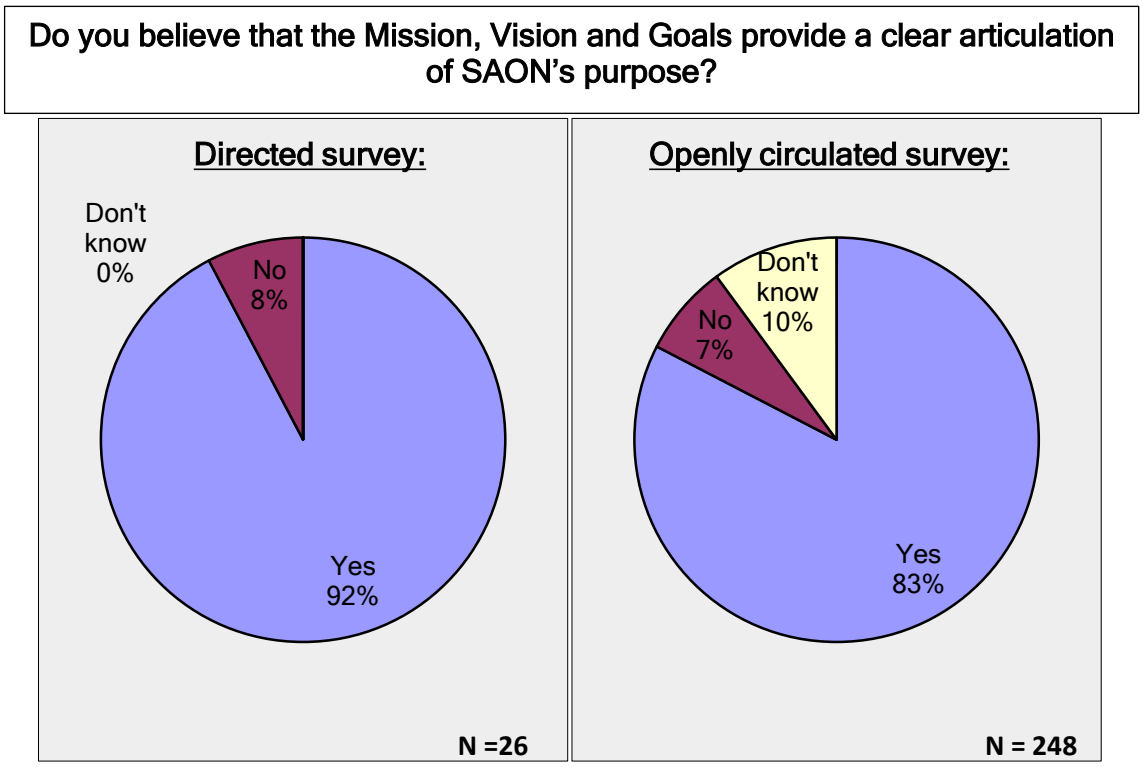

Figure 1.

In clarifying their answers, many of the interviewees as well as many of the survey respondents, however, stated that the Vision, Mission and Goal(s) of SAON were not as clearly worded as they could be. The SAON Goals, and what is meant by societal benefits, were, in particular, seen as needing to be much more explicit (see Finding #2). In addition, when reviewing SAON documentation on the SAON website, the External Review Committee noted that the SAON Vision, Mission and Goals exist in two versions on the SAON website, a formal one and a second more informally worded one and that these two versions can lead to ambiguity and potential uncertainty. As a result, it was not particularly clear what were SAON's "official" Vision, Mission and Goals.

Suggestions for Action:

The SAON Board needs to identify the official Vision, Mission and Goals and make them easily discoverable on the SAON website. In addition, since there appears to be a current lack of consistency in the wording as it changes among various SAON documents, it is important that consistent terms and language are used whenever referencing the Vision, Mission and Goals in other documents. More precise and consistent wording of the Vision, Mission and Goals could also benefit communications and outreach and clarify the role of SAON internationally since it is not clear to everyone. In specifying their answers to the question on clarity of SAON's Mission, Vision, and Goals, most of the shorter, openly circulated survey respondents provided suggestions for such revision. One suggestion was to revise the three statements used in this review to avoid overlapping language and more distinctly reflect the specific Mission statement, Vision statement,

and Overarching Goals. There was also a suggestion that the Mission, Vision and Goal(s) should clearly indicate what the added value of SAON is in relation to other existing international Arctic scientific programs and networks.

The Review Committee also suggests that SAON should consider developing a Strategic Plan that would more fully articulate the Vision, Mission and Goals and also include both a Communications Plan as well as a Funding Strategy. This Strategic Plan could provide a road map forward for SAON into the future. Developing such a Plan would tie together the various governance aspects of SAON and could be an effective means of communicating the role and added value of SAON.

Finally, as the environment in which SAON is working is facing rapid change, the Vision, Mission and Goals should be reviewed regularly to ensure their continued relevancy and appropriateness. This environment includes not only the changing physical landscape and consequent impacts on biological resources important to commercial and subsistence economies, but also the political and economic environment. Non-Arctic states such as China, Japan and Germany have an increasingly active interest in the Arctic, as seen by scientific research cruises and their participation as observers in the Arctic Council. International science organizations and more active stakeholder groups will play more prominent roles in Arctic observing, politics and governance. For that reason, SAON should ensure that its Vision, Mission and Goals are reviewed on a periodic, but regular basis.

RECOMMENDATION #1:

SAON's Mission, Vision, and Goals should be clear, consistent and more explicitly pronounced in SAON documentation. It is recommended that SAON develop a Strategic Plan that would more fully articulate the Vision, Mission and Goals and also include both a Communications Plan as well as a Funding Strategy. They should be written with measurable tasks and outcomes in mind, and reflect the continuing changes in the Arctic political, environmental and economic landscape.

Finding #2: SAON's goals need more specificity in order to develop action-oriented work plans, performance metrics and outcomes, and demonstrations of progress.

Most of the interviewees reported that, as SAON's Mission and Vision were very general (which seems appropriate for high-level guidance), the Goals were also very general but needed to be more specific. When the interviewees were asked what was the one aspect they saw should be changed to improve SAON or make it stronger, more than half responded by stating that SAON needs clear, concrete, action-oriented goals and a more strategic path forward. This view was also supported in the comments in both surveys to the question of clarity of SAON's Mission and Vision and Goals. The survey respondents stated that despite their views that the Mission, Vision and Goals are clear, they were not certain what SAON was doing or planning to do to achieve them. In the words of one respondent to the shorter, openly circulated survey: "Goals are clear, but the execution of goals is entirely unclear."

Suggestions for Action:

SAON should develop more task-oriented Goals that are reflective of the SAON Vision and Mission and would become a key component of a newly developed Strategic Plan. The Goals should be achievable actions that are incorporated into SAON Committee work plans and that specify milestones, deliverables, and review and reporting requirements. Developing more specific Goals will also provide SAON with concrete activities that could be the subject of success stories and communication activities. The surveys and interviews conducted in support of this review have provided several examples of possible goals for SAON, including: managing, coordinating and maintaining an up-to-date database of national inventories of Arctic observing networks; defining strategic observing networks for the purposes of sound and sustainable, international environmental governance; and identifying through an active and sustained dialogue the needs and issues of the various observing networks, and using the SAON committee structure to help respond to them.

The Review Committee also suggests that the Arctic Observing Summit could be used as the venue or platform where the SAON Board could report on and discuss their Goals every two years. The Appendices to this Report provide an excellent resource for further input on possible SAON Goals.

RECOMMENDATION #2:

It is recommended that SAON develop more task-and detail-oriented Goals as a key component of a newly developed Strategic Plan. These Goals should be reflective of the SAON Vision and Mission and specify milestones, deliverables, and review and reporting requirements so as to clearly demonstrate progress.

Finding #3: SAON's role and interactions with its networks and programs are not well-defined.

One of the questions included only in the directed, longer survey was: Does the SAON organizational model provide sufficient interaction with observing networks and projects? Only four of the 25 respondents to this question replied "yes". The general opinion among the respondents was that to improve this interaction, internal communications and the flow of information and interaction among various SAON organizational components needs to be improved. The survey respondents reported that this need for increased interaction also applied to SAON's outreach or external communications with different networks and programs. In the words of one respondent: "It seems that many national networks and projects are aware of the existence of SAON but not informed on current activities or achievements". The lack of sufficient interaction between SAON and the networks and projects was also reflected in the answers to this question in the shorter, openly circulated survey: "Do SAON's current activities help it fulfil its original mission?" As presented below, the most frequent response to this question (46%) was "Don't know"(Figure 2).

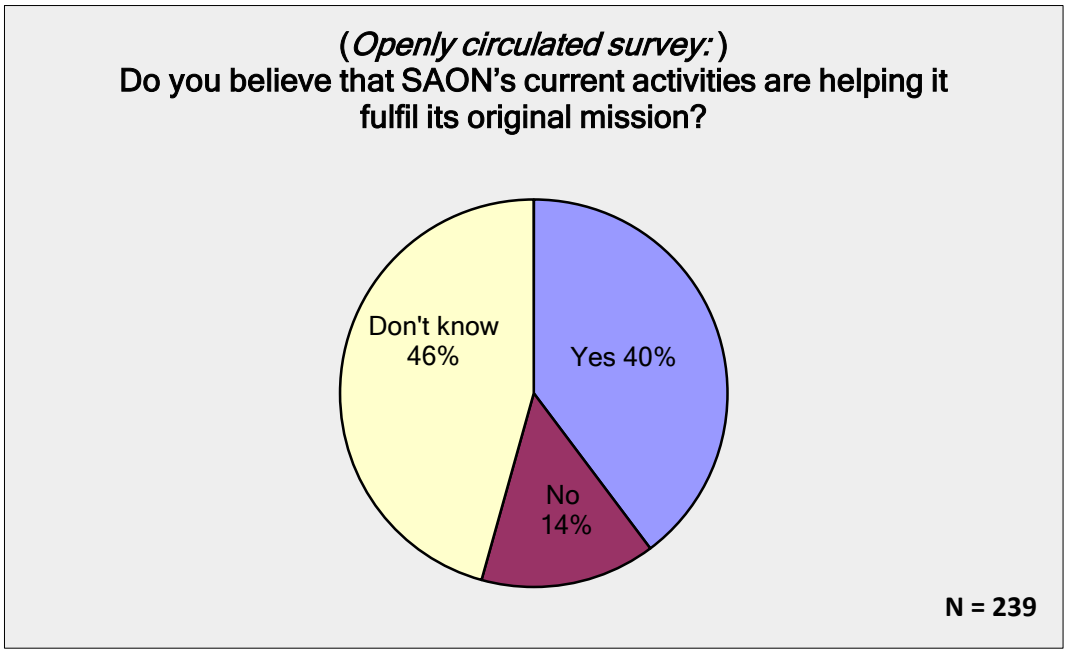

Figure 2.

The interviewees associated this insufficiency in SAON's interaction with observing networks and projects with the lack of clarity about SAON's role as well as the form of its interactions with SAON networks and programs.

Both survey respondents and the interviewees consistently referenced the concept of "network of networks" in referring to the desired roles and services of SAON to individual observing networks and programs. There was, however, no clear consensus over what this term entailed. The existing Arctic observing networks and activities appear to be looking to SAON for an increased role in helping coordinate and facilitate observing activities, but not necessarily for SAON to have a role in actual implementation of observing activities. Some interviewees were, for example, seeking more support from SAON in how their networks interact with different disciplinary observing networks and funding agencies. Some wished SAON would provide brokering and lobbying services on behalf of overall Arctic observing. Others desired that SAON would come up with concrete ways for facilitating the sharing of information about technology developments and different data sources. One suggested mechanism for implementing this recommendation was establishing a regular, multi-disciplinary Arctic technology forum. Yet another service the interviewees hoped that SAON would provide was the establishment of international observation standards and guidelines that would facilitate data sharing across borders. These desires were more or less in line with the roles the respondents to the shorter, openly circulated survey reported they would like to see SAON play in the future.

Suggestions for Action:

SAON needs to clarify what it means for an observing network to be part of SAON. At the same time, the observing networks need to determine what value they can bring to SAON. There should be increased dialogue among the SAON Board and the various SAON networks to determine what benefits and added value can be provided by SAON to the existing observing networks and programs.

Many of the interviewees and survey respondents provided concrete ideas for how to increase SAON's role and effective engagement with its networks. One such activity that was mentioned by the interviewees was for SAON to assist with the "holistic coordinating of Arctic Council working groups through information exchange, data management and coordination." In other words, SAON could provide underlying observational data and information products to support the efforts of the Arctic Council and all its working groups. One interviewee hoped that SAON would work as a think tank that initiated dialogues between different public and private observing networks. One of the directed, longer survey respondents wished, in turn, that SAON could act as a facilitator of well-defined and multinational observing networks and support efforts in seeking partnerships and funding opportunities. Further suggestions by the interviewees and survey respondents can be found in the Appendices B, C and D. The Review Committee suggests using a mechanism such as a "Call for Proposal Ideas" to solicit ideas and proposals for ways the SAON Board could increase communication and coordination with SAON networks. Such a call could be broadly circulated by the SAON Board to existing networks and activities, including Arctic Council Permanent Participants.

In addition, the Review Committee wanted to call attention to a statement issued at the 2016 Arctic Observing Summit that highlights the relevancy of the SAON observing networks. One of seven recommendations from the AOS 2016 Statement reads: "Coordinate the implementation of a pan-Arctic observing system with regional and global observing initiatives, and organize efforts in securing resources for its sustained operation through the leadership of the Sustaining Arctic Observing Networks (SAON) initiative".

RECOMMENDATION #3:

SAON's role and interactions with its networks and programs need to be clarified and strengthened through increased dialogue between the SAON Board and the SAON networks.

Finding #4: One of SAON's strengths is its position as an Arctic Council and International Arctic Science Committee-sponsored organization, and this could be used more effectively and strategically.

In the information-gathering phase of this review, the interviewees and survey respondents referred to a handful of other international initiatives that are similar to SAON, but associated with different international organizations. These included: GEO (Group on Earth Observations), EU-PolarNet, WMO's operational observing capacity, and EEA's (European Environment Agency's) European Environment Information and Observation Network (Eionet). SAON was seen as complementary to these initiatives and as capable of leveraging their observing efforts.

The special value that the interviewees saw SAON having in comparison to other global initiatives is its close association to the Arctic Council and International Arctic Science Committee. They thought that SAON was able to use the institutional structures of these organizations to its advantage in interacting with Arctic communities, including indigenous peoples, and different

worldwide Arctic science networks. In the words of one of the interviewees: “These are the two organizations that represent the global Arctic science community and Arctic sovereigns.”

Another strength of SAON that was reported by the interviewees as well as respondents to both surveys is the strong and positive working relationship that SAON has established with indigenous peoples’ organizations. This is an example that some of the interviewees believe should be replicated by other international scientific organizations.

An additional strength of SAON that was reported by both the interviewees as well as the survey respondents was SAON’s commitment to facilitating the integration of traditional indigenous knowledge and community based observations into technical, natural scientific knowledge. This strength relies on the continued and active involvement of Arctic indigenous peoples in the SAON activities and processes. The unique structure of the SAON leadership with both the Arctic Council together with IASC, creates the potential for SAON to become a platform for a true cross-disciplinary (holistic) approach to pan-Arctic networking of observations, data and information. A balanced participation from different sectors, national institutions and indigenous peoples brings together a diversity of minds and backgrounds, with connections ranging from the community level to space technology. A well-functioning multi-disciplinary SAON has the potential to make a wide spectrum of data available and accessible and ultimately providing better outcomes for SAON.

Traditional indigenous knowledge and community based observations were reported to have received strong attention and visibility in the SAON Implementation Plan and with the initial activities of both the Arctic Data Committee and the Committee on Observations and Networks. SAON’s support for the Community Based Monitoring Atlas was frequently highlighted as a specific success in implementing this connection and commitment.

Suggestions for Action:

SAON should take actions that capitalize on its unique strengths that make it well-positioned at the international level to facilitate, coordinate and enhance Arctic observing activities. SAON complements and leverages observing efforts of other organizations and initiatives, and the program’s strengths should be further exploited.

For example, SAON could advocate at the Arctic Ministerial level for support of validated Arctic observing efforts that could be supported at individual national levels. As well, SAON could coordinate follow-up of the Arctic research priorities for the next decade listed in the 2016 final report of the IASC’s 3rd International Conference on Arctic Research Planning (ICARP III). In addition, given SAON’s robust working relations with northern indigenous people and the Arctic Council Permanent Participant organizations, SAON is well positioned to lead international organizations in work to develop ethical guidelines for working with Arctic communities**.**

RECOMMENDATION #4:

SAON needs to capitalize on its strengths, including its position and unique nature as an organization with close ties to both the International Arctic Science Committee and the Arctic Council.

B. ORGANIZATIONAL STRUCTURE OF SAON

Finding #5: The National SAON Coordination Committees are viewed as a key component of the SAON organizational structure, but in general, are not functioning well.

The majority of both the shorter, openly circulated survey respondents (68%) and the directed, longer survey respondents (57%) felt that the national level of coordination of SAON related activities in their country was insufficient (Figure 3).

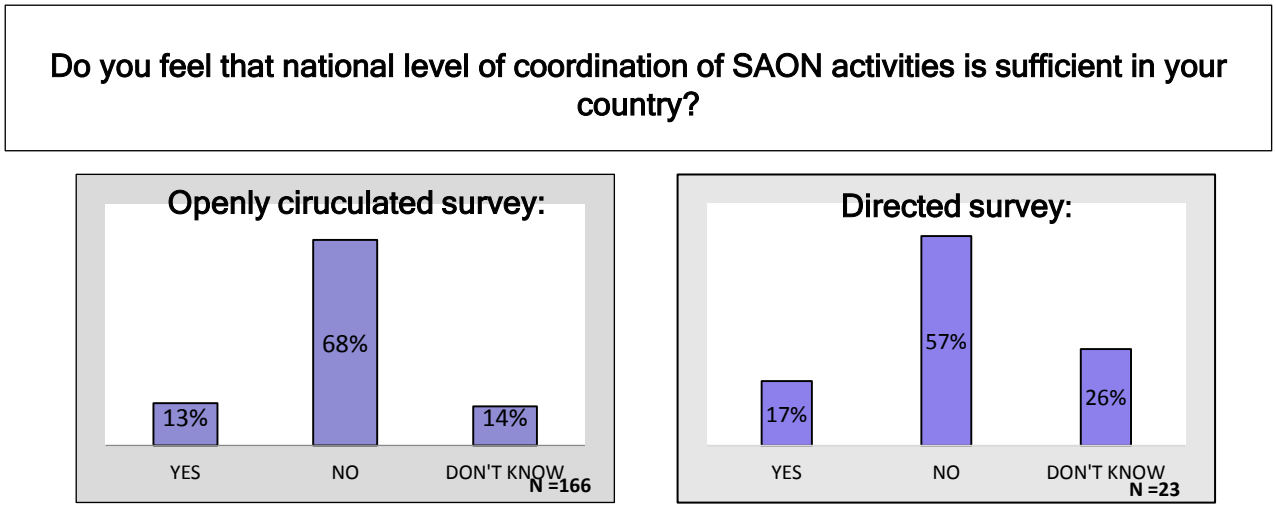

Figure 3.

In their review of SAON's organizational structure, a majority of the interviewees also said that the National SAON Coordinating Committees (NSCCs) were the component that needed the most attention. Some of the directed, longer survey respondents also connected the current perception of the NSCCs as "weak" with problems described in Findings 1-3 in formulating and following up of SAON activities. In the words of one of these respondents: "In order to have actual impact and realize the SAON vision, mission and goals, effective national structures must also be in place." In terms of another: "The success of SAON relies on effective national structures in SAON Member Countries to communicate the SAON activities and ensure national participation in these."

Suggestions for Action:

The National SAON Coordinating Committees are viewed as a vital foundational component of the work of SAON. It is seen as critical that these Committees be established – or enhanced - in all SAON Member countries as soon as possible. Guidelines, mandates and terms of reference should be developed for these Committees. The Committees should reflect the inclusive nature of SAON and include the broad breadth of observing disciplines, with a cross-section of members from government agencies, scientists/researchers, industry, indigenous peoples, non-government organizations, Arctic communities and other stakeholders. It is important that the involvement of indigenous peoples be sought in national coordination, to ensure a joint platform at the regional/national level and ensure indigenous/non-indigenous co-production of knowledge.

One suggestion for an increased role of the National SAON Coordinating Committees is that they could support international interactions and integration at regional sub-Arctic scales (e.g. Barents

Sea, Bering Sea) and work on a multi-disciplinary science perspective on priority issues for these regions.

The SAON Secretariat should provide support to these National SAON Coordinating Committees in those countries where there seems to be difficulty in getting them established, by providing advice and encouragement, as well as sharing lessons learned and best practices.

Robust National SAON Coordinating Committees would also benefit the SAON Committees (ADC and CON) by serving as appropriate links among and between the SAON Board, National SAON Coordinating Committees and SAON Committee efforts. These three levels of governance must all be operating effectively for SAON itself to be successful.

RECOMMENDATION #5:

National SAON Coordination Committees need to be established in all SAON Member Countries. These Committees are critical to the success of SAON and they need to be strengthened with the development of guidelines, mandates and terms of reference. The SAON Secretariat should be tasked with assisting SAON Member Countries in establishing and supporting these national committees.

Finding #6: The current reporting relationship of SAON within the Arctic Council's organizational structure is not always supported.

The location of SAON within the Arctic Council's organizational structure was something that many of the interviewees suggested be reviewed in the future. The SAON Secretariat is currently supported by IASC and AMAP, and hosted by the latter (see Section 2 "SAON History up to date" above), which is one of the Arctic Council's six working groups. Some of the interviewees were concerned that SAON's close connection to AMAP could hinder SAON from working to its full potential with the other five Arctic Council Working Groups. The interviewees were, for example, concerned that because of its association with AMAP, the other Arctic Council Working Groups might see SAON first as competition and only second as an opportunity for increased cooperation and coordination. There were suggestions that, in the future, SAON could be moved directly under the Arctic Council Secretariat, established as a seventh, independent Arctic Council Working Group, or even as its own independent entity.

Suggestions for Action:

SAON has spent considerable effort in the past four years in examining and establishing its own internal governance structure. This included the composition of the SAON Executive as well as the creation of the SAON Committees. With this governance now in place, it is time to SAON to focus on renewed efforts to achieve its Vision and Mission. While there was input from the surveys and interviews to review the location of SAON within the Arctic Council's organizational structure, the Review Committee does not deem this as a priority for SAON at this time. Consideration of any change in reporting should be put off until a later date.

RECOMMENDATION #6:

At a future date, the location of SAON within the Arctic Council organizational structure might be examined and reconsidered.

Finding #7: The SAON Board is not perceived to be functioning effectively nor adequately engaging with other components of the SAON organizational structure.

The directed, longer survey respondents, as well as the interviewees, were not satisfied with the functionality or engagement of the SAON Board with SAON's other organizational components. The interviewees saw the current composition of the Board and the frequent turnover of Board meeting participants as a special challenge for ensuring continuity of the SAON process, which was seen as essential for the advancement of SAON activities. Both the interviewees and the directed, longer survey respondents reported that there is a need to secure more "real engagement" from the Board in SAON activities and outreach, especially in regards to the further organization of the work of the two SAON Committees.

Suggestions for action:

The SAON Board has an enviably rich membership comprised of Arctic Council Member States, non-Arctic Council Member States, the Arctic Council Permanent Participants, international science organizations, and several Arctic observing networks. The current members also represent various disciplines within science, management and political levels. This rich membership is an asset for the diverse discussions and experience that can be brought forward to SAON discussions. However, this varied membership is also a challenge for SAON to harness and manage this diversity and to ensure that members are prepared with both commitment and resources for the SAON work. Observations from the interviews noted that perhaps SAON Board members should in fact be two members per country - one government official as well as another representing academia or the scientific research community.

Frequent dialogue is needed at the Board level to ensure communications among this diverse membership. Regular face-to-face meetings, and frequent teleconferences between these meetings, are a necessity. Without constant communication and meetings, the Board is at risk of becoming stalled and ineffective.

Another aspect that would strengthen the SAON Board is the creation of strong and effective National SAON Coordinating Committees (see Finding #5). These foundational committees would ensure that SAON Board members are briefed and engaged on all national observing activities and thus empower the discussion at the SAON Board level.

In addition, the development of action-oriented SAON Goals and preparation of supporting work plans would provide additional structure to the SAON Board discussions (e.g. with annual presentation of plans and annual progress reports on milestones and deliverables).

It was noted in both surveys and in the interviews that the SAON Executive was functioning well and has an important role in encouraging strong communication among the SAON Board and the two SAON Committees. Both the survey respondents and the interviewees also reported that if additional funding or personnel resources are made available, the Secretariat should be strengthened.

RECOMMENDATION #7:

The SAON Board needs ongoing and productive communication with the SAON Committees and within the Board itself, via regular teleconferences and face-to-face meetings. Productive discussions at the SAON Board level would be assisted with the development of specific SAON Goals, and annual work plans with milestones and deliverables.

Finding #8: The SAON Committees are seen as a successful addition to the SAON organizational structure.

Half of the directed, longer survey respondents (12) considered the SAON committee structure to be appropriate and working. The interviewees also thought that the two committees had been a successful addition to the SAON structure. When asked where possible extra funding for SAON should go, the interviewees mentioned Committee work most often along with strengthening of the SAON Secretariat.

The interviewees considered the work and mandate of the Arctic Data Committee to have progressed more since its development than that of the Committee of Observations and Networks. The directed, longer survey respondents saw that there was, in general, a need for more communication and outreach on behalf of the Committees about their activities, both underway and planned.

When asked about the possible need to form new committees or other SAON-related bodies, a little over half (15) of the directed, longer survey respondents replied “No” (Figure 4).

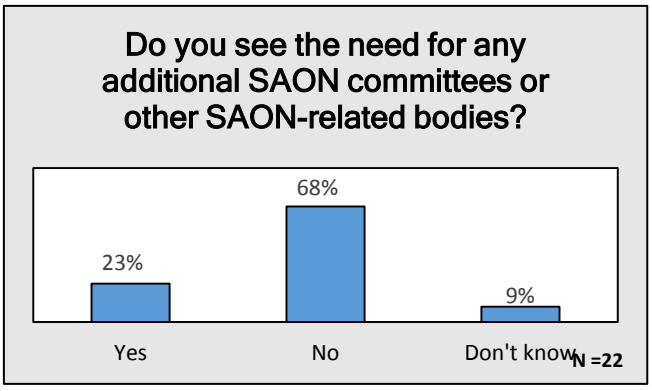

Figure 4.

Suggestions for Action:

The two SAON Committees (Arctic Data Committee and the Committee on Observations and Networks) are seen as the visible, on-the-ground presence of SAON. The SAON Board should provide them with additional and ongoing guidance to ensure their activities are aligned with the overall SAON Vision and Mission. Annual committee work plans need to be developed, discussed and approved by the SAON Board, along with provision of the necessary financial and human resources.

In addition, the work plan for the Arctic Data Committee should be considered in light of this recommendation (one of seven) from the Arctic Observing Summit 2016 Statement: "Work, through the IASC-SAON Arctic Data Committee, to develop a broad, globally connected Arctic observing data and information system of systems that is based on open access data and standards, in addition to recognizing and addressing ethical use and proprietary rights of Indigenous Knowledge and that deliver value to Arctic and global communities".

RECOMMENDATION #8:

The SAON Committees have been a successful addition to the SAON organizational structure and ongoing guidance from the SAON Board and resourcing should be made available.

C. FUNDING AND SUSTAINABILITY

Finding #9: The current funding structure of SAON is not sufficient to support its further development and achieve its Mission, Vision and Goals.

A little over half of the shorter, openly circulated survey respondents (52%) believed that SAON's current structure of funding was enabling SAON to achieve its goals. The directed, longer survey respondents were less satisfied with the structure of funding. Only 39% of them answered "Yes" to the same question. (Figure 5).

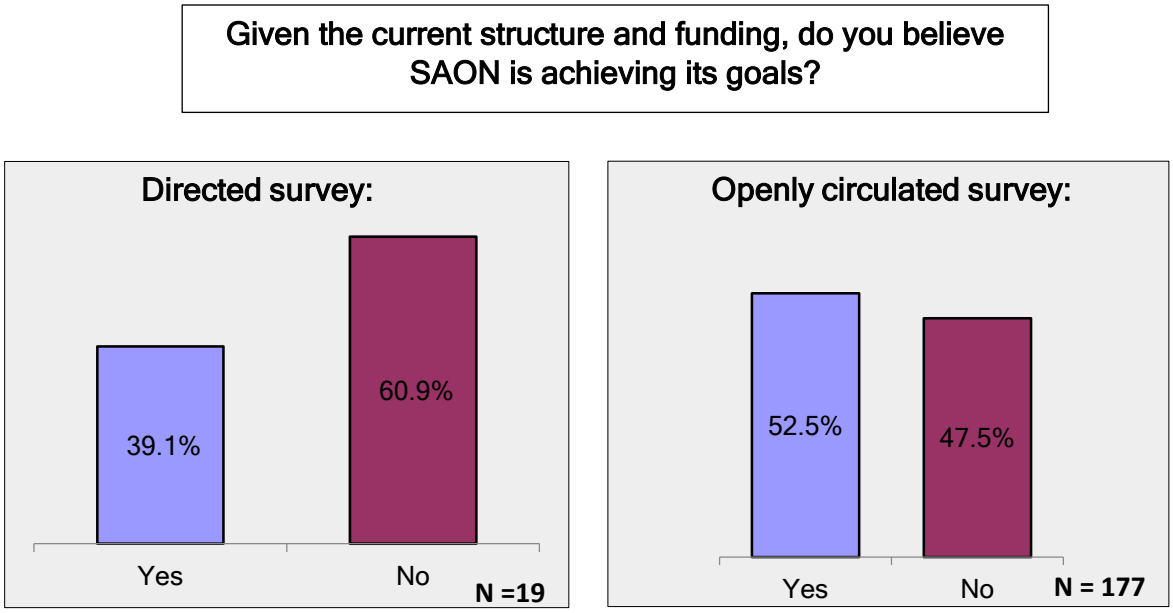

Figure 5.

The general opinion regarding SAON's funding among the directed, longer survey respondents as well as interviewees is summarized well in the following comment: "SAON needs substantial improvement in funding and staffing to be able to deliver. The staff members do not have to be at the same geographic place, but [can] use modern technology."

The interviewees saw that any extra funding should go to the two Committees and the Secretariat. The directed, longer survey respondents saw that the Secretariat was particularly in need of strengthening with extra personnel and resources, especially to increase follow up and reporting on SAON activities, supporting new National SAON Coordinating Committees, and, as summarized by one of the respondents: "mapping trends, determining science gaps, and encouraging or producing specific synthesis products".

Suggestions for Action:

In an era of limited resources, new and innovative funding possibilities need to be explored by SAON. A key component of a proposed new SAON Strategic Plan that reflects the Vision, Mission and Goals should be a Funding Strategy.

The SAON Funding Strategy should have two components. The first would examine resourcing from SAON members for work of the Committees and other SAON efforts. While ideally, incremental funding would be made available, other innovative forms of support might be pursued, such as secondments of staff identified by the National SAON Coordinating Committees to work on specific SAON efforts. This would represent contributions of in-kind salary for SAON work. If additional funding is made available, the priority areas for funding were considered the SAON Committees, as well as the Secretariat.

The second component of funding relates to the support by SAON to the SAON networks and observing systems. Although incorrect, the expectation still remains in some corners that SAON itself will serve as a funding mechanism. Clear and consistent messaging is needed to broadly communicate to global and Arctic observing networks that although SAON is not a funding entity,

it can provide other support by developing SAON branding and associated value that could help with funding opportunities elsewhere. For example, SAON could seek and facilitate mechanisms for funding actual Arctic observing efforts, along the lines of the Belmont Forum style. It is noted that such funding initiatives are not easy across national and international boundaries. However, as priorities and organizations change, there should be renewed interest in innovative funding mechanisms.

RECOMMENDATION #9:

SAON should explore new, innovative forms of funding with a focus on providing additional resources for the SAON Committees and Secretariat. It is recommended that the development of a SAON Strategic Plan include a Funding Strategy.

D. SAON OUTREACH AND COMMUNICATION ACTIVITIES

Finding #10: Current SAON outreach and communication activities have not been effective in reaching the wide range of audiences. As an outreach activity of SAON, the Arctic Observing Summit could be used to better communicate SAON efforts.

The shorter, openly circulated survey respondents and the interviewees did not feel sufficiently informed about SAON activities (Figure 6).

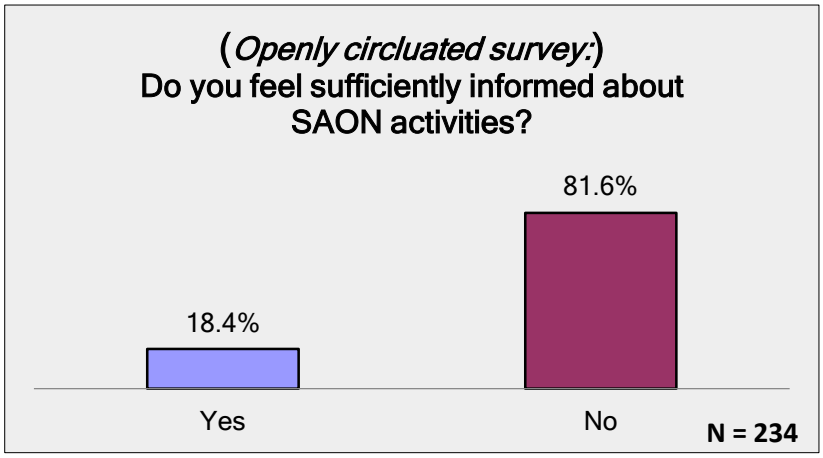

Figure 6.

The main means through which the respondents to the openly circulated survey reported to be informed of SAON activities were e-mail lists (57%) and the internet (16%). The interviewees stated that it was not only the circulation of information by SAON to external audiences that was largely inadequate. In their opinion, SAON's internal communication was also insufficient.

When asked to evaluate the specific entities on which SAON should focus its outreach, 65% of the directed, longer survey respondents and 61% of the shorter, open survey respondents mentioned SAON needed to improve its relationship with funding agencies.

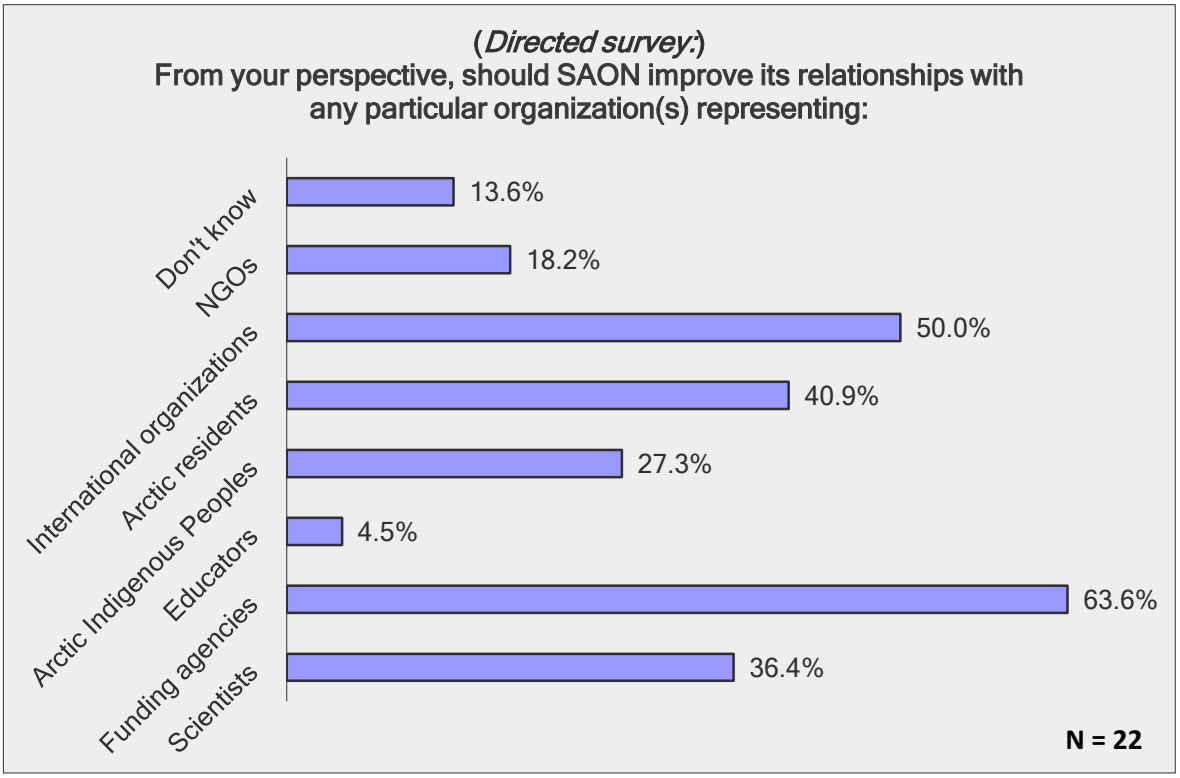

Figure 7.

The responses of the two surveys deviated most from each other in regards to this question in relation to the importance attached to outreach towards scientists. Where 74% of the openly circulated survey respondents mentioned scientists as a specific group SAON needs to improve its relationship with, only 37% of the directed, longer survey respondents were of this opinion. (Figures 7 and 8).

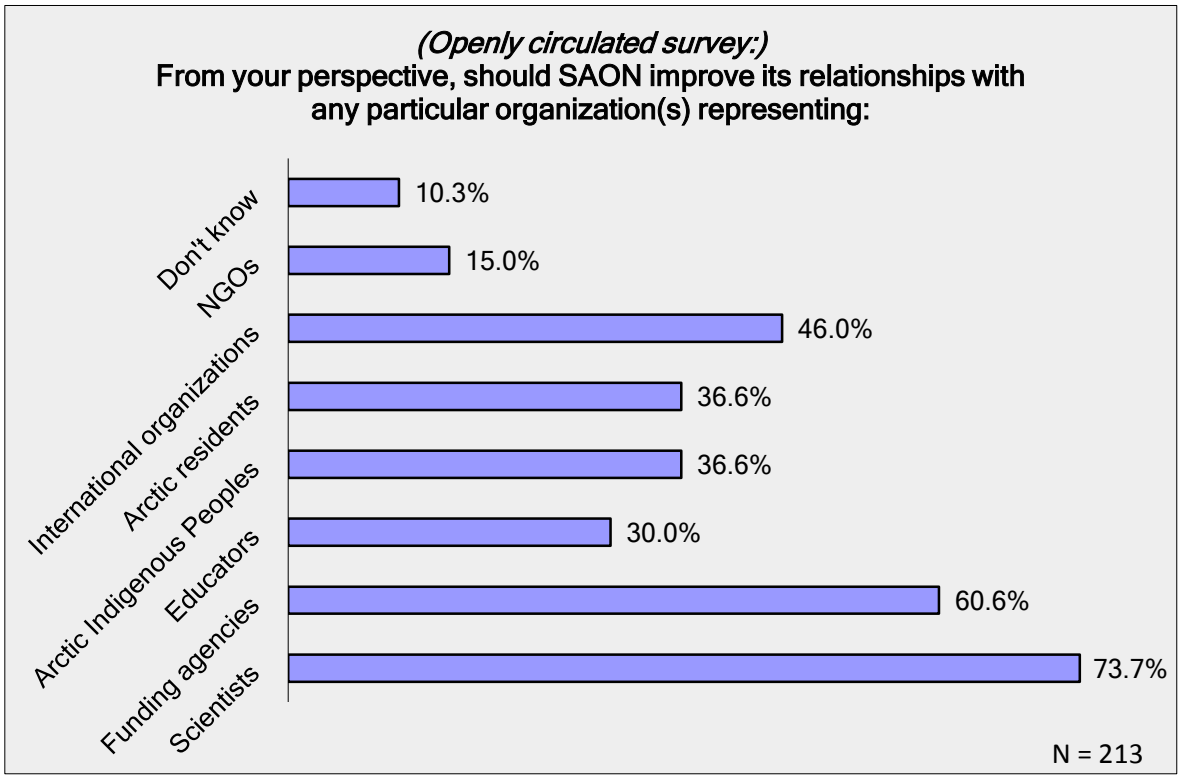

Figure 8.

In regards to the Arctic Observing Summit, the majority of the shorter, openly circulated respondents (65%) were knowledgeable of the Arctic Observing Summit. However, only 41% knew that it was a SAON sponsored outreach event (Figure 9).

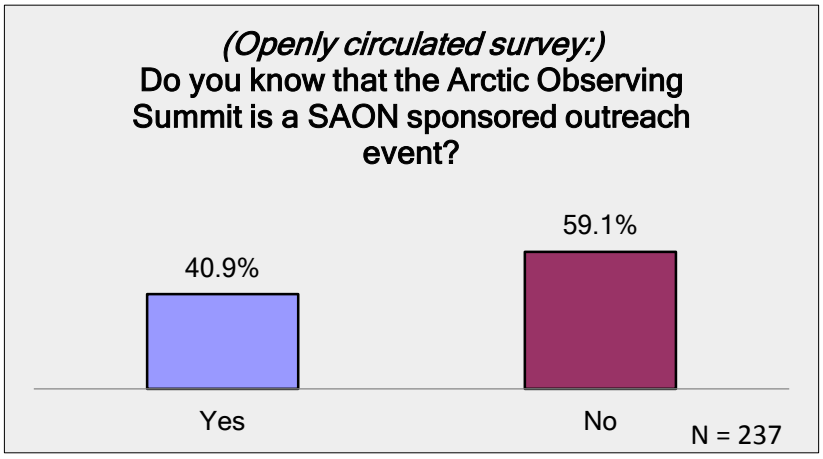

Figure 9.

Suggestions for Action:

Another key component of a proposed new SAON Strategic Plan, that reflects the Vision, Mission and Goals, should be a Communications Plan. This plan should develop and communicate the added value of SAON and reach the many and diverse audiences of the SAON community. Communicating what SAON does and its successes to date has thus far not been adequate. Clear

and consistent messages must be developed and communicated for a range of items, starting with the SAON Vision and Mission and possibly including a pan-Arctic ”State of the Arctic report” as a SAON-endorsed initiative.

The transparency of SAON would be improved with regular outreach and clear and consistent messaging on work plans and reporting. The creation of effective National SAON Coordinating Committees – and communicating their activities - would be another means of increasing the transparency of ongoing SAON activities.

The Arctic Observing Summit represents an opportunity that is not yet fully exploited by SAON. The AOS could be the venue at which SAON work plans are discussed, deliverables are presented and success stories communicated. The AOS could also provide the opportunity for one-day focused sessions as a means to implementing SAON goals. For example, SAON could host an “observing technology” forum where a wide range of community, remote and in-situ observing technologies could be examined.

RECOMMENDATION #10:

SAON should develop a Communications Plan that identifies its broad range of audiences and proposes strategies to reach out to these stakeholders.

The Arctic Observing Summit could be used more effectively as a mechanism to communicate about, and deliver on, SAON activities, products and deliverables.

6. Recommendations

a. Critical Organizational Structure Recommendations:

1) ***National SAON Coordination Committees need to be established in all SAON Member Countries. These Committees are critical to the success of SAON and need to be strengthened with the development of guidelines, mandates and terms of reference. The SAON Secretariat should be tasked with providing assistance to SAON Member Countries in establishing and supporting these National Committees.***

The National SAON Coordinating Committees are a vital foundational component of the work of SAON. It is seen as critical that these Committees be established and functioning well in all SAON Member countries as soon as possible. Guidelines, mandates and terms of reference should be developed for these Committees. The Committees should reflect the inclusive nature of SAON and include the broad breadth of observing disciplines, with a cross-section of members from governments, scientists, industry, Arctic communities, indigenous peoples, non-government organizations and other stakeholders.

2) ***The SAON Board needs ongoing and productive communication with the SAON Committees and within the Board itself, via regular teleconferences and face-to-face meetings. Productive discussions at the SAON Board level would be assisted with the development of specific SAON goals, and annual work plans with milestones, deliverables and review and reporting requirements.***

The SAON Board has an enviably rich membership comprised of Arctic Council Member States, non-Arctic Council Member States, the Arctic Council Permanent Participants, international science organizations, and several Arctic observing networks. The current members also represent various disciplines within science, management and political levels. This rich membership is an asset for the wide ranging discussions and experience that can be brought forward to SAON discussions. However, this diverse membership is also a challenge for SAON to harness and manage and to ensure that members are prepared with both commitment and resources for the SAON work.

b. Critical Recommendations for Fulfilment of SAON Vision, Mission and Goals:

3) ***SAON's Mission, Vision, and Goals must be clear, consistent and more explicitly pronounced in SAON documentation. SAON should develop a Strategic Plan that would more fully articulate the Vision, Mission and Goals and also include both a Communications Plan as well as a Funding Strategy.***

SAON's current Mission, Vision and Goals as articulated in a variety of SAON documents over time are not always clear, consistent, or easily discoverable. The current wording of the Mission, Vision and Goals does not always lend them to creating actionable tasks. The Mission, Vision and Goals also need review on a regular basis as the Arctic political, environmental and economic landscape changes**.** It is suggested that SAON should consider developing a Strategic Plan that would serve as a road map for SAON into the future.

Developing such a Plan would knit together the various governance aspects of SAON and could be an effective means of communicating the role and added value of SAON.

4) ***SAON must develop more task-oriented Goals that are reflective of the SAON Vision and Mission. The detail-oriented Goals will be a key component of a newly developed Strategic Plan, and should specify deliverables, milestones and annual review and reporting so as to demonstrate progress.***

SAON's Goals need more specificity in order to develop action-oriented work plans, performance metrics and outcomes, and demonstrations of progress. The Goals should be achievable actions that are incorporated into annual work plans of the SAON Committees. Developing more specific Goals will also provide SAON with concrete activities that could be the subject of success stories and communication actions.

5) ***A Communications Plan should be developed by SAON that identifies its broad range of audiences and proposes strategies to reach out to these stakeholders. As well, the Arctic Observing Summit should be used more effectively as a mechanism to communicate about, and deliver on, SAON.***

SAON's current outreach and communication activities have not been effective in reaching the wide range of audiences interested in SAON. The transparency of SAON would be improved with regular outreach and clear and consistent messaging on work plans and reporting.

6) ***SAON should explore new, innovative forms of funding with a focus on additional resources for the SAON Committees.***

In an era of limited resources, new and innovative funding possibilities need to be explored by SAON. A key component of a proposed new SAON Strategic Plan should be a Funding Strategy that provides resources across national boundaries – either in the form of funding or in-kind personnel support - in support of the Vision, Mission and Goals.

7) ***SAON's role and interactions with its networks and programs need to be clarified and strengthened.***

The existing Arctic observing networks and activities are looking to SAON for it to help coordinate and facilitate observing activities, but not necessarily for SAON to have a role in actual implementation of observing activities. The SAON Board needs to address questions raised in the Review regarding what it means to be a SAON network and what the networks mean to SAON. This should be a priority for the SAON Board to address and underscores the need for increased dialogue between the SAON Board and the SAON networks.

c. Additional Recommendations to Strengthen SAON:

8) ***The SAON Committees have been a successful addition to the SAON organizational structure and ongoing guidance from the SAON Board and resourcing should be made available.***

The SAON Committees (Arctic Data Committee and the Committee on Observations and Networks) are seen as the on-the-ground presence of SAON. Additional and ongoing guidance, as well as resourcing, is required to these Committees by the SAON Board to ensure their activities are aligned with the overall SAON Vision and Mission.

9) *SAON needs to capitalize on its strengths, including its position and unique nature as an organization with close ties to both the International Arctic Science Committee and the Arctic Council.*

SAON should take actions that capitalize on its numerous strengths that make it well-positioned at the international level to facilitate and coordinate Arctic observing activities. SAON complements and leverages observing efforts of other organizations and initiatives and this strength should be further exploited.

7. Concluding Remarks

Based on the findings, suggested actions and recommendations described above, the External Review Committee concludes that SAON is valued by the Arctic observing community, but has yet to reach its full potential. With refinements to its Vision, Mission and Goals, improvements to its Organizational Structure, a new focus on funding and sustainability, and increased outreach and communication efforts, SAON should be able to make great strides in the next five years to enhance pan-Arctic observing networks to meet the needs of Arctic peoples.

Appendices

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Interview Guide

Background information:

The Review Committee has been established in accordance with the 2011 Nuuk Declaration and the SAON's terms of reference.

The particular focus in the external review of SAON has been asked to be on:

1. The organizational structure of SAON
2. The extent to which current SAON activities are fulfilling its original mission
3. The SAON outreach and communication activities
4. The question of funding and sustainability of SAON
5. Providing suggestions for additional and future activities for SAON, including meeting frequencies and intersessional activities

One of the major activities of the Review has been the conduct of a survey among SAON stakeholders. This survey was made available for the stakeholders between the beginning of May and June 1st 2016. Information about it was distributed through an array of different channels. It gained a total of 331 answers from 21 countries.

In addition to the survey, the Review Committee is now conducting interviews of key persons who have insights into the relationship between the SAON mission and SAON's past and present activities.

The Review Committee will be reporting back to the SAON Board in September 2016.

General themes for the interviews:

We have prepared a set of questions that reflect the areas the external review was asked to focus on as well as the survey responses. The interview will, however, not be a structured one. The questions are rather meant as a general frame of reference. They deal with five more general issue areas:

I) The SAON's success in fulfilling its mission, vision & goals
II) The SAON's organizational structure
III) Funding
IV) The SAON's relationship to other forms of international Arctic scientific cooperation and coordination
V) The SAON's outreach and communication

Interview guidelines and confidentiality:

The interviews will NOT be recorded. Notes will be taken of our discussion and provided to the other Review Committee members for information purposes. Comments will NOT be attributed to anyone in the final report. The responses will also not be compared to one another but used for gaining further information beyond what was gathered in the online Survey. Please, be frank and open with your responses.

Appendix A. Interview Guide

QUESTIONS:

Background:

- Did you complete the online survey? Either the longer or shorter version? Through which means did you find out about it?
- Could you, please, briefly describe how you became/have been/currently are involved with the SAON and its activities. (*This question can be also personalised through stating what is known of their involvement and asking if this is correct, and if there is anything else to add.*)

I) The SAON's success in fulfilling its Mission, Vision & Goals

Q1. Reflections on SAON's past and/or current Mission, Vision, and Goals, which are:

- "Support and strengthen the development of multi-national engagement for sustained and coordinated pan-Arctic observing and data sharing systems.
- Promote the vision of well-defined observing networks that enable users to have access to high quality data that will realize pan-Arctic and global value-added services and provide societal benefits
- Implement the goal to enhance Arctic-wide observing activities by facilitating partnerships and synergies among existing observing and data networks and promoting the synthesis of data and information."

  - Do you have any thoughts on the way the SAON's Mission, Vision, and Goals have been/are stated at present?
  - Do they reflect the way you envision(ed) this process to take place?

Q2. How successful do you feel SAON has been in achieving its goals in the past five years? (Please, give concrete examples of successes and failures.)

Q3. What do you see as the specific challenges holding SAON back (from fulfilling its mandate)?

II) The SAON's organizational structure

Q4. Reflections on the SAON's organizational structure, which is based on SAON being:

"a "nested" organization with a SAON Board, National SAON Coordinating Committees, as well as an Arctic Data Committee and a Committee on Observing Networks, and a SAON Executive. These are supported by the SAON Secretariat."

3) How well do you think the existing organizational structure is functioning, whether it could be improved, and how?

4) Do you feel this type of structure is sufficient/appropriate in regards to the Mission, Vision, and Goals?

Q5: Reflections on working with the Observing Networks:

- The name '*Sustaining Arctic Observing Networks'* implies that SAON is an organization of observing networks. How do you see that SAON should interact with the observing networks?"

Q6. Reflections on the national coordination of SAON activities:

- Majority of the survey respondents were not satisfied with the level of national coordination of SAON in their country:

3 When asked if they felt that the level of national coordination of SAON was sufficient in their country, 68% of all of the respondents said no.

4 The respondents to the longer, more targeted survey also raised the problem of the lack of structural framework and coordination of national activities in SAON

- What do you see as the goals, objectives, and tasks of national SAON coordination? How could these be improved?

Q7. SAON Committees:

- SAON has two committees, the Arctic Data Committee (ADC) and the Committee on Observations and Networks (CON). In your opinion, is the mandate of the committees clear, and is it clear how they will interact with the Board. In your opinion, is the composition of the committees the right one?

III) Funding

Q8. Reflections on the current funding structure of the SAON, which is based on the principle of:

"Other than the Secretariat functions, which are provided by AMAP and by IASC, all other SAON activities are to be funded by the participants or by financial sponsors in response to proposals from the participants."

- Do you think this structure is appropriate for achieving the main aims? If not, how could/ should it be improved?

Q9. Reflections on possible changes to SAON's funding structure:

The need and desire to change the funding structure of SAON was raised at multiple times among the survey respondents. Two particular questions where the issue of funding was prominent were: i) the question about the desired services and outcomes of SAON, and ii) the one about SAON's future roles.

- In your opinion, if SAON was given more funding, how should the money be spent? Should SAON for instance fund projects? Also, who do you think should provide this funding?

IV) The SAON 's relationship to other forms of international Arctic scientific cooperation and coordination

Q10. What do you see is the added value of SAON in relation to other Arctic Scientific Organizations?

Q11. What are the strengths that SAON has to achieve this role?

Q12. What are the challenges holding SAON back (from fulfilling its full potential)?

Q13. Would improving its outreach in regards to specific entities somehow further enable it to better fulfill this role? (Which ones in particular? How?)

IV) The SAON's outreach and communication

Q14. Reflection on information and communication:

Majority of the survey respondents reported that they did not feel sufficiently informed about SAON activities:

When asked if they felt sufficiently informed about SAON activities, 82% responded "No".

- Do you feel it is/has been easy to find out and be informed of SAON activities? (Please, elaborate through concrete examples: i.e. how did you yourself get first involved with or informed of SAON)

Q15. Reflection on outreach and communication:

One of the open-ended questions in the survey was: Given its mission, what kind of outcomes and services would you like to see from SAON? Many of responses to this question included suggestions for the improvement of the content of SAON communication:

- How do you see that the content (not the means) of SAON communication and outreach could be made better in the future?

Wrap-up questions:

Q16. To conclude, if you could change one aspect of SAON to improve it or make it stronger, what would it be? (Could be something relating to governance? Funding? Other ideas?)

Q17. Also before we wrap up, are there any specific remarks that have not come up yet that you would wish to make the External Review Board know

Analysis of Open Survey Results

Background information

The shorter, openly circulated Sustaining Arctic Observing Networks (SAON) stakeholder survey had a total of 301 responses. The geographical area of the responses covered 21 countries. The most represented ones were Italy (120 responses), United States (74 responses), and Russia (24 responses). When the respondents' professional backgrounds were organized according to the working groups of the International Arctic Science Committee, the representation of each was as follows: Marine (17%), Atmospheric (17%), Social and Human (16%), Terrestrial (11%), Cryosphere (11%), and Other (23%).

The representation of different age-groups amongst the respondents was slightly skewed towards 51-60-year-olds (37% of all the respondents). The second largest age group consisted of 41-50 -year-olds (28%). Both 31-40- and 60+ year-olds represented a 14% share of the responses. The gender division among respondents was 64% male and 35% female.

Only 44 of the total of 301 respondents reported a personal involvement with SAON. Different modes of this involvement included: observer, Arctic Observing Summit participant, member of the Committee on Observations and Networks, scientist, coordinator of SAON activity, committee or steering board member, data manager, collaborator, data analysist, advisor, and program lead.

Because of the large number of survey responses from Italy and the United States, a separate analysis of the responses from these two countries was conducted to determine if they skewed the overall survey results. It was found that there was very little deviation between the Italian and American responses and the overall trends of the sum total of all responses. Surprisingly, the deviations in the answers from Italy and the United States often also evened each other out.

Most of the respondents used the possibility to skip any of the survey questions, except the mandatory questions about their Country/City/Region and their Area of Expertise, more than once. The Americans and Italians represented over half of the responses to three open-ended questions. The first one was question n.10 (*What kind of role would you like to see SAON play in the future?*), where 40 of the total of 104 answers came from Italy and 44 from the United States. The second was question n. 21 (*Given the SAON Mission, what kind of outcomes/services would you like to see from SAON?*) where 24 of the total of 100 answers came from Italy and 37 from the United States. The third one was question n. 18 (*What has been your own contribution to communicating about and raising the awareness of SAON?*) where 43 of the total of 63 responses came from the United States. On average there were about a hundred responses for open-ended survey questions and 240 for the closed ones.

Summary of findings

A) Fulfilment of SAON's Mission, Vision, and Goals

At present

Most of the respondents (83%) saw that SAON's current Mission, Vision and Goals provide a clear articulation of its purpose. In their comments on this topic, many highlighted that even though the Mission, Vision and Goals are clear, they are also all very general. One of the problems that the respondents associated with this generality was the lack of clarity on what the added value of SAON is to other, similar, international and Arctic-specific observing initiatives.

A little less than half of the respondents (40%) thought that current SAON activities were helping it to fulfill its mission. A similar number (46%) reported that they were not knowledgeable about this issue. Only 14% held a contrary opinion.

When asked to rank the importance of eight closed options for the current roles of SAON (*1. coordination, 2. information exchange, 3. data management, 4. outreach, 5. conferences, 6. funding, 7. data policy, 8. facilitating partnerships and synergies among existing observing and data networks*) the respondents attached most importance (4,26/5) to facilitating partnerships and synergies among existing observing and data networks and the least (3,31/5) to conferences. The less than one point of difference between the rating of SAON's least and most important roles illustrates how these eight roles were, in general, attached with more or less equal importance. The identification of other roles that SAON performed were primarily related to the promotion of common data policy/policies, and influencing international science policies.

In terms of the four areas of societal needs mentioned in SAON's Mission Statement (environmental, social, economic and cultural), the survey respondents evaluated SAON to have been most successful in serving societal needs related to environmental issues (3.29/5). They saw it as having been least the successful in responding to economic ones (2,78/5).

Majority (60%) of the respondents stated they did not know if SAON's support for community based observations (CBO) and traditional indigenous knowledge (TIK) was adequate, 24% of the respondents saw that this was the case, and 16% that it was not. Most of the specifying comments on TIK and CBO referred to two more general issues. The first one was the problem in the translation of these forms of knowledge into usable terms and forms for natural and technical sciences. The second one was the lack of visibility of SAON and its activities within Arctic communities.

In the future

Most of the suggestions the survey respondents gave for how to clarify SAON's Mission, Vision and Goals in the future were associated with two other survey questions. The first one was a question of what roles SAON was wished to play in the future; and the second, a question about what outcomes and services the respondents desired SAON to provide.

Majority of the respondents wished that SAON would become the main hub for data sharing and the coordination of international Arctic research. In one of the respondents' words, the future role of SAON

should be to become “the 'go-to' source” for Arctic observing information and reference. In more specific terms, SAON should become “*the* platform to learn about initiatives or to access programs or data”. The majority of the open-ended responses mentioned three more practical measures through which SAON could establish this status:

- The enforcement of communication and cooperation with other Arctic and non-Arctic international scientific organizations (International Oceanographic Commission, International Permafrost Association, World Meteorological Organization, International Arctic Science Committee, Arctic Monitoring and Assessment Programme etc.).
- The establishment of a crosscutting SAON database, which would indicate what different types of free and open data is available and where.
- The establishment of data management guidelines and metadata standards.

Other means through which SAON was seen to better meet its mission included: encouragement of involvement from more countries, getting governments involved in the processes of creating and maintaining a strategic pan-Arctic observing systems, sending out more open invitations to join SAON activities, and creating some key measures and graphics to highlight the progress of its activities over time.

B) Organizational structure of SAON

The shorther, openly circulated survey included only one question about the Organizational Structure of SAON. This was a question about the national level coordination of SAON. Majority of the respondents (68%) did not feel that the national level coordination of SAON activities was sufficient in their country. One of the respondents explained this dissatisfaction by commenting that it might “be easier to empower some of the underrepresented observing bodies to engage with SAON if there was an activity or a partnership mechanism proposed to achieve some of the SAON activities.”

The respondents raised the topic of the organizational structure of SAON themselves mainly in relation to the issue of funding. Some were of the opinion that the strengthening of the Secretariat through funding was an essential step in SAON’s future development.

C) Funding and sustainability

There was one survey question that dealt directly with the topic of funding in the shorter, openly circulated survey. The respondents were asked: “Given the current structure and funding, do you believe SAON is achieving its goals?” They were more or less evenly divided almost equally between the opinions “No” (47%) and “Yes” (53%).

The respondents themselves raised the topic of funding multiple times in response to other survey questions. One of the questions where the topic of funding came up most frequently was: “What kind of role would you like to see SAON play in the future?” Among the most frequently mentioned future SAON roles was the promoter of the preservation of existing Arctic observing infrastructure. Many of the practical means associated with this role were related to the further development of the capability of the Arctic science communities to attract sustained funding for observational networks, critical monitoring sites, and programs. SAON was wished to promote this by coordinating the leveraging and sustainment of multi-

nation observation platforms and by lobbying for observing networks in the EU and in other private and public transnational funding agencies.

Another question where the topic of funding became prominent amongst the answers was: “Given the SAON mission, what kind of outcomes/services would you like to see from SAON?” One of the most often mentioned ones was the coordination of projects and funding application processes. Concrete activities the respondents wished SAON would take in this area included:

- Creating active networks that would allow for the creation of more competitive applications for grants
- Coordinating funding of Arctic related projects more in line with the needs of operational observing for governance
- Acting as a coordinator for different projects that study Arctic natural complexes in relation to scientific organizations and institutions that have the possibility of financing these projects, such as the Belmont Forum
- Collecting and distributing funding for pilot projects
- Creating best practice references for coordinators and collaborators for funding applications
- Developing a more sustainable structure to fund long term Arctic observations

D) SAON outreach and communication activities

Majority of the respondents (82%) did not feel sufficiently informed about SAON activities. Most of them (65%) were knowledgeable of the Arctic Observing Summit. However, only 41% knew that it was a SAON sponsored outreach event.

The main means through which the respondents reported to be informed of SAON activities were through e-mail lists (57%) and the internet (16%).

The primary suggestion for how to improve the dissemination of information included a regular SAON newsletter, better outreach to existing list servers such as ArcticInfo, IASC, and Cryolist, and improved structuring and updating of the SAON website. The more specific forms of information that the respondents wished SAON would distribute included: information about ongoing activities and plans, as well as of different existing and upcoming funding opportunities.

Analysis

I) Background information

The Survey had a total of 301 responses. The geographical area of the responses covered 21 countries. The most represented ones were Italy (120), United States (74), and Russia (24) (Table 1.).

Country	Number of Responses
Italy	120
USA	74
Russia	24
Norway	12
Canada	10
Japan	8
Germany	8
Denmark	7
Sweden	7
Finland	6
United Kingdom	5
Netherlands	2
Iceland	2
Switzerland	2
Spain	2
Austria	1
Czech Republic	1
Estonia	1
New Zealand	1
Poland	1
Portugal	1
Reublic of Korea	1

Table 1. Number of responses by country

The disciplinary areas of expertise of the survey the respondents were divided more or less evenly according to the working groups of the International Arctic Science Committee (Table 2.).

Disciplinary area of expertise	Response Percent
Marine	17%
Atmospheric	17%
Social and Human	16%
Terrestrial	11%
Cryosphere	11%
Unspecified	23%

Table 2. Disciplinary areas of expertise

The professional background of 41% of the respondents fell within the category of Scientist/Researcher/Technician, 19% to that of professor, and 12% to the category of Manager/Director/ Leader.

The age of the majority (65%) of the respondents was between 41-60 years (Table 3.).

Age	Response Percent
20-30	5% (13)
31-40	14% (35)
41-50	28% (69)
51-60	37% (92)
60+	14% (35)

Table 3. Age

The gender division among the respondents was 64% male and 35% female.

Only 44 of the total of 301 respondents reported a personal involvement with SAON. These different modes of involvement included: Observer, (AOS) participant, member of CON, scientist, coordinator of SAON activity, committee member, member of steering board, data manager, collaborator, data analysist, advisor, and program lead.

Most of the respondents did not provide answers to all of the 25 questions of the survey.

II) The Need for SAON/ The SAON Mission, Vision and Goal

Clarity of SAON's Mission, Vision and Goals

Majority of the respondents (83%) thought that SAON's Mission, Vision and Goals (MV&G) provided a clear articulation of SAON's purpose. Only 7% held a contrary opinion, and 10% replied: "Don't know" (Figure 1),

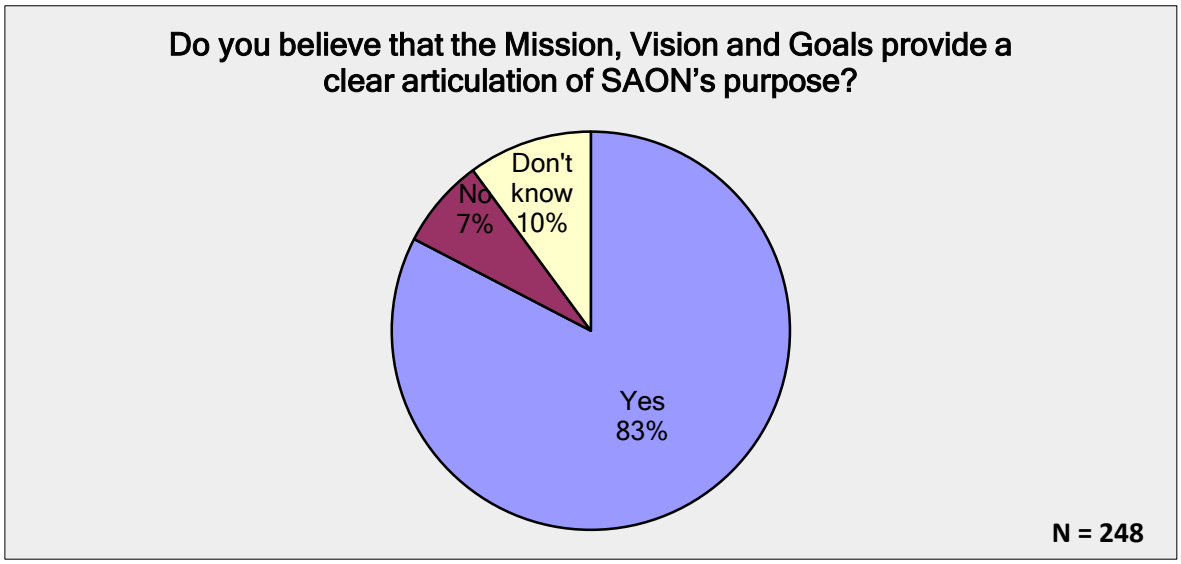

Figure 1.

The Italians were slightly more often of the opinion that SAON's MV&G provided a clear articulation of SAON's purpose (91% "Yes"), and the Americans slightly less (77% "Yes").

Summary of comments on clarity of mission, vision and goal:

In specifying answers to the question on the clarity of SAON's Mission, Vision, and Goals, most of the respondents provided suggestions for their revision. One of the suggestions for revision was to change the current three statements so that there would be one clearly concentrated on Mission, one on Vision and one on Overarching Goals. This was seen to ease what was argued to be the similarity between the first and the third points in the current mission statement. There was also a suggestion that the Mission, Vision and Goals should clearly indicate what the added value of SAON is in relation to other existing international scientific networks that work with Arctic issues. Another frequently raised point was that the goals were clear, but their execution unclear.

Current roles of SAON

The respondents rated the current roles of SAON (*1. coordination, 2. information exchange, 3. data management, 4. outreach, 5. conferences, 6. funding, 7. data policy, 8. facilitating partnerships and synergies among existing observing and data networks*) with similar levels of importance raging from an average of least importance (3,31/5) on conferences to most importance (4,26/5) on facilitating partnerships and synergies among existing observing and data networks (Figure 2).

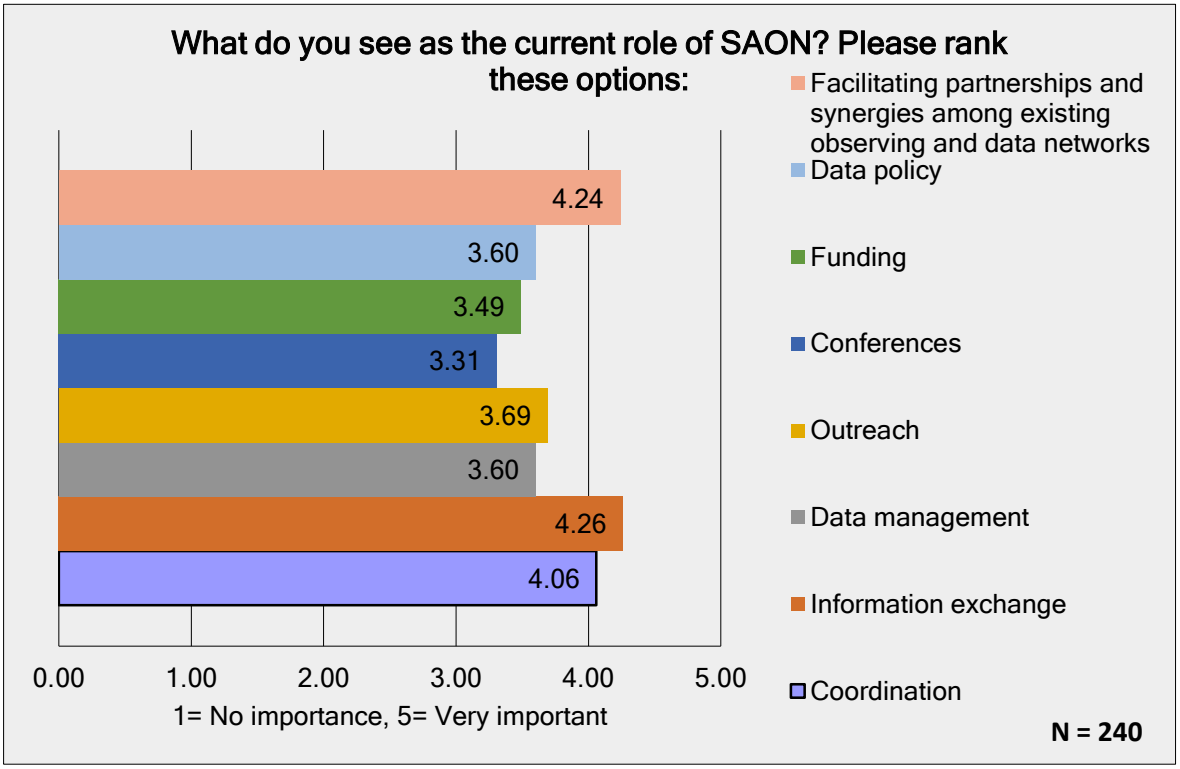

Figure 2.

The country specific answers followed more or less in line with the overall evaluation presented in Figure 2.

Two of the respondents raised an issue with the category of "Funding" in this scale, stating that this was not applicable to SAON because it does not directly fund any activities.

Summary of comments on SAON's current roles:

Other roles that the respondents mentioned SAON having fell under two broader categories. The first one was the promotion of common data policy/policies and the second, the influencing of international science policies.

Answers under the first of the aforementioned two categories included; maintenance of an inventory of Arctic observations by defining common and standard procedures ("Best practices") among different partners in reporting (national) Arctic observations; promotion of greater interoperability and access in Arctic data; facilitation of spread and use of community based observing; and planning for synthesis and new priorities needed.

Answers to the second category, regarding influencing international science policies, included: being a forum for circumpolar science to interact with government agencies, promotion of international treaties to support pan Arctic observing, and working with national entities to fund/implement Arctic observing.

Appropriateness of the current activities in relation to the original mission of SAON

When asked about the appropriateness of the current activities in relation to the original mission of SAON, 40% of the respondents believed that the current activities were helpful in fulfilling the original mission, 46% did not have an opinion on this issue, and 14% were of the contrary opinion (Figure 3).

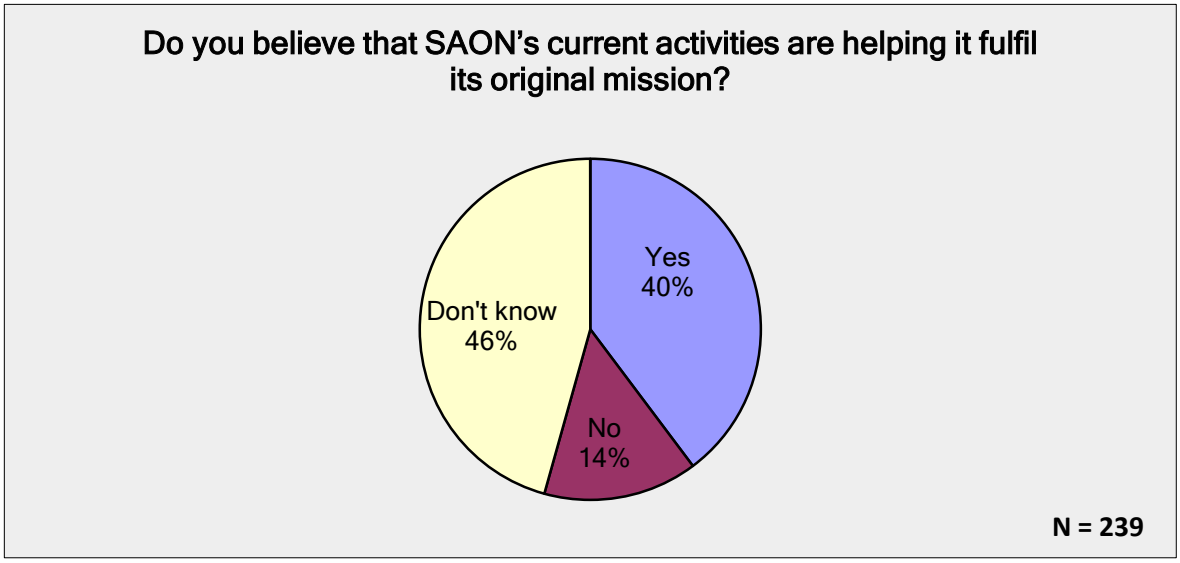

Figure 3.

The country specific answers to this question were more or less in line with the results' presented in Figure 3. (Italy: "Yes" 39%, "No" 4%, "Don't know" 57%, USA: "Yes" 34%, "No" 25%, "Don't know" 41%)

Summary of comments:

The detailed comments on the issues of SAON's current activities and the fulfilment of its mission can be categorized under two broader themes. The first one is the lack of clarity on what the added value of SAON is to other international Arctic observing initiatives. The second one is an argument for the need of better outreach.

Specific comments under the first-mentioned theme included arguments about: the need for the specification of the 'brand' of SAON, the broadness and vagueness of SAON's mission, and the problems associated with too many players (AMAP, IASC, IASOA) wanting to do similar observational coordination.

Specific comments under the second theme, the need for better outreach, included: suggestions for improvement in the areas of involvement from more countries, getting governments involved in the processes of creating and maintaining strategic pan-Arctic observing systems, more open invitations to join SAON activities (specifically to WMO Arctic programs), and the need to create some key metrics and graphics to highlight SAON progress over time.

Future roles of SAON

The open-ended question "What kind of role would you like to see SAON play in the future?" got a total of 104 responses out of which 40 were from Italy and 44 from the United States. The answers to this question can be organized according to four broader categories. These are, in the order of the frequency of references to them:

1) Coordination of data collection and sharing
2) Preservation of existing observing infrastructure
3) Meeting and bridging societal needs of the public as well as the private sectors
4) Policy and structure.

1) Coordination of data collection and sharing

The role that most of the respondents wished SAON would play in the future was that of a hub for data sharing and coordination of Arctic research. One of the respondents described this role by envisioning SAON becoming "the 'go-to' source for Arctic observing information, reference, platform to learn about initiatives or to access programs or data". The different means that SAON could undertake in order to establish this role included:

I) The coordination and organization of sharing information on availability, dissemination and standards for different types of data.
II) Establishment of a crosscutting researchable database, which would indicate what different types of available, free and open data is available and where.
III) Establishment of specific data management guidelines and metadata standards.

Next to strengthening the means of coordination, many of the respondents felt that in order for SAON to become a hub for data sharing and coordination on Arctic research SAON also needs to strengthen its outreach. Suggestions on how to improve the existing outreach measures included:

- Holding capillary surveys of ongoing Arctic observations.
- Seeking more direct contact with the groups and institutes involved in Arctic observations such as national hydro meteorological services (NMHSs) and the WMO.
- Promotion of the establishment of a common data and information exchange policy between different actors.

2) Preservation of existing observing infrastructure

The second most frequently referred to role the respondents wished that SAON would play in the future was the promoter of the preservation of existing observing infrastructure. Many of the practical means for establishing this goal were in association with enforcing the role of SAON in the further development of the capability of the Arctic science communities for attracting (sustained) funding for observational networks, critical monitoring sites, and programs.

More specific suggestions on how to fulfill the aim of preservation of existing observing infrastructure included:

- Being more active in coordinating the leveraging the sustainment of multi-nation observation platforms
- More active lobbying in relation to the EU science policies and other transnational funding agencies

3) Meeting and bridging societal needs of the public and the private sectors

The third most frequently area for a future role for SAON was the bridging of societal needs of the public as well as private sectors. This role was also associated with the previous one of preserving existing observing infrastructure through sustained funding. One of the respondents put this in the following words:

> "Support and strengthen the development of multinational engagement for sustained and coordinated pan-Arctic observing and data sharing systems that serve societal needs, particularly related to environmental, social, economic and cultural issues."

Other suggestions in relation to the bridging of societal needs included:

- Providing a link between academia and (inter)national agencies at a very practical level - consider the Science for Nature and People Partnership (SNAPP) model - while SAON won't undertake research, it can certainly help build and coordinate a similarly successful network
- Bridge gaps between scientific and Native communities
- Stress the importance of a sustainable development
- Create a platform for data holders to find means to share information with all potential users
- Promoting polar sciences to school administrations

4) Policy and Structure

The fourth cluster of answers in relation to the desired future roles of SAON was associated the restructuring of SAON's focus areas. One of respondents wished that SAON would represent the voice of the science community as a whole in the Arctic Council. Other suggestions for changes in SAON's activities and focus areas included:

1) Establishing a strong central hub to SAON to ensure continuity between meetings; advance partnership activities; and to provide leadership and vision.
2) Promoting treaty -level agreements between Arctic countries on observing strategies and responsibilities
3) Merging of SAON with the other networks to create one coordinating Arctic network

Support for community based and indigenous traditional knowledge

Majority of the respondents (60%) did not possess knowledge of the adequacy of SAON's level of support to community based observations (CBO) and indigenous traditional knowledge (TIK) (Figure 4).

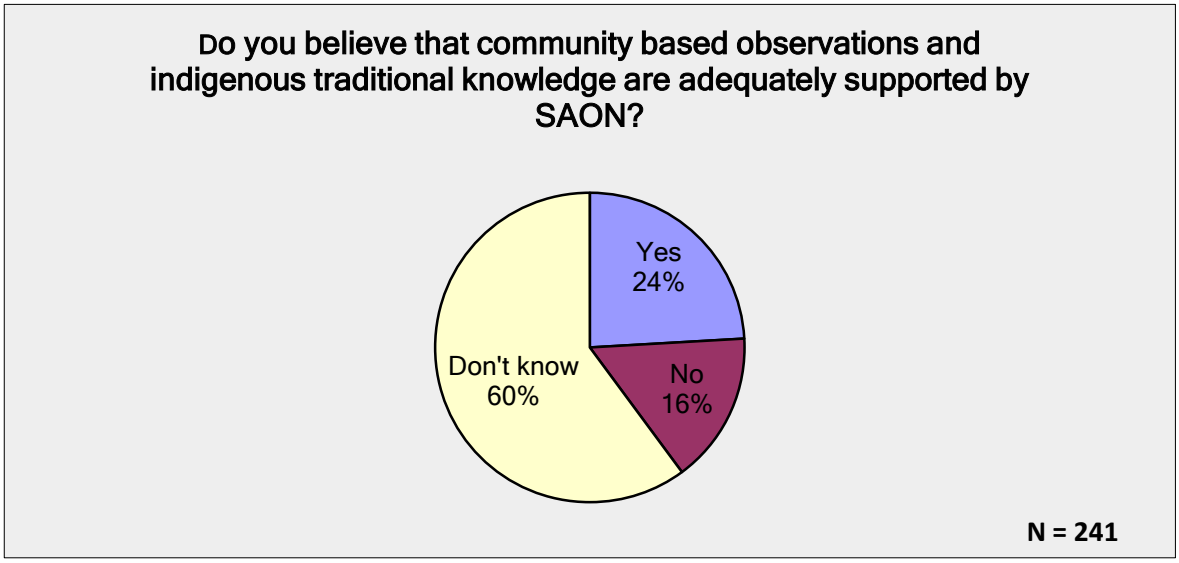

Figure 4

The Italians were slightly less knowledgeable of this issue (Yes" 25%, "No" 1%, "Don't know" 74%). Americans reported to be, in turn, slightly more knowledgeable of the issue (Yes" 17%, "No" 37%, "Don't know" 46%).

In the detailed comments to the question on community based and traditional indigenous knowledge two overarching issues were raised. The first one was the issue with the translation of these forms of knowledge to scientific usage and the second one was the visibility of SAON activities in Arctic communities.

Summary of comments on CBO and TIK:

In the comments on community based observations and traditional indigenous knowledge, these two forms of knowledge were acknowledged to have received strong attention and visibility in both ADC and CON implementation plans and first activities. The most frequently referenced challenge that was cited by the survey respondents was the utilization of these forms of knowledge and the question of how their integration to natural scientific observational data could be facilitated in practice.

One of the more practical concerns of the respondents was the difficulty of the translation of CBO and TIK into the standardized language of observational natural sciences. This concern was also acknowledged to persist in the opposite direction. That is, in the translation and delivery of scientific knowledge and information to Arctic communities.

There were some suggestions for how to solve the two-way 'problem of translation'. One was to create common systems of data transfer. Another was to refer to the recent release of the report on a review of CBM in the Arctic. A third suggestion was to aim for the creation of a common semantic layer through a 'cluster' approach used in other projects to deliver science to local and indigenous communities.

III) Awareness and Outreach

Arctic Observing Summit

Well over a half of the respondents were knowledgeable of the Arctic Observing Summit (AOS). When asked if they had heard of it, 64% of the respondents said they knew of it (Figure 5).

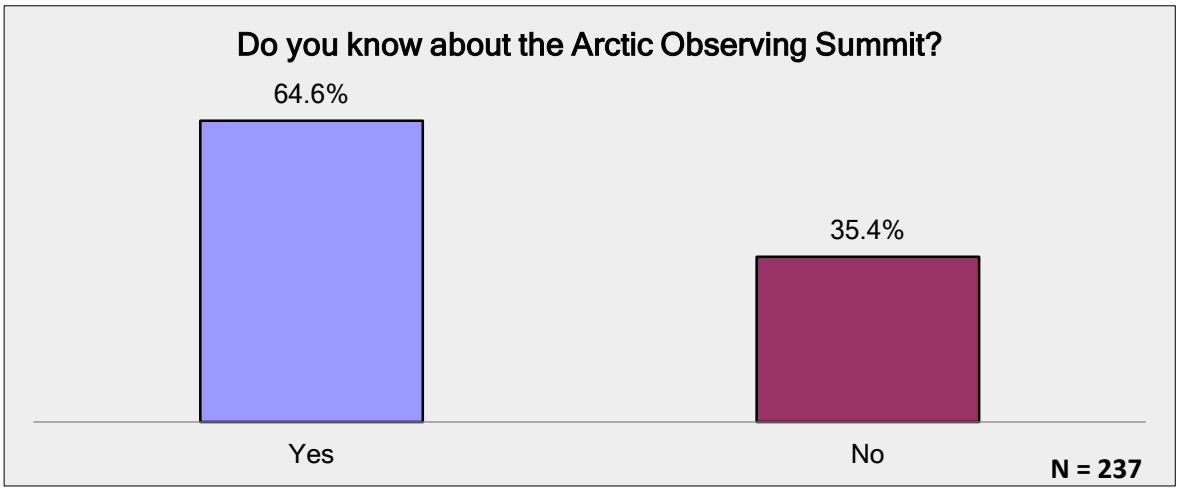

Figure 5.

However, only 41% of the respondents knew that the AOS was a SAON sponsored event (Figure 6).

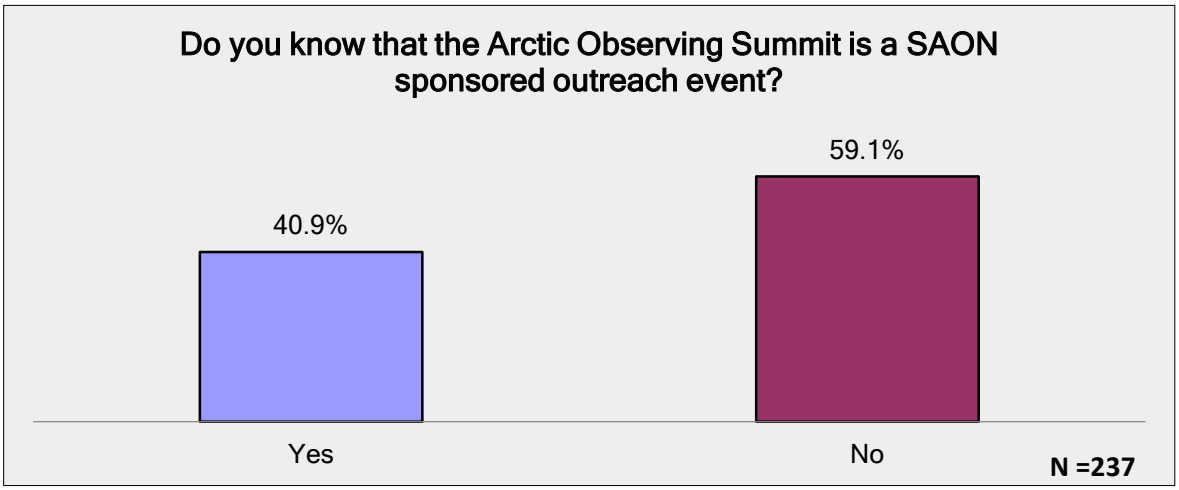

Figure 6.

Italians were less knowledgeable of this connection than the general trend. Only 13% of the Italians knew that AOS was supported by SAON. The Americans were, on the other hand, more knowledgeable of this connection than the general average (66% answered yes).

Dissemination of information

Majority of respondents (82%) did not feel that they were sufficiently informed about SAON activities (Figure 7).

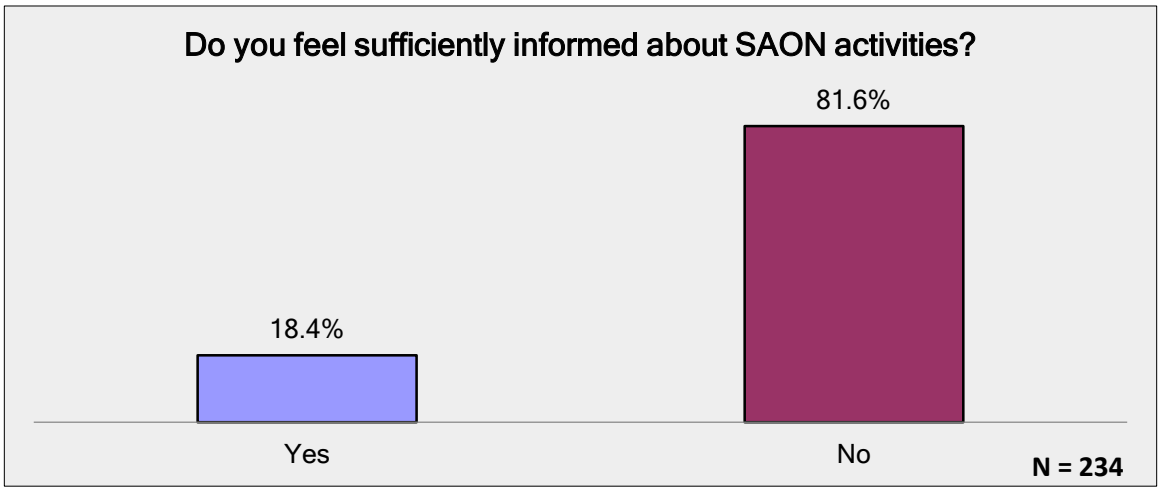

Figure 7.

Italians felt less informed (96%) of the SAON activities than the general trend. The Americans, on the contrary, felt a little more informed.

The main means through which the respondents reported to be informed of SAON activities were through different e-mail lists (57%) and the internet (16%) (Figure 8).

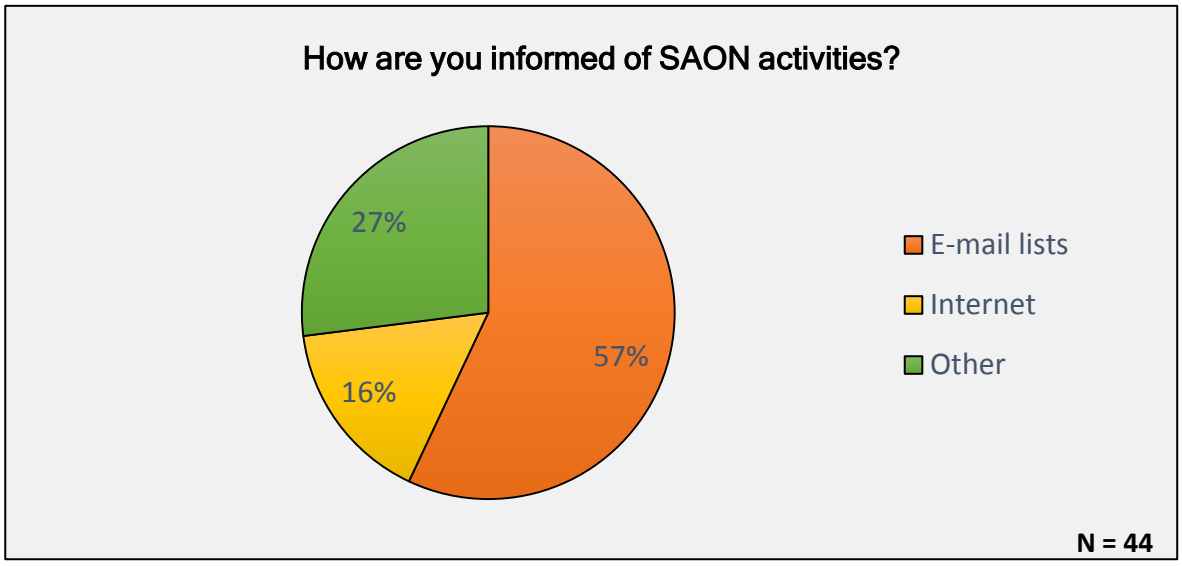

Figure 8.

In an open-ended question that asked about what means could be used to improve the dissemination of information, the majority of the respondents mentioned the need for a more frequent and regular newsletter sent out by SAON. Many other respondents mentioned the better usage of existing list servers for dissemination of information (i.e. ArcticInfo, Cryolist and IASC newsletter). Out of six given platforms of communication (1. Web site, 2. Newsletter, 3. Facebook, 4. Twitter, 5. Google+, 6 LinkedIn) the respondents ranked the SAON website and a Newsletter as the most effective ones (Figure 9).

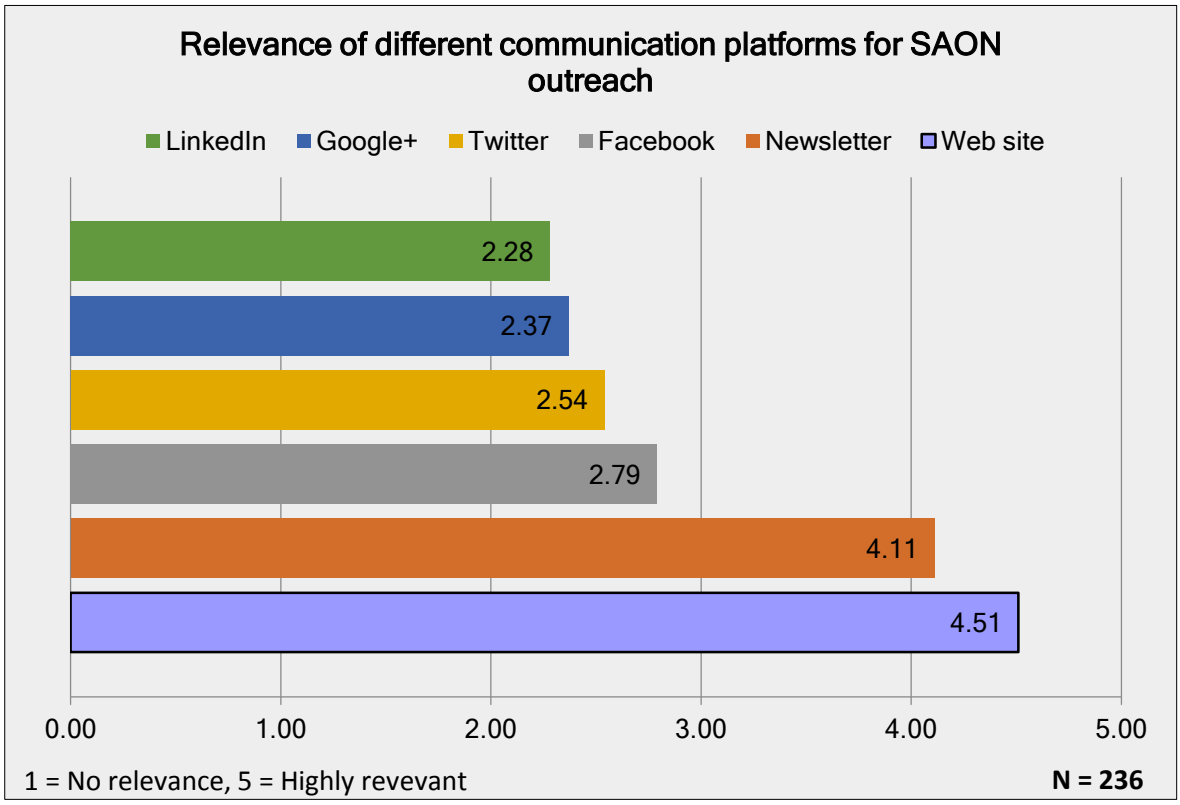

Figure 9.

Majority of the respondents did not respond to the question about the personal contribution to communication about and raising the awareness of SAON. The two main means that the 65 respondents gave were: 1) delivering information about SAON to their respective scientific community/communities, and 2) participation in panels, meetings. One of the respondents reported to have disseminated the information through tweeting during the Arctic Science Summit Weeks.

V) Outcomes

SAON's success in meeting its goals until now

Half of the respondents (53%) felt that given its current structure and funding, SAON was not achieving its goals (Figure 10).

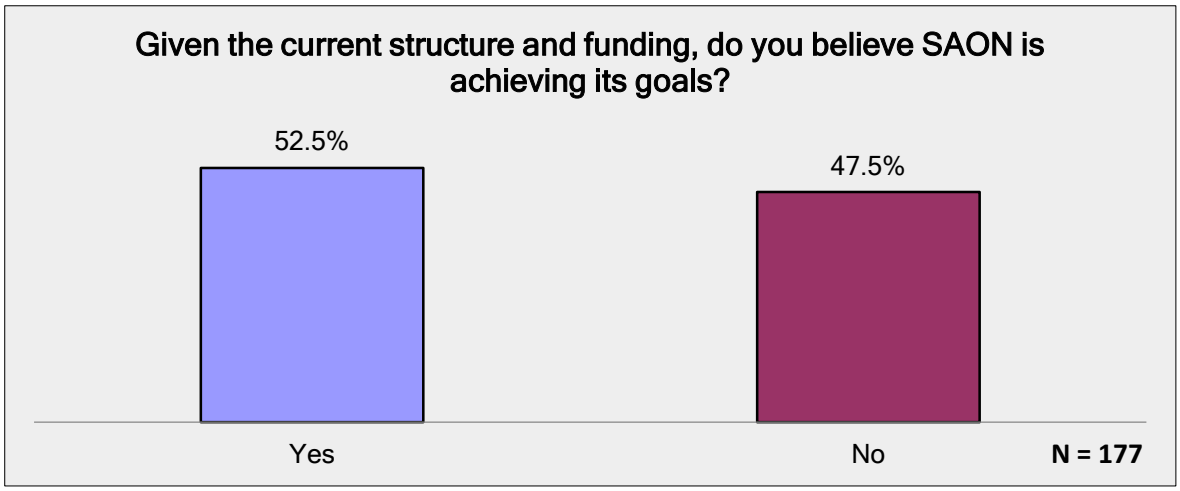

Figure 10.

Italians were slightly more often of the opinion that given the current structure and funding, SAON was achieving its goals (62%). The American were, in turn, a little less often of this opinion (42%).

The respondents rated SAON as having been most successful in meeting its Mission to "support and strengthen the development of multinational engagement for sustained and coordinated pan-Arctic observing and data sharing systems that serve societal needs, particularly related to environmental, social, economic and cultural issues" in the sphere of environmental issues (3,29/5). They felt that SAON had been least successful in meeting its Mission in relation to economic issues (2,78/5). (Figure 11).

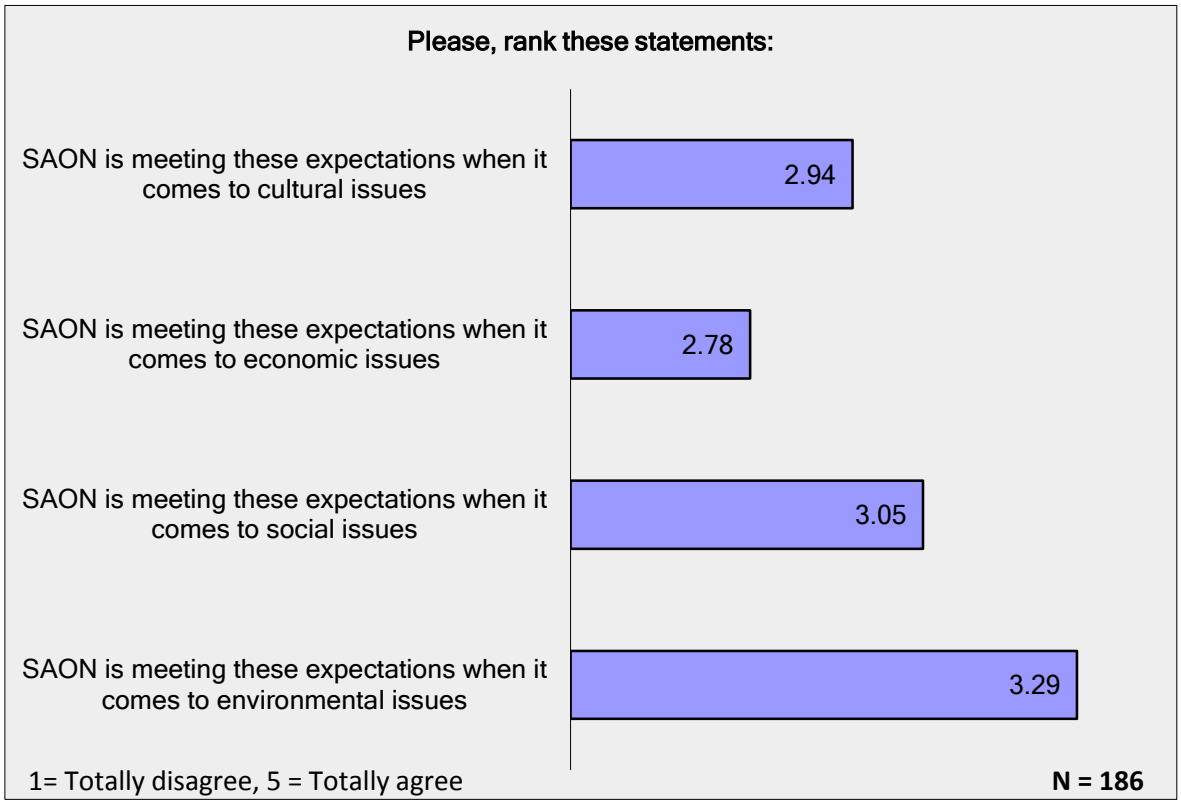

Figure 11.

Italians rated the success of SAON about half a point better than the general trends in each area presented in the survey. Americans rated SAON's success in meeting the expectations in the first two areas - culture

and economy - almost one point lower than the general average. The ratings of Italians and Americans in the two other societal areas, environmental and social issues, followed the general trends.

Wished outcomes/services from SAON

An even one hundred respondents gave an answer to the open-ended question about what kind of outcomes the respondents would like to see from SAON. Of these responses, 24 were from Italy and 37 from the United States. The answers to this question can be categorized according to four larger themes, which are:

- **Creation of data portal(s)**
- **Coordination of projects and funding application processes**
- **Facilitation of data translation and dissemination for policies & societal use**
- **Better information of ongoing projects**

1) Creation of data portal(s)

The two most frequently cited outcomes/services that were desired from SAON was the creation of data portal(s), correlated with future role of SAON in coordinating data collection and sharing. The data portal was seen as essential for simplifying and easing access to data, and furthering the establishment of international data sharing agreements. The establishment of data sharing portals was also associated with a wish of SAON to establish and supervise common infrastructures that would ensure data quality and measurement traceability of observations.

The following response summarizes one cluster of suggestions for how the creation of data portal(s) could be facilitated and also illustrates how this process is combined with the other abovementioned three themes.

> "Coordination meetings through synthesis centres (to help balance and loosen entrenched positions of partners), recommendations for standards, creation of trans-stakeholder working groups on key issues (via a call for participation), directories and surveys of data availability and services of partners."

Another answer to the wished future outcomes and services of SAON was a desire that the establishment of data portal(s) should not be a project that SAON took on its own. Instead SAON should be more proactive in: "Reaching out to other multinational Arctic or Arctic-interested organizations to make partnerships to achieve the recommendations of the CON and CDI". One of the aims of outreach that was suggested by the same respondent was the promotion of "standardization of measurements through co-sponsored activities with relevant organizations (IOC, IPA, WMO, etc)".

Within the theme of outreach activities that SAON was wished to undertake, it was envisioned that SAON should become the main organizing and coordinating platform to other portals of Arctic observing data or programs. This role was even envisioned to eventually turn SAON into "the point of contact for other regional multi-partner observing networks who want to engage across latitudinal boundaries".

2) Coordination of projects and funding application processes

The second type of services and outcomes that the respondents wished that SAON should establish was closely combined with questions of funding. The more specific comments in relation to this theme included:

1) Creating active networks to allow for more competitive applications for grants

2) Coordinating function among Arctic related projects, operational observation, as well as the international funding to such activities
3) Coordination of projects for the study of Arctic natural complexes with scientific organizations and institutions that have the possibility of financing these projects.
4) Negotiate new funding sources and opportunities with big international founders such as the Belmont Forum
5) Funding pilot projects
6) Best practices references coordinator or collaborator for funding, expanded monitoring programs (e.g. more biodiversity, research stations, etc.)
7) Active coordination and funding to implement international efforts to strategically observe the Arctic
8) Developing a more sustainable structure to fund long term Arctic observations

3) Facilitation of data translation and dissemination for policies and societal use

The third type of services that SAON was wished to provide was associated with the translation of observational data for societal, economic and political use. The more specific wishes in fulfilling this role included:

1) Translation services for transforming scientific data into a understandable format for non-expert audiences and providing explanations about their use or their applicability to different socio-economical activities
2) Assessments with clear links to Arctic Council/Arctic governments needs
3) White papers
4) More robust networks focusing on sharing data and information relevant to communities and Indigenous residents
5) Provision of mechanisms to educate scientists of both social and cultural issues, and how they become incorporated into decisions of governance

4) Better information of ongoing projects

The fourth type of service that SAON was wished to provide was better dissemination of ongoing projects. This was in line with the wish for better outreach that was also mentioned in relation to questions of Awareness and Outreach. The more specific forms of information that the respondents wished SAON would distribute included information on ongoing activities and plans, as well as on different existing and upcoming funding opportunities.

Outreach

When asked if SAON should improve its relationships with organizations representing seven entities (NGO's, international organizations, Arctic residents, Arctic indigenous peoples, educators, funding agencies, and scientists), the majority of the respondents (74%) answered "Scientists". The entity that was mentioned second most often were "funding agencies". Only 15% of the respondents saw that SAON should improve its relationship with NGOs. (Figure 12).

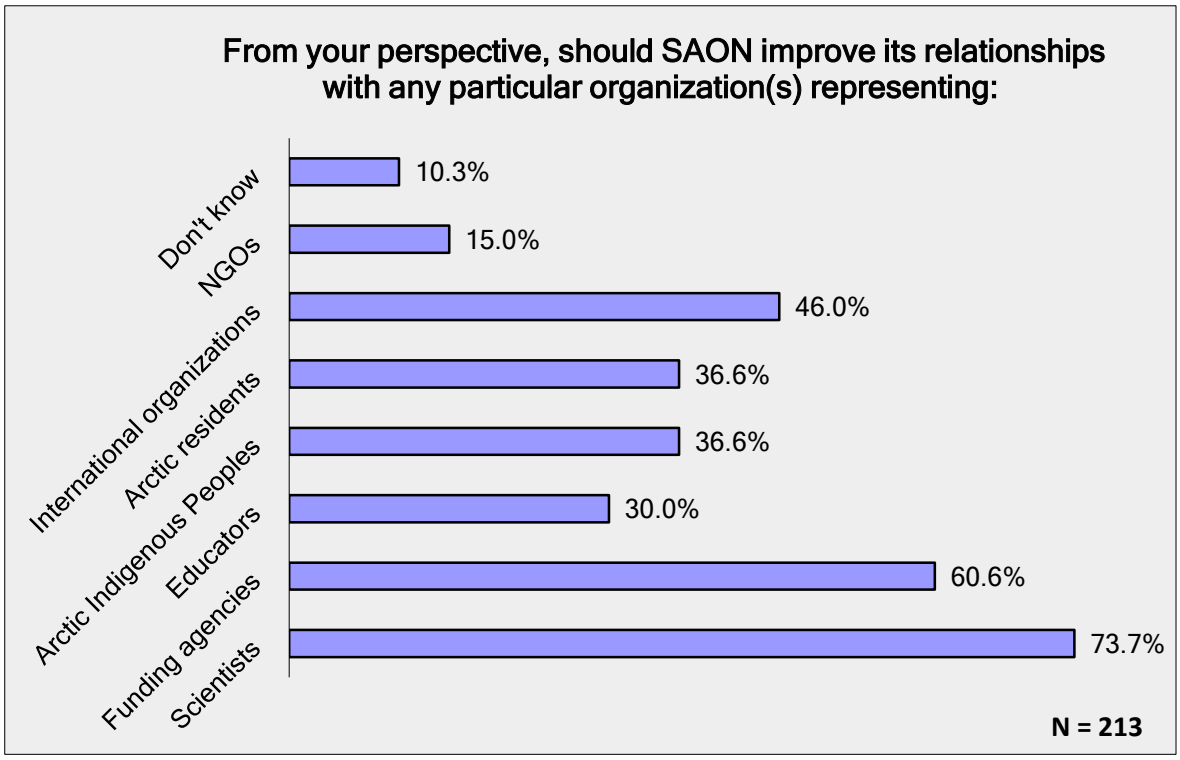

Figure 12.

Italians rated the need for improvement of SAON's relationship with scientists (92%) and funding agencies (69%) higher, and that of NGO's lower (8%) than the average presented in Figure 12. Otherwise the Italian responses were equal to the percentages of the total number of responses. The American answers followed the general trends, but with significant deviations (Figure 13).

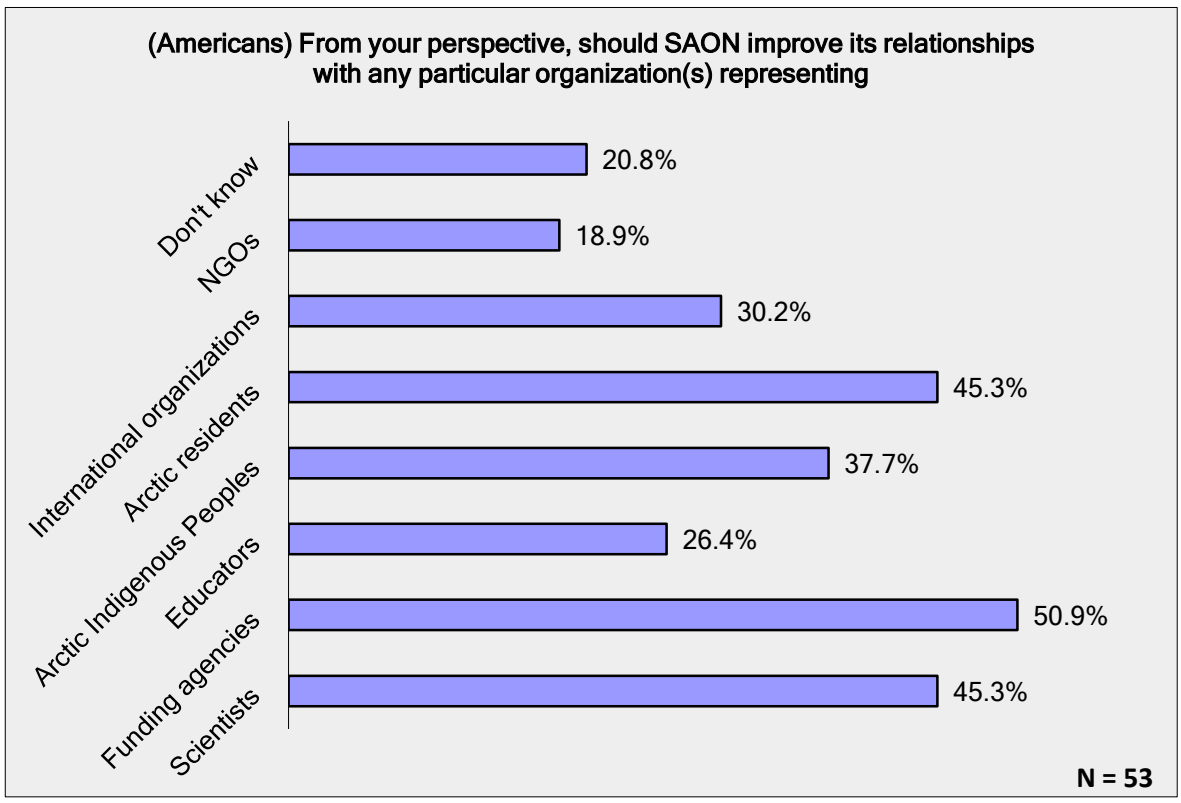

Figure 13.

Other entities with whom SAON should improve its relationship included: Conservation agencies, diplomatic bodies, Arctic Council and (Arctic) Governments, private corporations, industrial agents, policy makers, representatives of media, land management agencies, and national hydrometeorological services.

National level coordination of SAON

All of the respondents felt that the national level of coordination of SAON related activities in their country was largely insufficient (Figure 14).

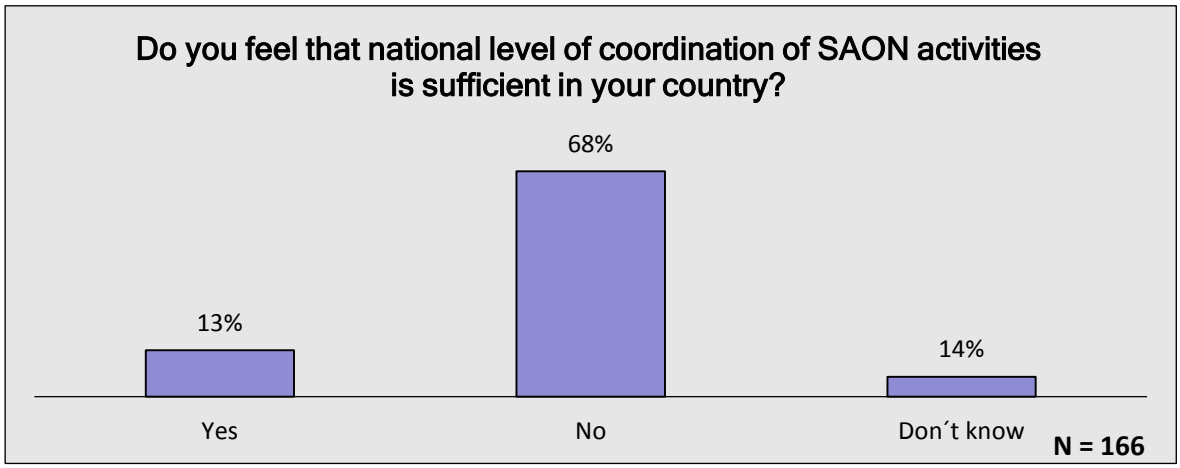

Figure 14.

Critical contributions of SAON between 2011 and 2016

Of the total number of 301 respondents to the survey, only 103 provided an answer to the question of what have been the three most critical contributions of SAON over the past five years. A little over a half of these responses (53%) was: "Don't know". The contributions mentioned in the 49 remaining answers included:

1) Starting and supporting AOS *
2) Reports
3) Establishment together with IASC the Arctic Data Committee (ADC)
4) Launching the initiative for the inventory of activities, programs and projects in the Arctic
5) Providing a platform for international discussion and networking
6) Raising awareness of the need to coordinate measurements across the Arctic
7) International network and coordination*
8) Data management and sharing*
9) Academic mobility
10) Tighten linkages to international bodies such as IPCC and IPBES
11) Raising of awareness of Arctic issues with funding agencies
12) Inclusion of Artic Indigenous Peoples in observations
13) Establishing data sharing systems, standards and databases
14) Acknowledging CBO and TIK* at a high level
15) The CBM Atlas*
16) Open access databases across the Arctic

** Most often mentioned*

V) Open comments

A total of 35 respondents left additional comments at the end of the survey. These comments were generally consistent with the answers to the open-ended questions in the main body of the survey. They re-stated the need for better outreach, data sharing, permanent personnel, and follow-up of the progress of different achievements and programs of SAON.

More specific comments in relation to **better societal engagement** included:

- “Approaching data integration from a semantic level (knowledge level) downward (to information and data levels): If we are not clear on what data and information is about, it's all too common that data providers with large volume or impressive software tools dominate the conversation at the expense of, e.g., indigenous groups or smaller institutes”.
- Greater engagement with GEO in the context of community based monitoring.
- Defining "societal benefits" or at least communicate good examples of societal benefits
- Combining wishes of activities of the scientific community with the wishes of stakeholders.

Comments that reflected the need for **clearer branding of the specificity of SAON** in relation to other international Arctic scientific initiatives included:

- Defining the real needs of SAON, which do not duplicate with other organizations
- “If SAON is not the principal, "go to" place to understand what is happening with Arctic Observations and what their significance is, what is the point?”

Comments on **the need for structural change in SAON and its activities** included:

- “there needs to be some discussion about the trade-offs, both among what is observed (how do we allocate resources among the many things to be observed) and between observations and research (what do we gain and lose when we shift money from one to the other).”
- “I think among terrestrial ecologists there is practically no engagement except possibly through the CAFF CBMP, which has been ineffective at issues related to vegetation monitoring and plant species monitoring. A coordinated international program of vegetation change monitoring is needed.”
- “Please use a qualified group, skilled in connecting across boundaries, scientific planning, and project management to organize and run the AOS.”
- “Review the working group’s progress to date.”
- “Investment in full-time personnel and close relationships with relevant global observing organizations to raise the SAON profile and lend more legitimacy to its actions”
- “Website could be made more user-friendly. There's no clear list of all the observing networks. Not clear how SAON is sustaining them (no funding) - but it should be more about collating and integrating them.”

Analysis of Directed Survey Results

Background information

The directed, longer Sustaining Arctic Observing Networks (SAON) stakeholder survey had a total of 30 responses. The geographical area of the responses covered 12 countries. The greatest number of responses came from the United States (7), Canada (4), and Norway (4). The respondents' professional backgrounds were diverse. The different areas of expertise represented across the respondents included: policy, data management, cryosphere, indigenous issues, and atmospheric and marine sciences. A wide range of institutions were represented across the thirty respondents.

The ages of the respondents were more or less equally divided between 30-60+-year-olds. The gender division among the respondents was 75% male and 25% female.

Two thirds of the respondents (21) reported a personal involvement with SAON. Different modes of this involvement included: board or executive member, vice-chair, (external) observer, (alternative) national delegate, Committee on Observations and Networks member, Arctic Data Committee member, and participant.

Most of the respondents used the possibility to skip any of the survey questions on more than once occasion; except for the mandatory question about their Country/City/Region and their Area of Expertise. There was an average of 20 responses for each survey question.

The main difference between the directed, longer and the shorter, openly circulated survey was that the longer survey had ten additional questions that dealt with the SAON organizational structure. The additional questions addressed the functionality of the SAON organizational structure as a whole as well as that of its individual parts: The SAON Board, Executive, and Secretariat, National SAON Coordinating Committees, as well as the Arctic Data Committee and the Committee on Observations and Networks.

Summary of findings

A) Fulfilment of SAON's Mission, Vision, and Goals

At present

Most of the survey respondents (92%) saw that SAON's current Mission, Vision and Goals, provide a clear articulation of SAON's purpose. Some commented that it was, nonetheless, hard to describe how they were, could be or should be implemented in practice. In the words of one of the respondents: "Great aims but a little too broad and vague to be practical."

Majority of the respondents (64%) saw that SAON's current activities were helping it to fulfill its original mission. Only 16% responded to this question, "Don't know". The reasons that the survey respondents gave for SAON not yet living up to its full potential fell under three more general categories: 1) the lack of

structured participation, especially at the national level 2) insufficient outreach, and 3) unsustainability of SAON's funding.

When asked to rank the importance of eight closed options for the current roles of SAON (*1. coordination, 2. information exchange, 3. data management, 4. outreach, 5. conferences, 6. funding, 7. data policy, 8. facilitating partnerships and synergies among existing observing and data networks*) the respondents attached most importance (4,38/5) to facilitating partnerships and synergies among existing observing and data networks and the least (2.92/5) to funding. Other roles that SAON was seen to hold included: promotion of specific research ethics, providing guidelines for how research should be conducted in the Arctic, moderating different interests, identifying observation gaps, and facilitating the coordination of a core network of Arctic observing systems.

In terms of the four areas of societal needs mentioned in SAON's Mission Statement (environmental, social, economic and cultural), the survey respondents evaluated SAON to have been most successful in serving societal needs related to environmental issues (3.17/5). They saw it as having been the least successful in responding to economic ones (2,29/5).

Majority of the respondents (42%) saw that SAON's support for community based observations (CBO) and traditional indigenous knowledge (TIK) was adequate, 27% held a contrary opinion and 31% reported that they did not know. In the clarifying comments to this question, one of the respondents highlighted how TIK and CBO are two completely different forms of knowledge and their production and sharing should be discussed separately within the SAON framework.

In the future

In the future, the survey respondents wished that SAON would become "the "go-to place" on all matters around information on research and data in the Arctic". This role was envisioned to entail the promotion and provision of common data standards and guidelines for sharing mechanisms between different databases and programs and playing the leading role "in assisting the holistic coordinating of Arctic Council working groups through information exchange, data management and coordination." It also included that, in all of its activities, SAON promote the increase of open-access data and its distribution. Some of the more specific means that the respondents mentioned SAON could take in order to become the central hub in Arctic data sharing included:

- Promotion of certain guidelines with regards to data policy and research ethics.
- Playing a more prominent role in maintaining the momentum between the Arctic Observing Summits i.e. through being more visible during other large international events (science conferences, general assemblies of large projects involving Arctic observations and data).
- Developing a SAON strategy and implementation plan for a pan-Arctic observing system.
- Targeting each of the mission components through specific working groups for Environment, Social Issues, Economic Issue and Cultural Issues.
- Publishing a "State of Arctic Observing report" every 5 years that included plans to improve.
- Making data available in a structured way through the creation of a common Arctic data and information sharing platform consisting of the outcomes of all the individual SAON –related activities.
- International agreement on data sharing principles or even a data policy that countries can sign on to.

In terms of data policy one of the respondents noted how five of the Arctic Council member states are European states. This, s/he noted, means they have signed up for the seven guiding principles in sharing environmental monitoring and observation data and information through SEIS (the Shared Environmental Information System), which s/he stated to offer "low hanging fruits for SAON."

B) Organizational structure of SAON

In regards to questions on SAON's overall organizational structure, most (55%) of the survey respondents felt that the current SAON organizational structure and the Committee(s) were appropriate. They did, however, identify some problems with their functionality. These problems were primarily related to:

- A lack of sustained funding and a budget for SAON
- A low level of engagement of, and a lack of clear guidelines for, the national committees
- A lack of sustained resources available for the functioning and tasks of the Secretariat
- Poor level of interaction between the different organizational units, networks and projects
- A lack of authoritative managerial roles
- Absence of communication and outreach of past achievements, as well as ongoing and future projects

One of the more specific suggestions for how to improve the last point on the aforementioned list was through, "more active outreach that documents "What's up, planned in near and long term future", and a kind of "Short News from the Arctic", related to the priority work for SAON."

Many of the respondents saw that the current activities within the organization structure were, in general, lacking in structure. One of the biggest problems they identified was the insufficiency of coordination in international network and capacity building by SAON. One of the more specific wishes in this area was that SAON would better follow-up on and coordinate the dissemination of information from SAON-related activities, of which most are ongoing activities of the members with different timelines, objectives, deliverables and overall goals.

Majority of the respondents (57%) did not feel that the national level coordination of SAON activities was sufficient in their country. The improvement of this aspect in SAON organizational structure was seen as crucial for SAON's future success. In the proper terms of one of the respondents: "The success of SAON relies on effective national structures in SAON member countries to communicate the SAON activities and ensure national participation in these."

The survey respondents were also asked if they saw a need for any new organizational changes in SAON. Majority (68%) did not think there was a need for any additional Committees or other SAON related bodies.

C) Funding and sustainability

The directed, longer survey respondents were asked about the funding and sustainability of SAON in two places of the survey. First, they were asked if they had comments or suggestions on the current funding of SAON or on the future sustainability of SAON. Majority of the respondents (63%) commented by stating

that SAON needed more resources. The additional funding was seen to be needed, for example, for the strengthening of the Secretariat to enable it "to be present at important meetings and organize/fund dedicated workshops." Another area that the respondents identified to be in need of more resources was in support of the National SAON Coordinating Committees. In the words of one of them:

> "In smaller countries SAON activities at a national level are rather limited due to the lack of any financial support. It would be perhaps helpful if SAON could come up with a kind of formal recommendation or support letter which could be used to approach national funding agencies/authorities to seek their support for SAON activities (both to promote SAON on a national level and to participate in SAON international activities)."

The second time the survey respondents were specifically asked about funding was in relation to the question: "Given the current structure and funding, do you believe SAON is achieving its goals?" Majority (61%) responded "No" to it and a minority responding "Yes" (39%).

In addition to the aforementioned two questions devoted to funding, the topic was repeatedly raised by the respondents throughout the survey. The general feeling among the respondents was that securing more structured, sustained funding for SAON was essential in the fulfilment of its original mission. The possible increases in its funding were seen to come from countries and international organizations that perform Arctic research and monitoring. Many of the respondents also wished that SAON would support the networks' in seeking partnerships and funding opportunities.

D) SAON outreach and communication activities

Majority of the respondents (68%) felt sufficiently informed about SAON activities. The main means by which they gained information was related to their direct involvement with SAON and its activities.

The respondents gave the following suggestions for the development of SAON outreach and communication activities:

- More targeted actions focused on facilitating partnerships, supporting multinational engagement and access to developing/existing observing networks
- Better media outreach through press releases, lobbying etc.
- Review of how many users there are of SAON services, e.g. the SAON Project Directory, including an overview of the different user groups and their nationalities.
- Creating better means of communication and reviews of what SAON has achieved so far

The further development of the SAON webpage was also mentioned as a priority in the future development of SAON outreach and communication activities. In the words of one of the respondents:

> "The current SAON website is not well organized, and provides insufficient information for those who may not be more intimately involved with SAON (ex: the main page should clearly state what SAON is). The website also does not adequately convey the value of SAON or its achievements to date. Info re: committee work plans, timelines, and deliverables should also be concise and easy to access on the website, along with progress against this, perhaps in conjunction with a newsletter."

Analysis

I) Background information

The directed, longer Sustaining Arctic Observing Networks (SAON) stakeholder survey had a total of 30 responses. The geographical area of the responses covered 12 countries. The largest amount of responses came from the United States (7), Canada (4), and Norway (4) (Table 1.).

Country	Number of responses
United States	7
Canada	4
Norway	4
Denmark	3
Iceland	2
Finland	1
Germany	1
Japan	1
Poland	1
Republic of Korea	1
Sweden	1
Switzerland	1

Table 1. Number of responses by country

The professional backgrounds of the survey respondents were varied. Areas of expertise among them included: policy, data management, cryosphere, indigenous issues, atmospheric and marine sciences.

The ages of the survey respondents were divided quite evenly between 31 and 60+ years (Table 2.).

Age	Response Percent
20-30	4% (1)
31-40	17% (4)
41-50	25% (6)
51-60	26% (6)
60+	29% (7)

Table 2. Age

The gender division of the respondents was 75% male and 25% female.

Most of the respondents (70%) reported that they were directly involved with SAON. The different modes of this involvement included: SAON Board or Executive Committee member, vice-chair, observer, national delegate, member of the Committee on Observations and Networks, Arctic Data Committee member, and participant.

Most of the respondents did not provide answers to all of the 32 questions of the survey.

II) The Need for SAON/ The SAON Mission, Vision and Goal

Clarity of SAON's Mission, Vision and Goals

Almost all of the respondents (92%) thought that SAON's Mission, Vision and Goals provide a clear articulation of SAON's purpose (Figure 1).

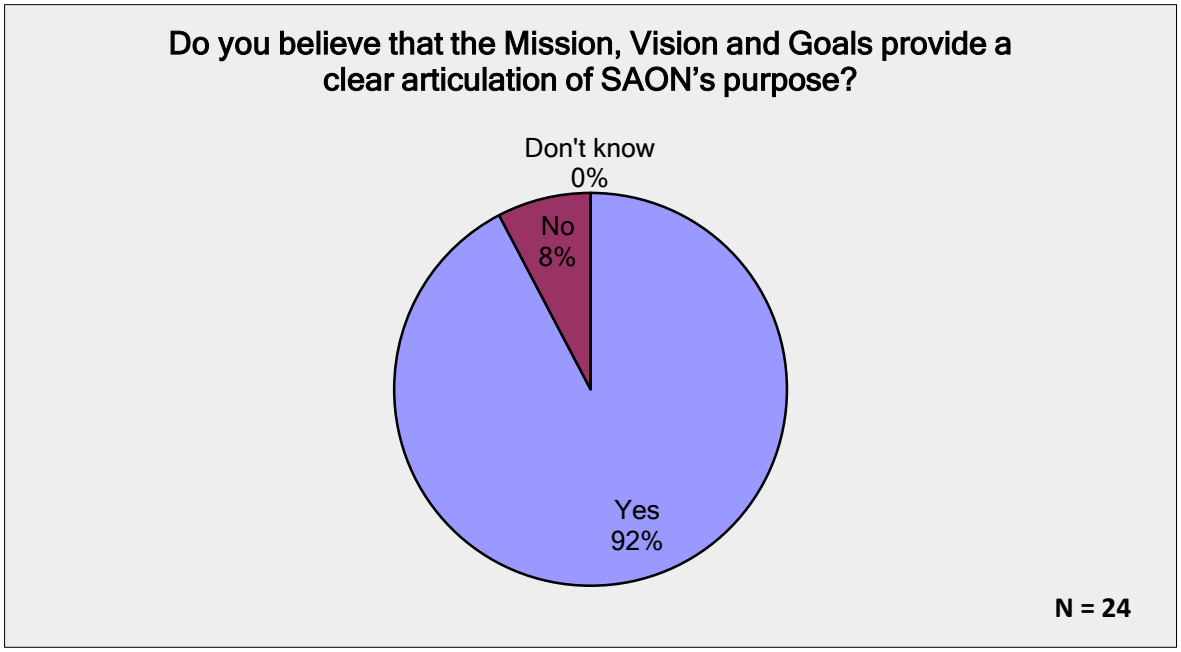

Figure 1.

Current roles of SAON

When asked to rank a selection of SAON's current roles, (1. coordination, 2. information exchange, 3. data management, 4. outreach, 5. conferences, 6. funding, 7. data policy, 8. facilitating partnerships and synergies among existing observing and data networks) the respondents attached most importance (4,38/5) to facilitating partnerships and synergies among existing observing and data networks. They ranked funding with the lowest importance (2,92) (Figure 2).

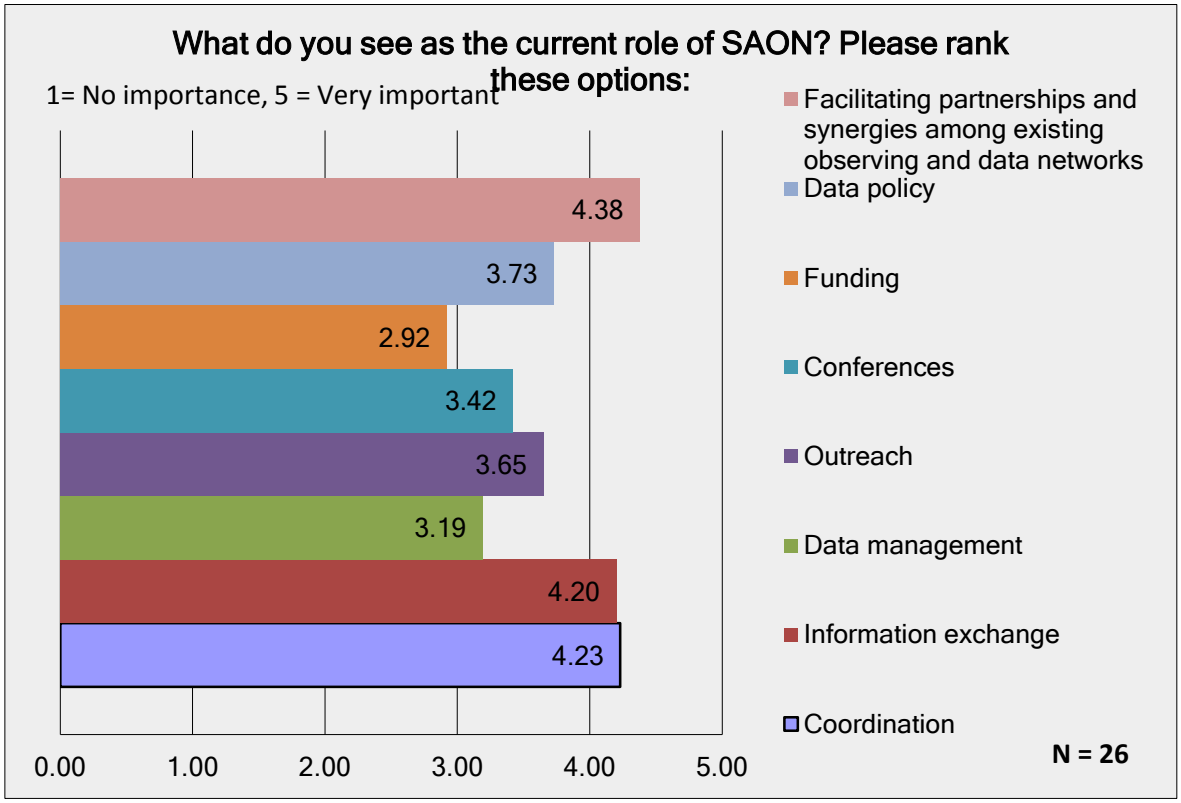

Figure 2.

Appropriateness of the current activities in relation to the original mission of SAON

Majority of the survey respondents (64%) believed that SAON's current activities were helpful in fulfilling the original mission, 16% did not have an opinion on this issue, and 20% were of the contrary opinion (Figure 3).

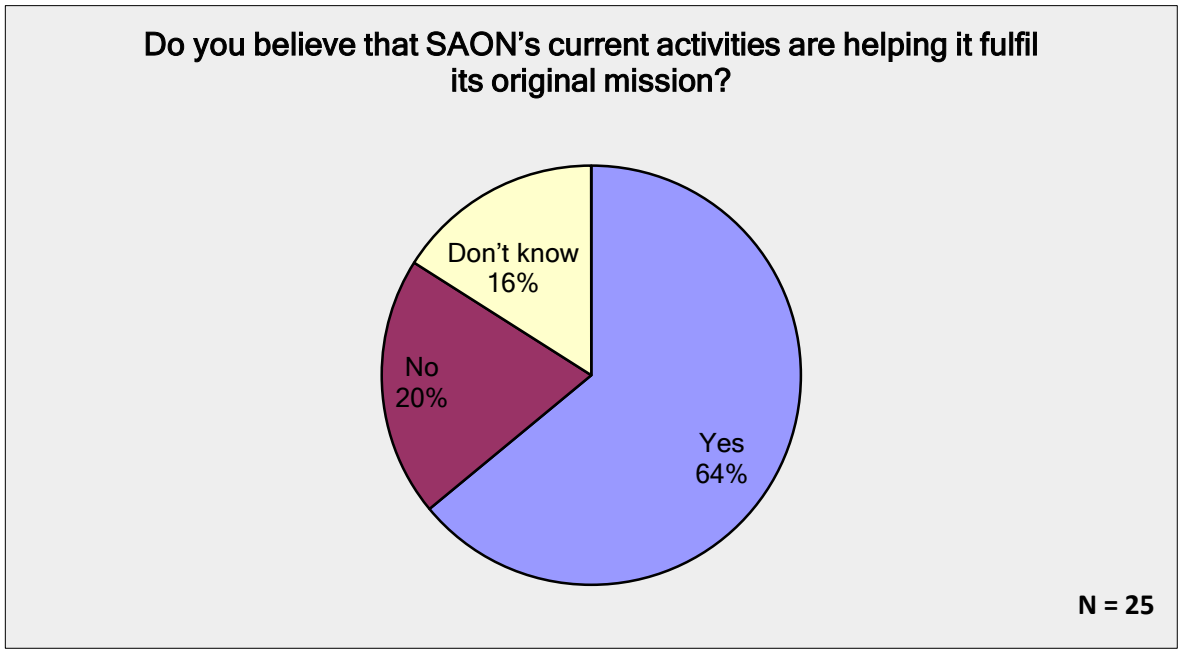

Figure 3.

The reasons the respondents gave for SAON not yet living up to its full potential in the comments to this question dealt with:

- **Lack of resources**: "If SAON had some funding it could do much more to fulfil its original mission."
- **Broadness of mission**: "Fuzzy mission, hard to say."
- **Need for better national engagement**: "SAON stands ready to do so much more. We need to get national governments to accept SAON as a conduit to achieve this mission and provide the funding to do so."
- **Not enough outreach**: "In some aspects SAON fulfils its original mission (promoting the vision, sharing and synthesis of data and information) while more targeted actions focused on facilitating partnerships and supporting multinational engagement and access to developing/existing observing networks would be beneficial."

Future roles of SAON

The open-ended question "What kind of role would you like to see SAON play in the future?" gained a total of 22 responses. The roles that were mentioned by the respondents included:

- Promoter of certain research ethics, i.e. how research in the Arctic should be conducted
- The "go-to place" in the future on all matters on data collection, archiving, and distribution in the Arctic
- A key forum for coordination of Arctic observations of nature, and social as well as health issues in the Arctic
- Creator of a framework for a heterogeneous but consistent system of observations
- Main discussant and promoter of observation issues in the Arctic Council
- Promotor of open access data and information, and provider of data standards and sharing mechanisms (ADC), facilitator of well-defined and multinational observing networks, including support for seeking partnerships and funding opportunities
- Facilitator of Arctic wide observations and standards
- Bridger of existing databases/ programs
- Leader of implementing a sustained Arctic Observing System
- Provider of pan-arctic funding opportunities
- Coordinator of Indigenous organizations into conversations with observation networks.
- Facilitator in the identification of needed policies to support the sharing of information from different knowledge systems
- Assisting the holistic coordinating of Arctic Council working groups through information exchange, data management and coordination

Support for community based and indigenous traditional knowledge

Majority of the respondents (44%) were of the opinion that SAON's support to community based observations (CBO) and traditional indigenous knowledge (TIK) was adequate, 27% held a contrary view, and 32% stated they did not know (Figure 4).

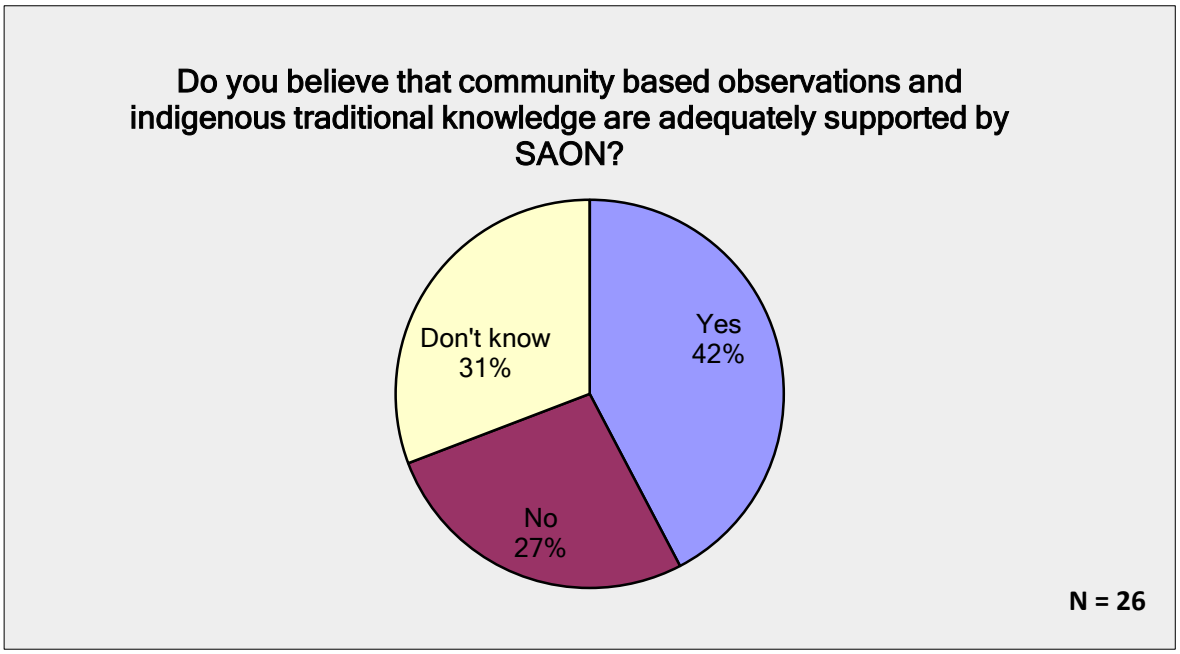

Figure 4.

In the specifying comments to this question the respondents noted that there was a need for more activities that were related to CBO and TIK. One of the respondents highlighted that the two were very different and as such "integrating indigenous knowledge needs a separate process".

III) Awareness and Outreach

Arctic Observing Summit

All of the respondents were knowledgeable of the Arctic Observing Summit (AOS). Three did not know that AOS was a SAON outreach activity.

Dissemination of information

Majority of the respondents (68%) felt that they were sufficiently informed about SAON activities (Figure 5).

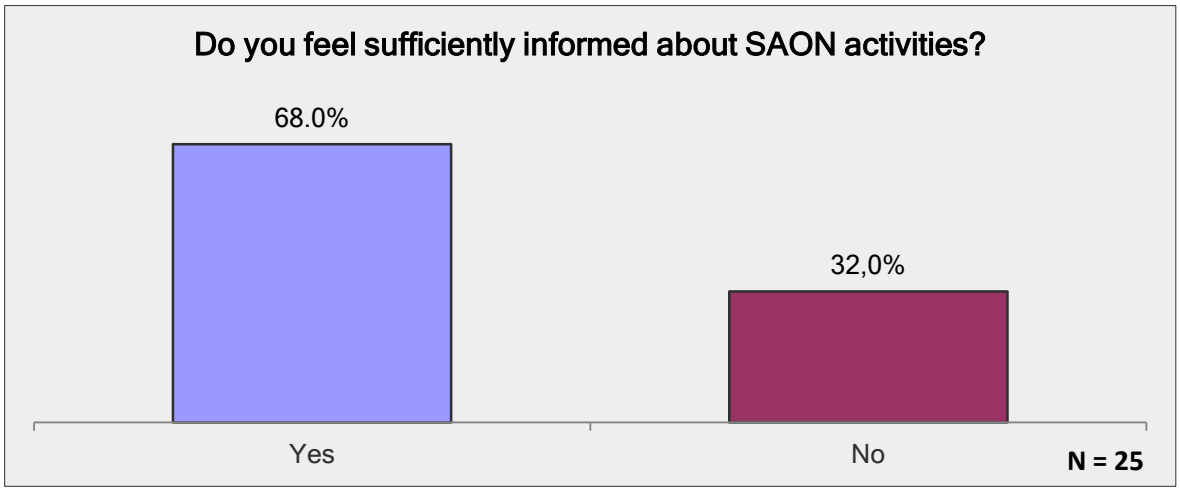

Figure 5.

Most of the respondents reported that they gained this information through direct, e-mail communication that is associated with their involvement in SAON.

When asked about possible means that could be used to improve the dissemination of information in and of SAON, the respondents suggested a quarterly newsletter, increased media outreach in the form of press releases and lobbying, and the improvement of the website. One respondent summarized the need to update the website in the following words:

> "The current SAON website is not well organized, and provides insufficient information for those who may not be more intimately involved with SAON (ex: the main page should clearly state what SAON is). The website also does not adequately convey the value of SAON or its achievements to date. Info re: committee work plans, timelines, and deliverables should also be concise and easy to access on the website, along with progress against this, perhaps in conjunction with a newsletter."

The survey respondents were also asked to rate the relevance of six different communication platforms for SAON outreach (1. Web site, 2. Newsletter, 3. Facebook, 4. Twitter, 5. Google+, 6. LinkedIn). The respondents rated the SAON website as the most relevant (4, 62/5) means of communication and Google+ as the least relevant one (2,54/5) (Figure 6).

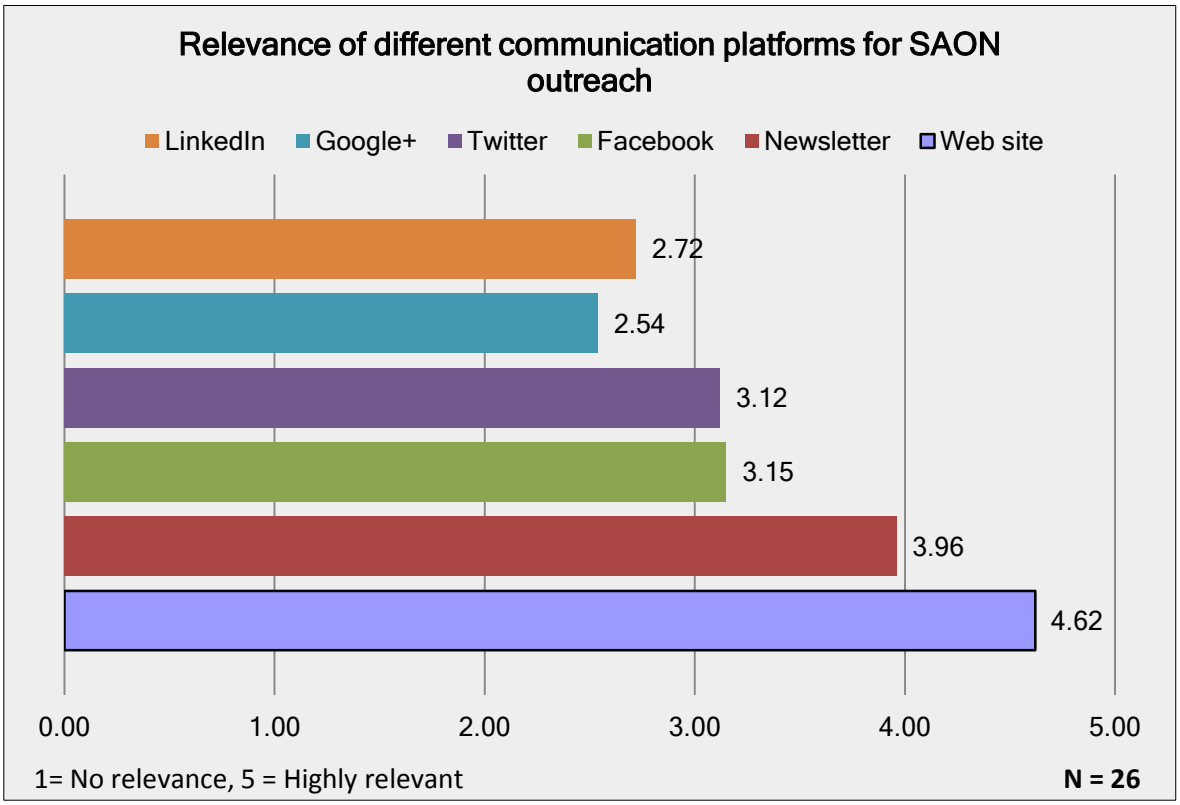

Figure 6.

The primary means by which respondents have contributed to the promotion of SAON themselves was through the dissemination of information and promotion of engagement in and through their personal contacts.

IV) The SAON Organizational Structure

Appropriateness and functionality of SAON's organizational model

Half (50%) of the respondents thought that SAON's organizational model was appropriate and working, 21% saw that there was need for some improvement in SAON's functionality. The rest (29%) did not have an opinion on the matter (Figure 7).

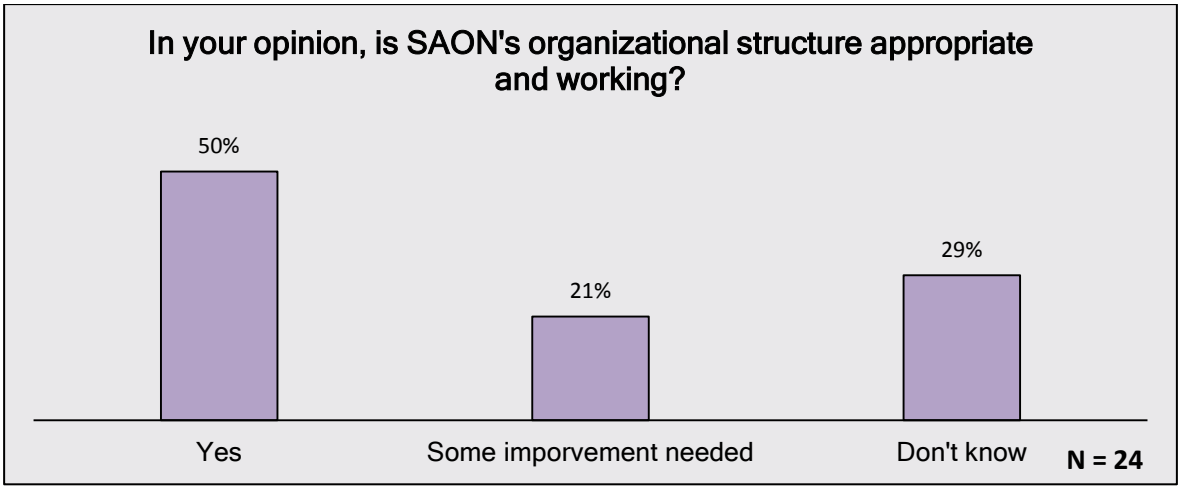

Figure 7.

The respondents were especially satisfied with the addition and work of the two SAON Committees. The areas identified for improvement were outreach, rules for and functionality of National SAON Coordinating Committees, budget, and the structure as well as engagement of the SAON Board. One respondent commented on the SAON outreach with the following words:

> "I think you need an actual coordination office that maps and network, periodically reports on trends, and orchestrates synthesis products (if this role is not in the Secretariat already)."

Majority of the respondents (43%) thought that the current model provided sufficient interaction with observing networks and projects, 33% held a contrary opinion and 29% did not know.

Appropriateness and functionality of the SAON Committee structure

In addition to the questions about SAON's overall structure the respondents were separately asked about the appropriateness and functionality of the SAON Committee structure. A little over half (55%) thought that it was appropriate and functioning, 32% did not have an opinion on the matter, and 14% held a contrary view (Figure 8).

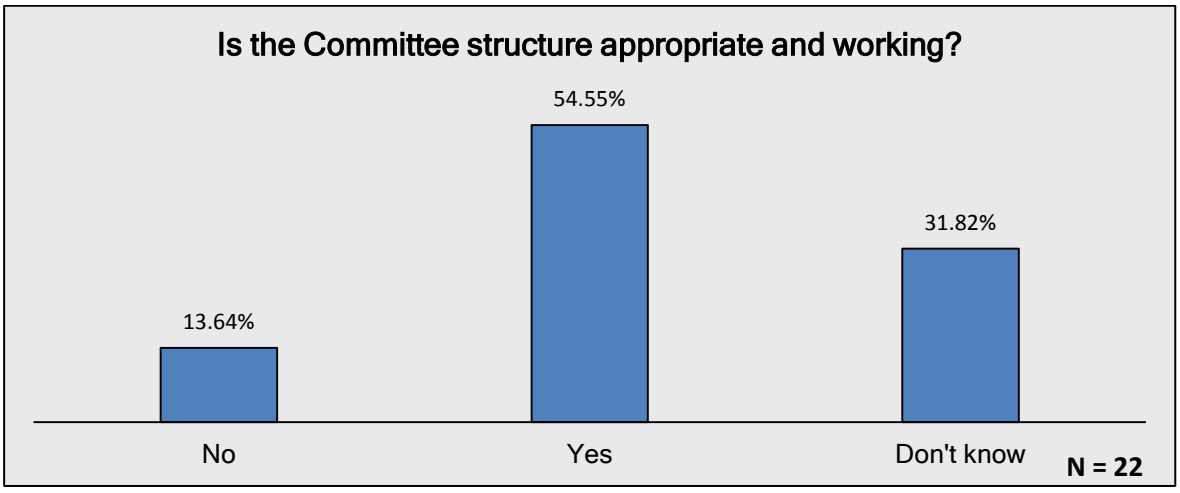

Figure 8.

Comments on the need to improve the Committee structure were not about the Committee's form and position within the organizational structure of SAON but related more to their internal functionality and communication with other entities in the SAON organizational structure. A handful of the respondents identified that there is a special need to improve the outreach of the two Committees. They should regularly communicate what has been achieved, what is going on, and what is being planning. The respondents highlighted how this cannot be done unless the Committees get more resources for their disposal.

Need for additional SAON Committees or other SAON-related bodies

The respondents were also asked about the possible need for additional SAON committees or SAON-related bodies. Majority of them (68%) said that this was not necessary, 9% had a contrary opinion and the same number of the respondents stated they did not know (Figure 9).

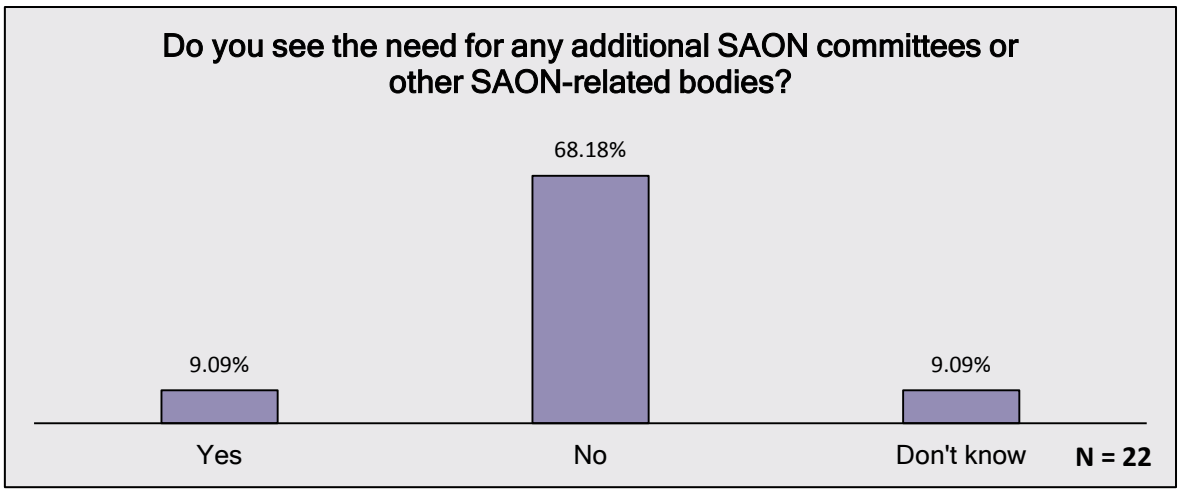

Figure 9.

The comments to this question identified that that even if the structure was appropriate at the moment it should be revisited as SAON develops further. One of the respondents stated that:

> "Perhaps a small advisory group of representatives from main funding agencies could be helpful for establishing/facilitating long-term sustainability of existing observing networks."

Another respondent commented that maybe another "scientific committee could be setup in order to create indicators and define priorities".

Future interaction with SAON

The survey also provided respondents with an opportunity to describe their desired future modes of interaction with SAON, as well as provide any suggestions for additional or future activities for SAON.

Responses to the question about future interaction with SAON included:

- "Through newspapers, newsletters, higher profile outlets that are regularly read by the scientific community."
- "Its webpage."
- "More intensive as things develop on ICES side."
- "More involvement in Arctic Council policy making."
- "I think ASSW is a good venue, if it is made relevant at the network level."
- "More involved- need clearer direction of expectations for roles of members."
- "I would prefer a more frequent exchange of information and progress made by short video conferences. One board meeting in person per year is enough but video-conference every 3 month would be good."
- "Within the GEO Cold Region Initiative and a possible Arctic GEOSS."
- "I would like to re-engage in the SAON discussions, and possibly link the SAON effort to parallel monitoring concepts developing in eastern North America."
- "We hope to be active on the SAON Board and to have our community based monitoring projects be integral with SAON."
- "Continued communication and being engaged. As time allows it is good take an active role within SAON activities. But it is also good to not have to always play an active role when time does not allow."

Responses to the question about possible additional or future activities for SAON included:

- "It would be helpful if SAON could work towards the promotion of certain guidelines with regards to data policy and research ethics, and have in particular the interests of Arctic Indigenous peoples in mind."
- "The agenda items and content of SAON CON meetings seem to be repetitive, and it can be difficult to anticipate timely progress against deliverables, or even sufficient progress from meeting to meeting, including as a result of clear timelines and sufficient commitment from each party backed by resources."
- "Play a more prominent role in maintaining the momentum between AOS conferences."
- "Be more involved with Research Councils in the planning of a variety tools for future needs."
- "In addition to AOS, more visibility during other large international events (science conferences, general assemblies of large projects involving Arctic observations and data, etc.) would be beneficial. This could encourage more vivid interactions between SAON Committees and existing observing systems/activities. Meeting frequency is adequate with teleconferences being very helpful to keep updated about on-going activities and current issues."
- "Renew mission and deliver more observations to everyone."
- "I would like to see a meeting place at the Observing network level."
- "Lessons from 20 years of experience in facilitation and coordination environmental observation and monitoring efforts from Europe could be drawn upon (Eionet). Five of the Arctic states are

European states, and they have thereby signed up for the 7 guiding principles in sharing environmental monitoring and observation data and information through SEIS (the Shared Environmental Information System) which offers low hanging fruits for SAON."
- "It would be great if SAON would have some more funding from the nations involved to provide pan-arctic funding and further work towards its goals."
- "Develop SAON strategy and implementation plan for a pan-Arctic observing system."
- "I think that SAON needs at least one meeting a year that is held away from other events such as ASSW or Arctic Council. This meeting should include all SAON principles, board, management, secretariat, etc., and it should strive to improve the functioning of SAON."
- "Additional meetings dedicated to the engagement of Indigenous Peoples/organizations and focus on addressing the challenges of sharing information from Indigenous Knowledge holders. Additionally, it may be beneficial to place focus on the transfer and accessibility of information across scales."
- "More visible participation in international meetings. Follow the example of the US SEARCH program."

Funding and sustainability of SAON

The last question in the section about the SAON Organizational Structure addressed the current funding of SAON and SAON's future sustainability. Fifteen of the respondents provided a detailed answer to this question.

Responses about SAON's funding and its future sustainability included:

- "SAON needs a budget! There are no funding pots available for participation in SAON activities from SAON itself, support for Arctic Indigenous peoples/organizations to participate in SAON, etc. The lack of funding has hampered progress of SAON considerably."
- "Much of the work of SAON needs to be undertaken and sufficiently resourced at the participating country/organization level, and therefore there is a need for high-level buy-in backed with resources to provide country and organization-specific inputs into the broader SAON initiative. Opportunities to coordinate observing and related initiatives are also missed."
- "Would reiterate the importance of highlighting key SAON achievements to date, plus ensuring regular progress against committee work plan items, and the effective, concise and broader communication of the progress made – the importance of SAON, what SAON is doing, and the associated benefits."
- "We need to secure broader international recognition that SAON is playing an important role, and hopefully that recognition will also lead to financial support."
- "SAON needs substantial improvement in funding and staffing to be able to deliver. The staff members do not have to be at the same geographic place, but use of modern technology.
- In smaller countries SAON activities on national level are rather limited due to the lack of any financial support. It would be perhaps helpful if SAON could come up with a kind of formal recommendation or support letter which could be used to approach national funding agencies/authorities to seek their support for SAON activities (both to promote SAON on national level and to participate in SAON international activities)."
- "Arctic Council should become more serious about SAON by funding it."
- "If possible, SAON should have a budget to initiate own activities which are tailor made for achieving the visions and objectives. The activities will be carried out through SAON members (organizations/member states)."
- "Get Russia properly involved."

- "Funding situation for the SAON secretariat needs to be increased, so that the SAON secretary has the possibility to be present at important meetings and organize/fund dedicated workshops."
- "A Trust fund fed by all countries might help sustainability and avoid bad surprises."
- "Funding for stronger Secretariat is needed."
- "Extend the network to other main players like China."
- "SAON needs more resources to fulfil its mandate."
- "This is a good model, if the Norwegian government is able to continue providing the primary financial support. However, to increase participation of Indigenous organizations and representation it may be necessary to provide travel support and financial compensation for work that needs to be completed. This may also be achieved through joint grant proposals."

V) Outcomes

SAON's success in meeting its goals until now

The majority of the respondents (61%) felt that given its current structure and funding, SAON was not achieving its goals (Figure 10).

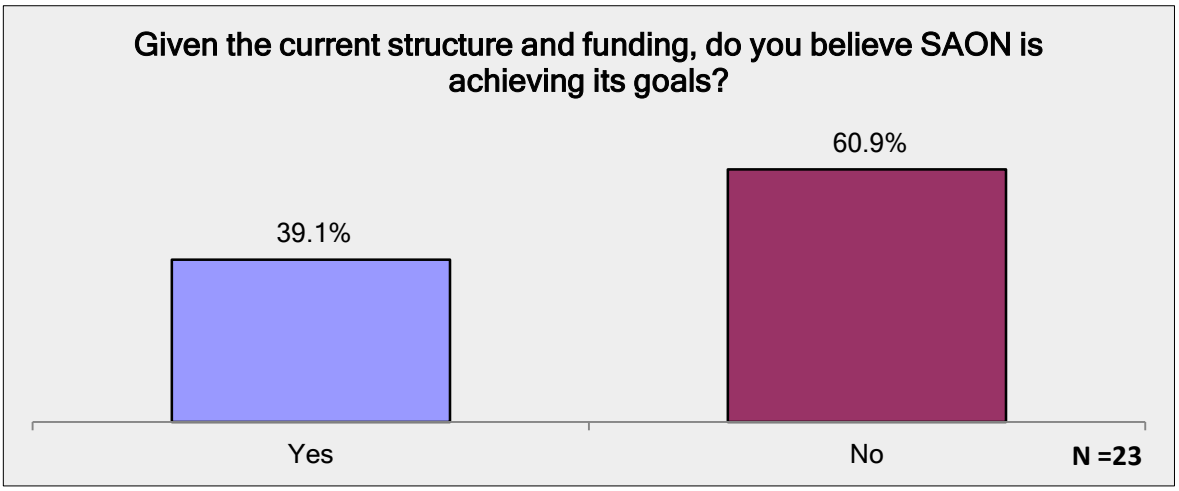

Figure 10.

The respondents rated SAON as having been most successful in meeting its Mission to "support and strengthen the development of multinational engagement for sustained and coordinated pan-Arctic observing and data sharing systems that serve societal needs, particularly related to environmental, social, economic and cultural issues" in the sphere of environmental issues (3,17/5). They felt that SAON had been least successful in meeting this aspect of its Mission in relation to economic issues (2,29/5) (Figure 11).

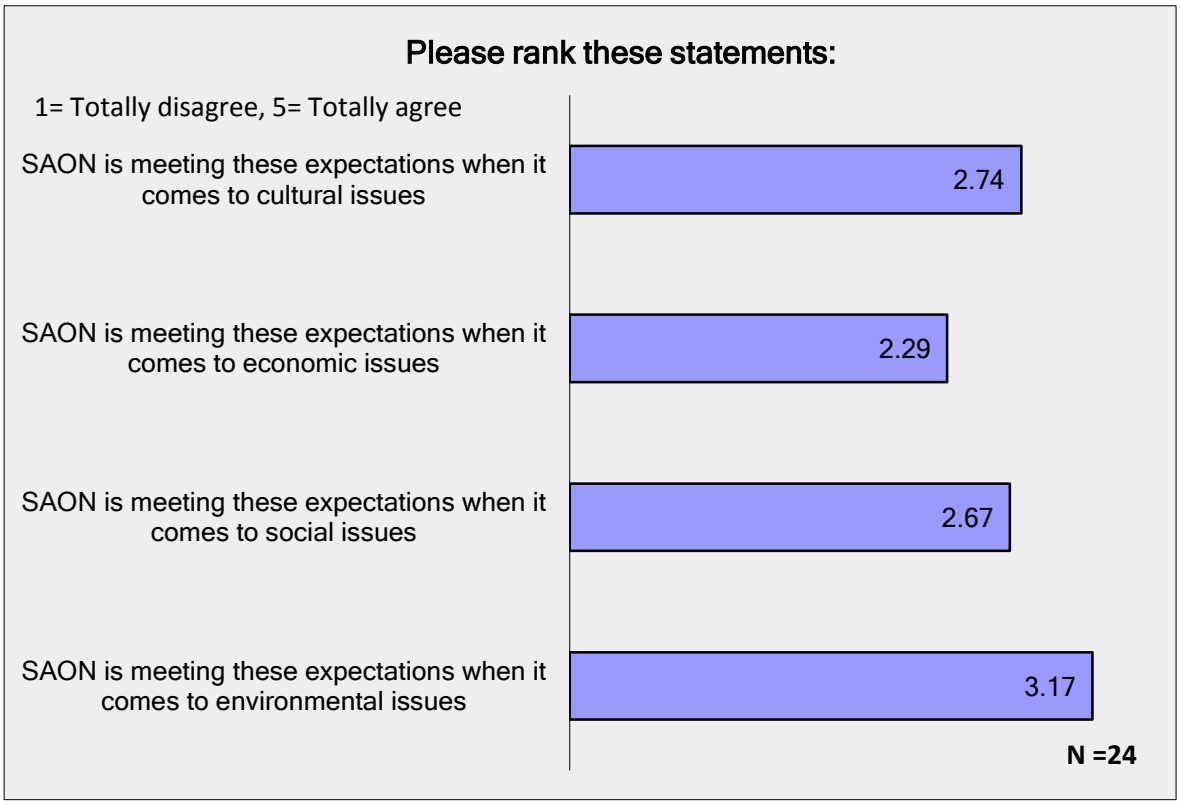

Figure 11.

Wished future outcomes and services from SAON

The open-ended question: "Given the SAON mission, what kind of outcomes/services would you like to see from SAON?" gained eleven responses. They were as follows:

- "SAON should be the place to go for data on all issues, and for information about research in monitoring in the Arctic generally. This is currently not the case."
- "We need to have greater engagement and involvement to target each of the mission components. Perhaps working groups for Environment, Social Issues, Economic Issue and Cultural Issues would help?"
- "State of Arctic Observing report every 5 years and plans to improve."
- "It could be useful to see how many users there are of SAON services, e.g. the SAON Project Directory, including an overview of the different user groups and their nationalities. Another useful product would be more communication on what SAON has achieved so far."
- "Ideally SAON would deliver a common arctic data and information sharing platform consisting of the outcomes of all the individual activities. The platform would reduce overlap, increase efficiency and facilitate coordination of efforts. The platform would furthermore make both operational monitoring, research activities and CBM/LTK available in a structured way that strengthen the knowledgebase."
- "A socio-economic analysis of the value/benefit of global observations."
- "Better formulating user requirements and gaps."
- "A mapped network of measurement sites producing inter-operable data accessible in a common standard format, and products on regional trends in issues of concern."
- "More support for various networks."
- "Mentioned previously, elaborates tools for incentive, for instance indicators and tailored actions towards monitoring networks."

- "International agreement on data sharing principles perhaps even a data policy that countries can sign onto."

Outreach

When asked if SAON should improve its relationships with organizations representing seven entities (NGO's, international organizations, Arctic residents, Arctic indigenous peoples, educators, funding agencies, and scientists), the majority of the respondents (64%) answered "Funding agencies". The entity that was mentioned second most often was "international organizations". Only 4,5% of the respondents saw that SAON should improve its relationship with educators.

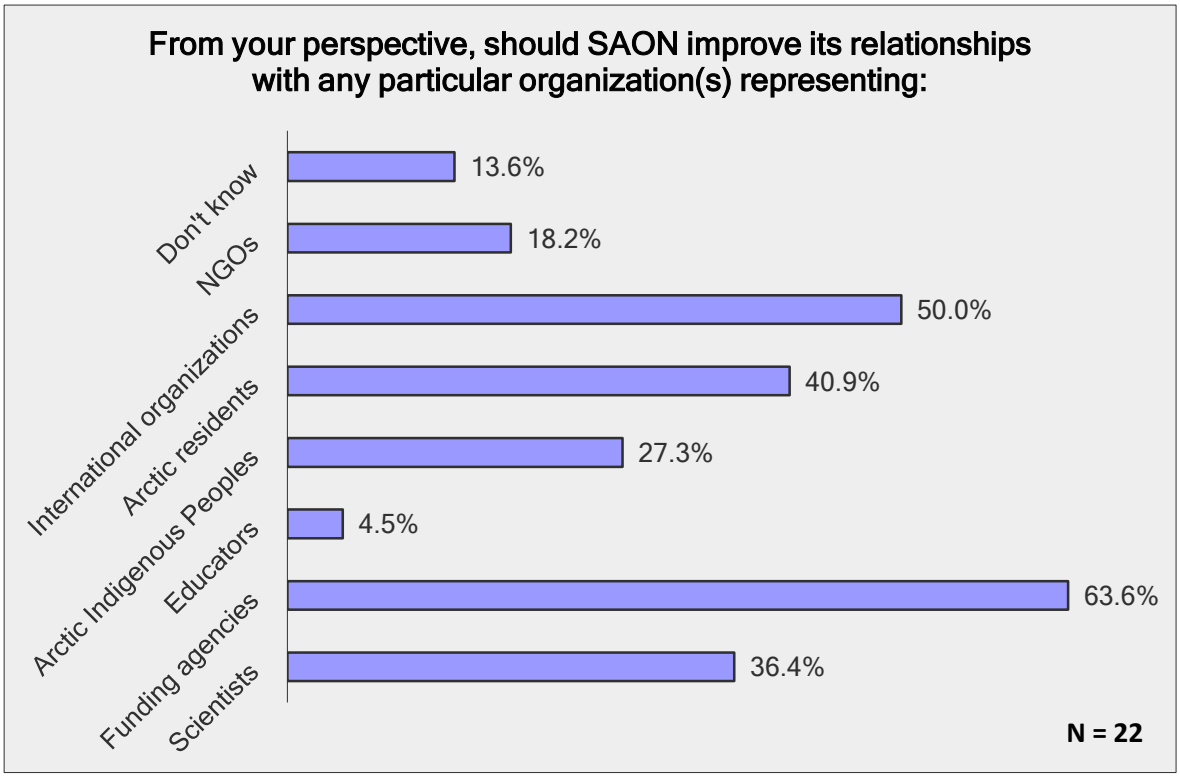

Figure 12.

Other entities with whom respondents suggested SAON improve relationships, included: observing networks, operational agencies, decision making bodies, and other entities that have taken (or are planning to take on) similar efforts to SAON.

National level coordination of SAON

Majority of the respondents (57%) did not feel that the national level coordination of SAON related activities was sufficient in their country. A little less than a third (26%) of the respondents did not know whether this was the case or not. Only 17% were satisfied with the level of national coordination of SAON related activities in their country. (Figure 13)

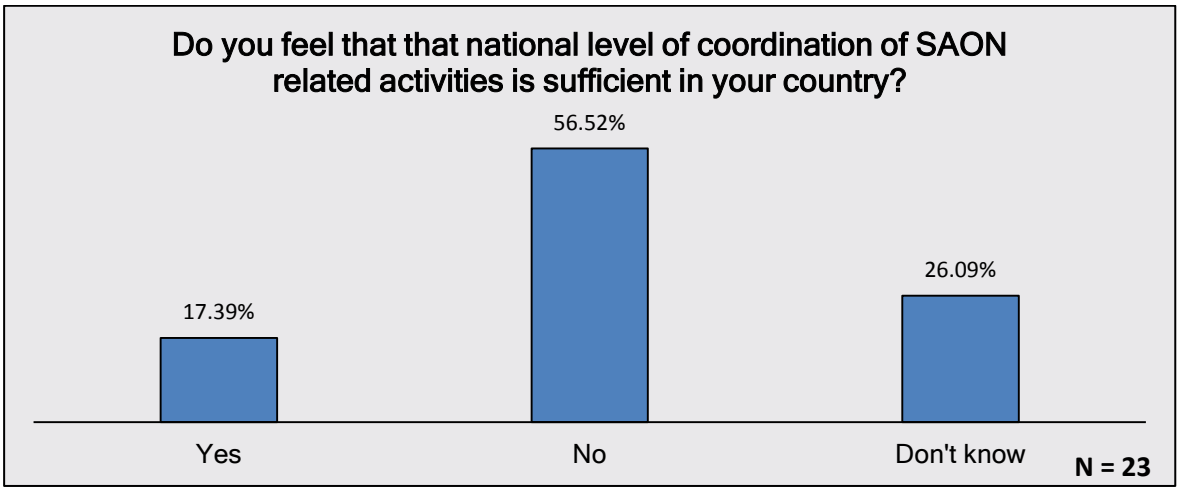

Figure 13.

Critical contributions of SAON between 2011 and 2016

During the past five years, SAON's most critical contributions were seen to have been:

- Developing research inventories (national and CBM)
- Organizing the three Arctic Observing Summits
- Promoting Data Policy through efforts such as the Arctic Data Forum
- Establishing ADC as the first Arctic-wide, cross-discipline body working towards open and sustained access to Arctic data and information
- Linking the data committees of SAON/AISC
- Its efforts to include LTK [Lay and Traditional Knowledge]
- Highlighting the role of community based observations in Arctic observing
- The Community Based Monitoring (CBM) Atlas

VI) Open comments

At the end of the survey, five of the respondents provided additional comments for the consideration of the Review Committee. They were as follows:

- "SAON has done a good job considering its resources. The challenge now is to draw in greater international support and commitment to SAON, so SAON can achieve more."
- "Without substantial funding to and acknowledgement of SAON by countries and international organizations that perform Arctic research and monitoring, SAON will be in trouble."
- "If GEO/GEOSS proceed to consider SAON as the vehicle for delivering the Arctic component for a global observation network, how will SAON respond and deliver without funding or mandate to direct/enforce individual activities?"
- "My only partially-informed read is that SAON has successfully sustained the international dialog about arctic observing, and has made progress on data standards and sharing, but has struggled to generate a real, collaborative network producing improved data on trends for key Arctic issues. A more hands-on approach to coordination, with data delivery expectations, common standards, gap analyses, synthesis products, and multiple outreach venues may be necessary to reach full implementation. Links to temperate system networks in lower latitudes would further reinforce the Arctic network's value."
- "SAON needs more support from all the Arctic states if it is going fulfill its mandate. A fully functioning SAON will improve Arctic observing and make it more efficient."

Summary of Interviews

Background information

The Review Committee and the external data analyst interviewed nineteen people in total. Most of the people interviewed were nominated by the Review Committee members. Some were also suggested by other interviewees. The final list of interviewees covered a range of Arctic and non-Arctic states, observing networks, as well as Arctic Council's Permanent Participants' organizations.

The interviews were conducted according to an Interview Guide, which the External Review Committee designed after receiving preliminary results of the two surveys. The interviews were not recorded. Each of the interviewers took notes of their discussions. These were later circulated amongst the Review Committee.

Six of the interviewees had completed the SAON stakeholder surveys online. Thirteen had not.

General message

The general consensus from the interviewees was that there is a need to push SAON out of talk, policy and politics and into more structured, task- and goal-oriented action. Many of the interviewees highlighted that without tangible and measurable success stories and benefits, it would be hard to "sell" SAON to governments that should be supporting it. Many also emphasized that without concrete action and visible benefits, it would also be difficult to convince the scientific community to continue to engage with and contribute to SAON. Despite the difficulties that the interviewees identified SAON to have at present, they all thought that it was a valuable and much needed process with great potential for future development.

Summary of findings

I. Strengths

Majority of the interviewees considered SAON to be a valuable and feasible effort.

Specific strengths SAON was considered to have included:

1.1. SAON's relationship with the Arctic Council and the International Arctic Science Committee

- ✓ "SAON is a huge opportunity for the Arctic Council, in the way that SAON has successfully involved observers and non-Arctic states."
- ✓ "SAON biggest strength in that it has an audience with, and direct access to, Arctic Ministers."
- ✓ "The AC and IASC are the two organizations that represent the global Arctic science community and Arctic sovereigns."
- ✓ "All of the existing working groups in the Arctic Council are looking for something to cross-bridge their projects and data. SAON should be this glue to bridge their interests with each other and third parties interested in the usage and collection of observational data."

- ✓ "AC tends to use the same scientist all the time, SAON potentially engage other / wider crowd of scientists."
- ✓ "IASC is not well positioned to handle things like stakeholders. That SAON has the ability to do the brokering at the stakeholder interface is added value."
- ✓ "AOS – SAON engagement is good for addressing the various challenges, to enhance networking and sharing of data."

1.2. SAON's global mandate

- ✓ Many of the interviewees highlighted how, in comparison to similar frameworks and initiatives in Europe and Americas, SAON is the only group with an international Arctic-wide mandate. However, they also mentioned that:
  - "ultimately, observations are done at the local/regional scale and funded at the national scale. The real challenge is to convince people at the local/regional scale to invest time and money at the international scale."

1.3. SAON's Organizational structure and a multi-disciplinary approach

- ✓ Many thought that one of SAON's strengths are the changes it has made in its organizational structure during its development, especially the establishment of the two committees.
- ✓ Another specific strong point of SAON that was mentioned by a handful of interviewees was the involvement and incorporation of lay and traditional indigenous knowledge into observing networks. (*Some of the interviewees gave the CBM-Atlas as a concrete example of one of SAON's success stories*.)
- ✓ "SAON is the potential platform for true cross disciplinarily (holistic) approach to observations (data and information)."
- ✓ "Could become the facilitator in bridging the different interests of the different (atmospheric, terrestrial, oceanographic) scientific working groups and observing networks."
- ✓ "Role as the connector between science & implementation (by governments and industry)."
- ✓ "The SAON's strong point is that it is half governmental and half academic (non- governmental)."
- ✓ "Other international organizations are relative specialised, such as IASSA etc. There is a need for SAON, a need for overall coordination of the accumulation of existing data/info."

1.4. Current global momentum

- ✓ A few of the interviewees mentioned that there is growing interest of the world community to Arctic regions, which supports the further development of SAON.
- ✓ "There is interest and growing understanding of the importance of data management. There is a lot of money going around for data policy."
- ✓ "At the moment there is a mismatch between the activities of coordination and funding of fieldwork. The guys in the field are still doing the same job. In order to get funding for that job they need to coordinate and collaborate with an increasing number of entities. However, they still also have to do their own research and job. SAON could ideally facilitate do part of this discussion between the increasing number of different funding and coordinating entities and the individual researchers and research teams."
- ✓ "The time is right and there is a need to begin to move beyond working on little tasks in isolation and to work together on something bigger."
- ✓ Three of the interviewees also mentioned the involvement of enthusiastic individuals as a specific strength of SAON: "People involved, have worked hard. There is not lack of will."

II. Critical issues:

General

Despite the many strengths the interviewees saw SAON having, many of them thought that during the past couple of years the SAON process had gotten stuck into institutional politics and administrative governance. Some of them considered SAON as "closed club" where emphasis had been increasingly put on polishing SAON's organizational structure and making declarations rather than the undertaking of specific actions.

Some of the reasons for the aforementioned patterns that the interviewees mentioned included:

- Too tight connection of SAON to AC, AMAP and IASC:
  - "There is competition between AC working groups: If SAON continues to be with AC it needs to "clean its own house" before moving forward". Some suggestions for how to solve the problem of institutional politics were:
    - "SAON should be taken aside from AMAP and established as an independent project/process." (Put directly under the AC Secretariat or established as the seventh working group of AC)
    - "It would be better if the SAON Secretariat was independent: "Considering how it appears from outside would require some reflection, as SAON is both AC and IASC."
    - "If most of funding that is dedicated to SAON goes to AMAP and IASC, then they run the organization."
- A few of the interviewees mentioned that the turnover of people involved in SAON is too high, which often leads to the Board meetings starting from zero instead of continuing from where they last left off.
- Some highlighted that there was a problem with lack of national engagement and the existence of too many SAON-like international initiatives:
  - "It seems to me that there is not much interest towards SAON at the national level or by international organizations that already have networks in the Arctic. The latter can even consider SAON as a competitor."
  - "There is too much competition between similar national and international science initiatives."
  - "There is still not enough coordination with national and international organizations aiming to do or doing similar things." (e.g. EEA, SEARCH, INTERACT, IARCP, GEO).
- Another specific problem that the interviewees associated with SAON's institutional politics was the formulation of its Mission, Vision, and Goals and tasks:
  - "For people that are involved in data gathering, observations, the SAON Mission, Vision, and Goals seem to be too simplistic and vague. For people not involved, they seem to be too complicated."
  - "There is no clear consensus or mandate over what kind of process or organization SAON should be."
  - "The definition and organization of tasks is too sporadic. The result of this is that the work of the SAON Board becomes often like "herding cats".
  - "The managers of the project SAON have no real mechanisms of the project management (administrative and-or financial). The result of work completely depends on good will of participants of the project."
- Many of the interviewees thought that the very wide composition of, and lack of real communication and involvement by, the Board made the work of the other SAON organizational entities difficult. Some also thought there were problems with other organizational entities of SAON:

- "The problem with national coordination of SAON activities is that the people involved are political appointees who are not involved in the area themselves (observing researchers). This leads to a disconnect between national level people and those actually doing the research."
- "The idea of a centralised secretariat for SAON that was prominent at one point never really materialised. With the present solution of having the Secretariat with AMAP, there are no real resources behind the Secretariat. This seems to translate into too little resources for the tasks. The broader discussion here is then also about resources and people being dedicated to run and organize the SAON."

A) Fulfilment of SAON's Mission, Vision, and Goals

Seven of the nineteen interviewees did not consider SAON having been very successful in fulfilling its mandate. Half, however, though that it was slowly "starting to get there".

The interviewees' dissatisfaction with SAON in fulfilling its mandate was mainly associated with the lack of concrete and measurable actions that would show the fulfillment of SAON's role as a "network of networks". In the words of one of them:

> "Progress has been made on the observing front – things like the IASOA network that NOAA has, other observatories, Arctic moorings & tethered profilers, AOOS (Alaska Ocean Observing System). But when it comes to the integration and value-added piece, I don't see where that much has been done. Maybe it is too early in the process, but I don't see many examples of networks being brought together."

Many of the interviewees referred to the notion of "network of networks" as the main role SAON should be fulfilling. There was, however, no real consensus over what this would entail. One of the interviewees defined the role as a "network of networks" as follows:

> "SAON should be considered as overarching network. It should be an organization that brings together national Arctic networks, and international projects and networks, e.g. EU-PolarNet, GEO Cold Regions Initiative (GEOCRI), International Arctic Systems for Observing the Atmosphere (IASOA) network, Global Terrestrial Network for Permafrost (GTN-P), etc."

Another interviewee referred to specific measures and activities SAON could and should take as "an organization of observing networks" with the following specifications:

> "SAON could, define how observational data can be useful other places/for others. (…) It could also facilitate the comparison of data over time, to see change. Add value by identifying networks and recognize that that need to keep going, SAON could assist governments to know which ones are important to sustain for those purposes. In itself it has a function that all countries are involved."

B) Organizational structure of SAON

Most of the interviewees saw that in the organizational structure of SAON, it was the National SAON Coordinating Committees that needed most work. They reported that, despite of the prominent role described for them in SAON documents, in many of states that are involved in SAON, national committees have not been formed, and/or had been largely inactive.

A little over half of the interviewees also criticized the Board for its lack of communication and coordination. In the words of one of the interviewees:

> "The SAON Board is a big and complicated body that is even hard to get together. Maybe better than others, but some discussions take place over and over again."

Most of the interviewees saw that the establishment of the two SAON Committees, the Committee on Observations and Networks (CON) and the Arctic Data Committee (ADC), had been a successful addition to the SAON organizational structure. The future functioning of the committees was, however, thought to be dependent on more sustainable future funding.

C) Funding and sustainability

The lack of resources was one of the most often mentioned challenges in getting SAON properly off the ground during the past years. In the words of one of the interviewees:

> "If you look at SAON's goals, they are big. The tasks are large and complex, but the resources are not there. Human bodies are needed to make SAON work. If you look at SAON's scope. (…) If this was a proposal to a national funding agency – it would get criticized for not having the resources to do what it sets out to do."

The interviewees connected this mismatch of SAON's goals and its resources (funding + human resources) also with the current formulation of SAON's Mission, Vision and Goals. Majority reported that even if the two first mentioned (mission and vision) are a bit vague, they were appropriate. Ten out of nineteen interviewees stated that the goals should, in contrast, be reformulated.

Majority of the interviewees saw that SAON Goals should be reformatted to include clear tasks and actions that SAON will take on. These tasks and actions should also include clear deadlines, and plans for follow-up in the form of regular progress reports etc.

The general consensus among the interviewees was that if SAON was given additional funding, it should come from the states that are involved with it. The interviewees thought that any additional funding should go to the two Committees and the Secretariat.

Majority of the interviewees highlighted that SAON itself should not become a funding organization. This view was summarized by one of them in the following statement:

> "SAON should not become a funding organization for projects. If it took on this activity, it would become too political and the structure would need to change."

D) SAON outreach and communication activities

Over half of the interviewees considered that much needed extra funding and resources would be best spent on further promoting the work of the two Committees and on the strengthening of the Secretariat. Adding funding to these two entities was seen to be necessary to enable the tracking and promotion of the success stories of SAON, such as the CBM Atlas and the national observing reviews. A few of the interviewees mentioned that at present such outreach and communication activities were almost non-existent. In the words of one of the interviewees:

> "The information on SAON activity is intended mainly for participants of the projects. If you are not involved in a SAON process, it is difficult to gain or find information of SAON or its activities."

Some of the concrete measures for the improvement of outreach and communication that the interviewees mentioned included: redesign of the SAON webpage, a quarterly SAON newsletter, and the follow-up of SAON's progress in the form of a five-year evaluation report.

III. Suggestions for future action:

3.1. Definition of a task-oriented action-plan/roadmap/business plan

At the end of the interviews, the interviewees were asked to identify priority areas in making SAON stronger (Q16). One of the issues that was most often raised in relation to this question was the formulation of new, clear, action-oriented goals for SAON.

In the words of some of the interviewees:

- ✓ "There should a clear definition of mission, vision and goals and a definition of the critical tasks that will fulfill them with deadlines."
- ✓ "More doing and less planning and talking."
- ✓ "Shift its focus from polishing grand ideas to finite products."
- ✓ "We need to make SAON more effective in actually implementing international coordination"

Other interviewees also referred to the need for such a plan during other parts of the interviews. The different terms the interviewees used in describing such plan included: a roadmap, building blocks, and a business plan.

The suggestions for the content, structure and composition of the roadmap and plan included:

- ✓ "More short-term goals (or more incremental steps)."
- ✓ "One goal could be the establishment of an annual technology forum, where atmospheric, ocean, and terrestrial working groups could come together to share information about the technologies they work with."
- ✓ "Mapping through an active and sustained dialogue what the needs and issues different observing networks have, and then using the committee structure to help them do their work better."
- ✓ Better defining what the networks referred to in SAON's name are: "We should be able to go to the national representative no matter who it is, and they should connect us to SAON."
- ✓ "We need a think tank with clear recommendations and conversations with others struggling with these issues, such as industry people. The recommendations from this think tank could later be turned into a business plan."
- ✓ "We need to come up with more objective methods to determine the nature of observing systems or the practicality of them. (…) We need Observing system evaluations (OSE) and Observing System Simulation Experiments (OSSE) to do experiments with current observing systems to determine which observations can be left out."
- ✓ "Defining better what is meant by "societal needs" as well as "stakeholders.""
- ✓ "Arctic Council working groups (and SAON) should set up concrete goals to satisfy the relationship with each other."
- ✓ "A possible 5-year-plan that included a funding plan and a strong and robust communication plan."
- ✓ "SAON should develop working groups where principal investigators of similar observing networks can come together and exchange information."

- ✓ "The process should be marketed and approached in relation to global trends (UNEP, EU, etc.) in data collection, storage, and organization."
- ✓ "The next project in SAON should be the beginning of the formalization process for gaining sustained funding from the states involved in the process. We should come up with a clear definition of how much funding SAON should have and how it should be spent."
- ✓ There should be more discussion about "operational monitoring". "By this we mean a discussion about monitoring in regards to governance. In other words, more emphasis should be put on discussing observations and measuring in association with attempts of management."
- ✓ "SAON should help to involve countries in development of data standards, in facilitating interoperability of data and observational systems. SAON should help to solve specific problems of data exchange on national level."
- ✓ "If SAON could establish a system of observations and fast and uninterrupted exchange of high-quality data in the Arctic, it would be the champion among all Arctic Scientific Organizations."
- ✓ "SAON should reach out and organize data gathering that is going on outside universities with private organizations, industry etc."
- ✓ "SAON should consider undertaking work to support, or perhaps political statements that support, Arctic observing activities that might be undertaken at the global scale under other initiatives. For example, SAON could advise the Arctic Council to lend its support to the Arctic observation initiatives of the WMO."
- ✓ "SAON could produce statements, endorsed by its leadership in the Arctic Council and IASC, that state that gaps exist in Arctic observing and that there are international bodies that can help address these gaps (e.g. IOC, WMO) and to which member states of the Arctic Council already belong. A level of commitment of sustained investment in Arctic observing could be encouraged by SAON."

The need for a clearer task-oriented operational plan was also connected to need to reformulate the Goals of SAON's Mission, Vision, and Goals.

3.2. Re-defining SAON's Goals

Majority of the interviewees thought that despite the SAON Mission and Vision being very broad, they were, in general, appropriate. Many of them had, however, problems with the current formulation of SAON's Goals. They were seen to be too broad and in need of more clear, action-oriented terms, such as the actions in the aforementioned roadmaps. One of the interviewees connected the need to redefine SAON's Goals to the more general need for SAON to focus on action rather than policy with the following words:

> "The big themes will always be there. Many of the themes in the 2016 document have been on the table for the past 25 years as discussion pieces. We should move more away from that and towards things that are at the level of concrete things we can do."

Another mentioned that more declarations would not improve the area of data management:

> "There will never be a perfect way for data management or sharing. We need to have something concrete to show and discuss at the ministerial meeting and now the committees are a little unstructured and not ambitious enough."

Suggestions for more specific goals SAON could adopt were in line with the aforementioned suggestions for the content, structure and composition of a SAON roadmap.

In relation to SAON's Mission, Vision and Goals (MV&G), some of the interviewees also drew attention to the possibly misleading nature of the word "implement" used in the third part of the Mission, Vision and Goals presented to them:

> "Implement the goal to enhance Arctic-wide observing activities by facilitating partnerships and synergies among existing observing and data networks and promoting the synthesis of data and information".

One interviewee mentioned how:

> "Part #3 can be misleading. People see the word "implement" and think SAON should be building an observing system, including the data system. This can be confusing. That may need some work if you want to communicate more the facilitation/coordination role of SAON."

Another interviewee raised concern over the formulation of the goals with the following words:

> "The last point should rather be on FACILITATION. Implementation promises too much, especially as SAON does not focus or provide funding. SAON should promise things that it can actually achieve."

Two of the interviewees also raised a question in regards to the usage of sustaining in the title of SAON. In their words:

> "Sustaining" is a verb – to sustain Arctic Council observer networks. But how do you sustain? There must be some funding mechanism, rather than just relying on the observing community. I do like the sustaining piece, but it requires strong leadership and resources for this."

> "Perhaps the name of SAON should be changed from Sustaining Arctic Observing Networks to Strategic Arctic Observing Networks. This name change might enable SAON to align more closely with other Arctic or global observing programs."

3.3. Organizational changes

National SAON Coordinating Committees

The part of SAON's organizational structure that was seen to be most lacking in input, structure and coordination was the National SAON Coordinating Committees.

Suggestions for how to improve the work of the National SAON Coordinating Committees included:

- ✓ "The SAON board needs to review the National SAON Coordinating Committee structure country-by-country and see if there is some way they could offer their international status to help them get more active. SAON has the international mandate to do what they do, but are they getting support from nations?"
- ✓ "The tasks of the National SAON Coordinating Committees have not been clearly indicated. Their performance should be reviewed by the SAON Board."
- ✓ "The national committees should be widely knowledgeable about what is happening in their country on Arctic observing, what are the policies and priorities and state of funding." Possible examples of how similar initiatives have been executed before that were mentioned by the interviewees included: The US Interagency Arctic Research Policy Committee (IARCP), the compilation of the Canadian inventory on Arctic Monitoring Activities.
- ✓ "Submission of annual national reports should be mandatory."
- ✓ "National SAON Coordinating Committees could help clarify or generate engagement – then, when there are bigger Arctic Council initiatives, countries could find and mobilise resources and generate engagement."
- ✓ "They should be able to maintain the national inventories of observations."

- ✓ "Ideally, the national representatives who are members of the SAON Board, and the two Committees (CON and ADC) are also members of the National SAON Coordinating Committees."
- ✓ "We should post on the SAON website a page from each country describing how the Arctic stuff works in their country and their accomplishments."
- ✓ "One of the main problems SAON should address is how to get national funding coordinated for international cross-border observation."
- ✓ "Indigenous representatives should be part of national coordination."
- ✓ "In many Arctic countries there are the systems of monitoring and information systems which satisfy national interests. A benefit from the international cooperation are existing but it is not obvious. It is necessary to show on concrete examples benefits for the country from participation in the project SAON."
- ✓ "The national committees could consist of about three people (one from each area of observation). They would be chaired by a national science fund employee. This would ensure that the voice of the field (what is required) would be combined with the power of making things happen (national research council person)."
- ✓ "SAON work should be a national priority, in order for resources to be identified for the future, within the countries, they should live up to the commitment, this should not be much to ask for the national level, quite well by the secretariat few committed people to work."

One of the interviewees highlighted how the national level coordination "cannot be improved until the role of SAON and the tangible products it can offer are clarified and decided upon".

SAON Committees

The formulation of the two SAON Committees, the Committee on Observations and Networks (CON) and the Arctic Data Committee (ADC), was seen as a welcomed addition to the SAON structure. When asked about where possible extra funding should go, the SAON committee work came up most often.

The interviewees evaluated the work and mandate of the Data Committee very highly. In the specific words of one of the interviewees: "The ADC has undertaken relevant and valued work packages that complement the larger data management universe." The mandate and work done in the Committee on Observing Networks were, in contrast, not thought to be very clear, visible or efficient yet.

Suggestions for improvement of the committee work included:

- ✓ "The committees should be coming up with proposals to send back to the national representatives to get funding. We need to get coalitions in the committees, then get national support."
- ✓ Making the roles of the committees clearer to the community.
- ✓ "The action items and their roadmap of each meeting must be clear and reported each time"
- ✓ "Less is more in terms of the committees and task forces. We need to agree on something concrete at the more structural level of cooperation in the committees."

SAON Board

Many of the interviewees were not satisfied with the work, communication and/or composition of the SAON Board. In the words of one of them:

> "We know by default that most board members represent government agencies and national institutes, and they may not represent the true breadth of observing capacity and observing needs. Whatever is nested under them won't function well in that case. We don't need necessarily a new structure, but we

> need somehow to have a better way to ensure the board reflects the broader observing capacity, especially from academic institutions and stakeholders."

Suggestions for improvement of the functioning of the SAON Board included:

- ✓ "The range of each SAON Board meeting's responsibility should be clearly stated beforehand, and the meetings followed by clear action items, roadmap and report to members."
- ✓ "Alongside a national representative, someone who possesses all information on the national Arctic observing activities needs to participate in the SAON board meetings."
- ✓ "One concrete example of the lack of communication of SAON is that I do not know who the board members are. I also have no idea what they are doing. This kind of information should be provided regularly in the form of a short and concise newsletter for example."

Secretariat

The Secretariat, and its one part-time employee, was the second part of the SAON organization that was identified by most of the interviewees as a priority for possible additional funding. Below are quotes from three different interviewees, regarding the need to increase the funding of the SAON Secretariat.

> "The current framework of the SAON is not sufficient for the coordination of Arctic observing networks and data management. The secretariat should be strengthened and more funding needed for it. The system needs to report the action items and roadmap, and check them is necessary."

> "The SAON secretariat should become a point where different observing networks would go when they were running out of funding. It should be able to refer the researchers in individual networks to entities that could provide such funding. The Secretariat could even manage a small emergency fund itself that different states and international organizations contributed to. In this work the special focus should be on facilitating ways of getting funding for cross-border observing."

> "SAON coordination requires organization, outreach, info gathering, reporting etc. The secretariat service need resources behind it."

3.4. Improvement of outreach and communication

Most of the interviewees saw that SAON's internal and external communication and outreach activities were in the need of major improvements.

Internal communication and outreach

Many of the interviewees reported that the different parts of the SAON organization were not communicating effectively nor on a regular basis with one another. One of the interviewees connected the lack of communication to the prominent role the Arctic Observing Summit (AOS) has come to hold in relation to SAON:

> "AOS has become the face of SAON because we do not know what else is going on with SAON. "

Another interviewee linked problems in SAON's internal communication with SAON's mission:

> "There is a real need to know who is doing what and where in Arctic observing. If this knowledge could be obtained and then shared, it would greatly help enable SAON coordination and assist in reaching its vision."

The suggestions for improvement of internal communication were in association with the aforementioned suggestions to strengthen the Secretariat, come up with a clear roadmap, and clarify the terms and responsibilities of national coordination.

External communication and outreach

The general message that the interviewees sent out regarding the need for improvement of SAON's external outreach communication was that this should come only after there has been a clear change from planning to action. In the words of one of interviewee:

> **"**The content of outreach links backs to resources. As SAON evolves, we have more to say. It's not just how well written the content is, but you need to have something to report on. (…) The first priority is to have something to communicate."

Another interviewee confirmed this message by stating:

> "Before SAON can establish any of this [further cooperation, outreach, and increased funding] it needs to have a tangible product. That is a "wow-factor" that it could sell and that would ensure interest of networks as well as governments and communities."

Suggestions for improving SAON's external communication and outreach included:

- ✓ "SAON needs to start with working on its image as well as on the promotion of its individual tasks and organizations that are involved in it. It also needs to communicate what it could do. Concrete ways of doing this include brochures, talks and meetings."
- ✓ "SAON should make its website more accomplishment oriented."
- ✓ "If you go to the SAON website, it's good about hosting minutes. They're doing a good job of that. The website is being used in a good way, but it could push information out more."
- ✓ "SAON needs a fully developed social media strategy and implementation plan."
- ✓ "One thing needed with SAON is different outreach and communication for different audiences, some are scientists and some are communities. Targeted outreach for different audiences."
- ✓ We need a lobbyist to get to decision-makers and politicians.
- ✓ "As communities of Arctic science, AMAP and CAFF conduct a lot of synthesis work that they then communicate really well; SAON could maybe learn some lessons and catch up."
- ✓ "If SAON could work with AC Working Groups maybe savings could be found and greater efficiencies obtained."
- ✓ "SAON members should reach out at conferences, workshops and other Arctic forums to spread information about the specific successful SAON projects in the field of organization of Arctic observations and data exchange."
- ✓ "Need to make an effort to find out about SAON, initial contact should be made from SAON, and follow that up as well."
- ✓ "SAON should take advantage of these internal mechanisms within the Arctic Council. SAON could be an advocate for Arctic observing, and when there are Arctic monitoring activities being proposed by international science organizations, then SAON could be an advocate at the Arctic Council level to support these other observing activities."

Specific entities the external outreach was seen to need to target included:

- ✓ "More alignment and engagement with existing FUNDED observing networks and initiatives like GEO, EU-PolarNet or global programs like the WMO's initiative on PORS (Polar Observations, Research and Services), YOPP (Year of Polar Predictions), WMOMETAREAS (Meteorological Areas of

the Arctic), and the Global Cryosphere Watch (GCW), as well as Global Greenhouse Monitoring, and the IOC Global Ocean Observing Systems."

- ✓ "The need for Polar Observations will continue to be a priority within the WMO for the next ten years. There are excellent synergies that should be explored between organizations of SAON and WMO."
- ✓ "I would like SAON to tie to the modeling community. That could benefit SAON down the road – generate more rationale for particular type of observations – construct pictures of the current state. It could be a win-win there."
- ✓ "We need to get different countries to pitch in. China is pushing technology: ask them to provide funding to support a working group on technology for High Arctic sustained observations in the marine environment."
- ✓ "SAON should take contact with the existing observation networks, and exchange information, ideas, and requests. IASC has many partners, and there are international frame works like GEO which can work collaboratively with SAON."
- ✓ "In making the needed organizational changes in SAON, using some presently existing organization such as UN or WMO may proof beneficial."
- ✓ "SAON should investigate see how other organizations such as UNEP promote their data and seek guidance and cooperation with them. There are entities that SAON has touched based with, but the cooperation with them is not well structured or professional. Maybe there could be an advisory council with bigger international scientific organizations to further facilitate and guide the development of SAON. The focus in this cooperation should be cooperation rather than competition."
- ✓ "A lot of the EU environmental data mandates cover parts of the Arctic. The EEA database also captures a lot of data done by non-Arctic EU members states such as Germany (and at least until now) the UK."
- ✓ "It is necessary to work more actively with the existing international (WMO, IASC) and national networks."
- ✓ "The Arctic Council Ministers represent governments, and governments must understand that observations are the underpinnings of predictions of future conditions in which economic opportunities can be achieved (e.g. fisheries, shipping, navigation, etc.). These observations need to be long-term and only governments can provide this long-term investment."

Appendix E. Listing of Interviewees

Listing of Interviewees

	Name	Organization	Reason for Interviewing:
1.	David Hik	University of Alberta, Canada	Former Vice-Chair of SAON Board and co-chair of SAON Steering Group (SAON-SG)
2.	John Calder	Retired from NOAA, USA	Former Chair AMAP WG and co-chair of SAON Steering Group (SAON-SG)
3.	Halldor Johannesson	Arctic Portal, Iceland	Responsibilities on Arctic data management
4.	Nikolaj Bock	European Environmental Agency	Member of SAON Board
5.	Eva Kruemmel	Inuit Circumpolar Council, Canada	Member of SAON Board and SAON Executive
6.	Terry Callaghan	INTERACT, Sweden	Representative of SAON networks
7.	Sandy Starkweather	NOAA and International Arctic Systems for Observing the Atmosphere (IASOA), USA	Representative of SAON networks
8.	Lisa Loseto	Fisheries and Oceans Canada, Canada	Chair, SAON Committee on Observations and Networks
9.	Carolina Behe	ICC Alaska, USA	Indigenous organization
10.	Jim Gamble	Aleut International Association. USA	Member of the SAON Board
11.	Hajo Eicken	Director, International Arctic Research Center, University of Alaska Fairbanks, USA	Scientist engaged in Arctic observational activities
12.	John Walsh	Chief Scientist, International Arctic Research Center, USA	Scientist engaged in Arctic observational activities
13.	Peter Pulsifer	ELOKA project, USA	Chair, IASC/SAON Arctic Data Committee
14.	Tetsuo Ohata	National Institute of Polar Research, Japan	Member of the SAON Board
15.	Hiroyuki Entomoto	National Institute of Polar Research, Japan	Member of the AOS Organizing Committee
16.	Yoo Kyung Lee	Korea Polar Research Institute, South Korea	Executive Officer of IASC and member of the SAON Board

Appendix E. Listing of Interviewees

17.	Alexander Klepikov	Arctic and Antarctic Research Institute of Roshydromet, Russia	Member of AMAP Working Group
18.	Igor Ashik	Arctic and Antarctic Research Institute of Roshydromet, Russia	Member of the SAON Board
19.	David Grimes	President, World Meteorological Organization	WMO is a parent organization of SAON; staff are members of SAON

Sustainable Arctic Observing Networks (SAON): External Review

1. Background

In the Salekhard Declaration (2006), the Arctic Council "Urges all Member countries to maintain and extend long term monitoring of change in all parts of the Arctic, and request the Arctic Monitoring and Assessment Programme (AMAP) to cooperate with other Arctic Council Working Groups, the International Arctic Science Committee (IASC) and other partners in efforts to create a coordinated Arctic Observing network that meets identified societal needs".

The Sustaining Arctic Observing Networks (SAON) was established following the Nuuk Declaration in 2011[1]. In the report to the Nuuk meeting, the Senior Arctic Officials (SAOs) of the Arctic Council had decided that "The SAOs will review the SAON structure in two to four years' time and make any necessary adjustments to the structure at that time"[2].

This is further detailed in the SAON Terms of Reference[3]: "In order to both ensure the success of SAON, as well as the effective implementation of its tasks, activities and related operations, an external body will review SAON on a periodic basis to be determined by the SAON Board in consultation with the AC and IASC. The SAON Board will develop details for implementation of, and response to, the review during and in between its formal meetings".

This document is the plan for the review, and it has four parts 1) Background, 2) The Review Committee 3) The Survey, and 4) Timelines.

The review will be conducted by a Review Committee, and is planned to take place in early 2016. The review will have two goals: It will look backward and investigate how SAON has met its mandate in the past, but will also look forward and give future directions on the development of SAON.

AMAP, IASC, The Association of Polar Early Career Scientists (APECS), and The Scientific Committee on Antarctic Research (SCAR) have conducted similar reviews in the past years, and background documents from these reviews have been consulted in the preparations for this document[4-7].

2. The Review Committee

2.1 Review Committee composition

The Committee members shall be experts of international recognition with a broad understanding of Arctic observations and policy. The expertise of the members shall cover the whole perspective of SAON goals and objectives, considering geographical, age and gender balance. The Committee will have five members, and in order to cover the breath of SAON, it will ideally cover these areas:

(1) Scientific community
(2) Governmental agency
(3) Indigenous

(4) Industry
(5) Global observing systems

The reviewers should be independent, have some knowledge about SAON, but not have been involved in SAON work for at least the past five years. Independent secretariat support will be provided.

2.2 Terms of Reference for the Review Committee

The Review Committee should evaluate SAON with particular focus on:

- The organizational structure of SAON
- The extent to which current SAON activities is fulfilling its original mission
- The SAON outreach and communication activities
- Providing suggestions for additional and future activities for SAON, including meeting frequencies and intersessional activities
- The question of funding and sustainability of SAON

A major activity of the review will be to conduct a survey among SAON stakeholders. The Review Committee will receive a proposal on the contents of the survey from the Board, but the Review Committee will make the final decision on the composition of the survey.

In addition, the Committee should study these background documents:

- SAON Terms of Reference
- SAON Overview document:
    - SAON history before and after the Nuuk Declaration (brief)
    - Committee mandates and activities (web site, work plans)
    - SAON outreach activities (web site, newsletter, Facebook, Arctic Observing Summit, Polar Data Forum)
    - SAON national and organization reports
    - Overview of networks and projects
    - Funding (fiscal, in-kind, Secretariat)
- Selected SAON products: CBM Atlas, Project Directory and MetaData Search Facility
- Minutes from meetings of the SAON Board, Executive, and Committees

The Committee is welcome to interview persons that have been involved in SAON since the beginning, with the aim of providing insight into the relationship between the SAON mission and SAON's past and present activities.

The Committee should report back to the SAON Board on its findings in September 2016. The volume of the report is expected to be 5-10 pages + appendices

3. The Survey

The survey will provide feedback from the community and will be an important input to the Review Committee work. It is proposed that it should have a backward looking component and a forward looking

component. The backward looking component would outline the visions and principles for SAON as formulated by the SAON Initiating Group, Steering Group and Board, and it would ask the reviewers if SAON has properly addressed these. In the forward looking component respondents would be asked to formulate wishes, recommendations and expectations with regards to SAON's future development.

It is expected that the knowledge about SAON among the wider group of stakeholders is limited. It is also expected that a second group of stakeholders (Board members, Committee members, AC SAOs, AC WGs, and IASC Council) has a more detailed insight into SAON and its business. The proposal is consequently to organize an open survey, in principle accessible to anyone, but also to have a closed part directed towards the second stakeholder group. Questions in the open part could be organized under the headings: 1) Introductions, 2) The Need, 3) Outcomes, and 4) Awareness and Outreach. Additional questions in the closed part would be included under the headings 5) The SAON Committees, and 6) The SAON Organizational Structure.

The secretariat supporting the work will send out the survey to the respondents and will provide the analysis to the Review Committee.

4. Timelines

- 2 December: Draft review plan presented to Board
- 15 December: Board to provide comments and provide reviewer candidate names
- 8 January: New version of plan circulated
- 15 January: Board approval of plan
- 15 January: Draft survey presented to Board
- 22 January: Overview document finalised
- 22 January: Review Committee appointed
- 22 January: Board provide written input to the survey
- Mid-End March2016: Review Committee telephone conference
- 15 April: Review Committee releases survey contents
- 4 May: Survey is coded by SAON Secretariat and made available
- 17 June: Survey is completed
- 1 July: Survey database and analysis handed over to Review Committee
- Mid-August 2016: Review Committee physical meeting
- Mid-October 2016: Review report published

5. References

1) Nuuk Declaration (2011): https://oaarchive.arctic-council.org/handle/11374/92
2) Senior Arctic Officials (SAO) Report to Ministers, Nuuk, Greenland, May 2011: http://www.arcticobserving.org/images/pdf/Board_meetings/5th_tromso/sao_report_to_ministers_-_nuuk_ministerial_meeting_may_2011.pdf
3) SAON Terms of Reference: http://www.arcticobserving.org/images/pdf/Board_meetings/4th_potsdam/34_saon%20terms%20of%20reference.doc
4) An International Review and Strategy for the IASC Council: http://iasc25.iasc.info/images/history/reviews/IASC-2007-Review-and-Strategy-Paper.pdf
5) External Review of the Arctic Monitoring and Assessment Strategy: http://www.amap.no/documents/download/985
6) Survey on SCAR Organisational Structure (2015): https://www.facebook.com/permalink.php?id=282292838637823&story_fbid=351728355027604
7) APECS Organisational Review (2015): http://www.apecs.is/who-we-are/organisational-review-2015.html
8) Plan for the Implementation Phase of SAON: http://www.arcticobserving.org/images/pdf/Board_meetings/5th_tromso/saon_report_february_2011 2.pdf

Introduction to SAON

The process for developing the Sustaining Arctic Observing Networks (SAON) was initiated by the Arctic Council and has been underway since early 2007. It was formally established following a decision of the Arctic Council Ministerial Meeting in 2011.

Its purpose is to support and strengthen the development and multinational engagement for sustained and coordinated pan-Arctic observing and data sharing systems that serve societal needs, particularly related to environmental, social, economic and cultural issues.

SAON promotes the vision of well-defined observing networks that enable users to have access to free, open and high quality data that will realize pan-Arctic and global value-added services and provide societal benefits. Its goal is to enhance Arctic-wide observing activities by facilitating partnerships and synergies among existing observing and data networks, and promoting sharing and synthesis of data and information.

SAON itself does not undertake science planning, policy setting, observations, data archival, or funding of these efforts, which remain the responsibility of the ongoing networks/sites/systems and data centers, the organizations that support them, or appropriate policy officials.

(From "Plan for the Implementation Phase of SAON")

Members of the SAON Board are Arctic and non-Arctic countries, Arctic Council Permanent Participants (indigenous peoples' organizations), a number of international organizations (EEA, EU, GEO, ICES, IPA, ISAC, PAG, WMO, and more) and Arctic Council Working Groups. The SAON Board is currently chaired by Christine Daae Olseng, The Research Council of Norway, and Larry Hinzman, University of Alaska Fairbanks, USA, is vice-chair.

The Arctic Council is implementing the SAON initiative together with theInternational Arctic Science Committee (IASC) and the World Meteorological Organization (WMO). Secretariat support to SAON is provided through the Secretariat of the Arctic Monitoring and Assessment Programme (AMAP) and IASC.

The activities of SAON mainly take place in two Committees: The Arctic Data Committee (ADC) and the Committee on Observations and Networks (CON). The mandates of the two Committees are:

- Arctic Data Committee: The Committee should give advice to the SAON Board on how to meet its vision from the point of view of information and data services keeping in mind the IASC Statement of Principles and Practices for Arctic Data Management.
- Committee on Observations and Networks: The Committee (…) should give advice to the SAON Board on how to fund, coordinate and expand the scope of arctic observational activities and address the questions of how to ensure sustainability of observational platforms in the Arctic and how easier access to them can be achieved

A key component of SAON is education and outreach, with the biennial Arctic Observing Summit serving as SAON's major outreach event, in addition to a web site and Facebook presence

Appendix G. Survey questionnaires (both Open and Directed Surveys)

Funding for the Secretariat functions is provided by AMAP and IASC. All other SAON activities are funded by the participants or by financial sponsors in response to proposals from the participants. SAON does not collect funds to support travel or any other activity. Thus participants on the SAON Board are responsible for covering their own expenses or for finding a funding source.

The SAON Board has established an External Review Committee to conduct an external review of SAON. The plan for the review states that the Committee should organise a survey among Arctic stakeholders. The survey will be conducted using two different versions: a general version for those less familiar with the inner workings of SAON, and a version that also asks about internal processes and structures of SAON. The outcomes of the survey will be used to inform the External Review Committee's deliberations and be part of the report that the External Review Committee delivers to the SAON Board in 2016.

The External Review Committee was provided with a background document from the SAON Secretariat, which included specifics on the functioning of SAON to assist in ensuring that the External Review Committee was well informed.

There are 32 questions in the survey, and two of these are mandatory. They are marked with an '*'.

1. General information

* 1. Your Country/City/Region?

2. Your Organization/Role/Position?

* 3. What is your area of expertise?

4. Gender?

5. Age (Years)?

6. If you are involved in SAON, what is your role?

2. The Need for SAON / The SAON Mission, Vision and Goal

7. The SAON Mission, Vision and Goals are:

- Support and strengthen the development of multinational engagement for sustained and coordinated pan-Arctic observing and data sharing systems that serve societal needs, particularly related to environmental, social, economic and cultural issues.
- Promote the Vision of well-defined observing networks that enable users to have access to high quality data that will realize pan-Arctic and global value-added services and provide societal benefits. Implement the Goal
- to enhance Arctic-wide observing activities by facilitating partnerships and synergies among existing observing and data networks ("building blocks"), and promoting sharing and synthesis of data and information.

Do you believe that the Mission, Vision and Goals provide a clear articulation of SAON's purpose?

- ◯ Yes
- ◯ No
- ◯ Don't know

Please specify:

8. What do you see as the current role of SAON?

Please rank these options:

	No importance				Very important
Coordination	○	○	○	○	○
Information exchange	○	○	○	○	○
Data management	○	○	○	○	○
Outreach	○	○	○	○	○
Conferences	○	○	○	○	○
Funding	○	○	○	○	○
Data policy	○	○	○	○	○
Facilitating partnerships and synergies among existing observing and data networks	○	○	○	○	○

Other (please specify):

9. Do you believe that SAON's current activities are helping it fulfil its original mission?

○ Yes

○ No

○ Don't know

Please specify:

10. What kind of role would you like to see SAON play in the future?

11. Do you believe that community based observations and indigenous traditional knowledge are adequately supported by SAON?

○ Yes

◯ No

◯ Don't know

Please specify:

3. Awareness and Outreach

12. Do you know about the Arctic Observing Summit?

◯ Yes

◯ No

13. Do you know that the Arctic Observing Summit is a SAON sponsored outreach event?

◯ Yes

◯ No

14. Do you feel sufficiently informed about SAON activities?

◯ Yes

◯ No

15. If 'Yes', how are you informed of these activities?

16. If 'No', what would be required to provide you with sufficient information?

17. In your view, what are the most effective communication platforms that SAON should use? Please rank these options:

	No relevance				Highly relevant
Web site	◯	◯	◯	◯	◯
Newsletter	◯	◯	◯	◯	◯

Facebook	○	○	○	○	○
Twitter	○	○	○	○	○
Google +	○	○	○	○	○
LinkedIn	○	○	○	○	○

Other (please specify)

18. What has been your own contribution to communicating about and raising the awareness of SAON?

4. The SAON Organizational Structure

19. SAON is a „nested“, community driven organization and this results in many levels of organization. The SAON organisational structure has these components:

- SAON Board
- National SAON Coordinating Committees
- ADC and CON Committees
- SAON Executive
- SAON Secretariat

(From “Plan for the Implementation Phase of SAON”)

In your opinion, is this model appropriate and working (Please explain)?

20. Does the model provide sufficient interaction with observing networks and projects (Please explain)?

21. Is the Committee structure appropriate and working (Please explain)?

22. Do you see the need for any additional SAON committees or other SAON-related bodies (Please explain)?

23. How would you like to interact with SAON in the future?

24. Do you have suggestions for additional and/or future activities for SAON? For example comments on meeting frequency and intersessional activities?

25. AMAP and IASC are providing secretariat support to SAON. The Norwegian government through AMAP pays the costs of the position as the SAON Secretary. Part of the time of the IASC Executive Secretary is allocated to supporting SAON.
The support to the Chairs and vice-Chairs of the Board has been provided as in-kind contributions from the respective countries (Canada, Norway, and USA). Similarly, the Chairs of the SAON Committees are supported by Canada and USA. Participation in SAON activities, including the meetings of the SAON Board and Committees is at the expense of the participating nations and organisations.

Do you have comments or suggestions on the current funding of SAON or on the future sustainability of SAON?

5. Outcomes

26. Given the current structure and funding, do you believe SAON is achieving its goals?

- ◯ Yes
- ◯ No

27. The Mission says that SAON should "support and strengthen the development of multinational engagement for sustained and coordinated pan-Arctic observing and data sharing systems that serve societal needs, particularly related to environmental, social, economic and cultural issues"
Please rank these statements:

Appendix G. Survey questionnaires (both Open and Directed Surveys)

	Totally disagree				Totally agree
SAON is meeting these expectations when it comes to environmental issues	○	○	○	○	○
SAON is meeting these expectations when it comes to social issues	○	○	○	○	○
SAON is meeting these expectations when it comes to economic issues	○	○	○	○	○
SAON is meeting these expectations when it comes to cultural issues	○	○	○	○	○

28. Given the SAON mission, what kind of outcomes/services would you like to see from SAON?

29. From your perspective, should SAON improve its relationships with any particular organization(s) representing:

- ☐ Scientists
- ☐ Funding agencies
- ☐ Educators
- ☐ Arctic Indigenous Peoples
- ☐ Arctic residents
- ☐ International organizations
- ☐ NGOs
- ☐ Don't know

Other (please specify)

30. Do you feel that that national level of coordination of SAON related activities is sufficient in your country?

31. In your opinion, what are the three most critical contributions by SAON over the past 5 years (2011– 2016)

6. Comments

32. Do you have any other comments that you would like the Review Committee to consider?

Appendix G. Survey questionnaires (both Open and Directed Surveys)

Introduction to SAON

Текст опроса на русском языке можно найти здесь в формате PDF

The process for developing the Sustaining Arctic Observing Networks (SAON) was initiated by the Arctic Council and has been underway since early 2007. It was formally established following a decision of the Arctic Council Ministerial Meeting in 2011.

Its purpose is to support and strengthen the development and multinational engagement for sustained and coordinated pan-Arctic observing and data sharing systems that serve societal needs, particularly related to environmental, social, economic and cultural issues.
SAON promotes the vision of well-defined observing networks that enable users to have access to free, open and high quality data that will realize pan-Arctic and global value-added services and provide societal benefits. Its goal is to enhance Arctic-wide observing activities by facilitating partnerships and synergies among existing observing and data networks, and promoting sharing and synthesis of data and information.

SAON itself does not undertake science planning, policy setting, observations, data archival, or funding of these efforts, which remain the responsibility of the ongoing networks/sites/systems and data centers, the organizations that support them, or appropriate policy officials.
(From "Plan for the Implementation Phase of SAON")

Members of the SAON Board are Arctic and non-Arctic countries, Arctic Council Permanent Participants (indigenous peoples' organisations), a number of international organisations (EEA, EU, GEO, ICES, IPA, ISAC, PAG, WMO, and more) and Arctic Council Working Groups. The SAON Board is currently chaired by Christine Daae Olseng, The Research Council of Norway, and Larry Hinzman, University of Alaska Fairbanks, USA, is vice-chair.

The Arctic Council is implementing the SAON initiative together with the International Arctic Science Committee (IASC) and the World Meteorological Organization (WMO). Secretariat support to SAON is provided through the Secretariat of the Arctic Monitoring and Assessment Programme (AMAP) and IASC.

The activities of SAON mainly take place in two Committees: The Arctic Data Committee (ADC) and the Committee on Observations and Networks (CON). The mandates of the two Committees are:

- Arctic Data Committee: The Committee should give advice to the SAON Board on how to meet its

vision from the point of view of information and data services keeping in mind the IASC Statement of Principles and Practices for Arctic Data Management.

- Committee on Observations and Networks: The Committee (…) should give advice to the SAON Board on how to fund, coordinate and expand the scope of arctic observational activities and address the questions of how to ensure sustainability of observational platforms in the Arctic and how easier access to them can be achieved

A key component of SAON is education and outreach, with the biennial Arctic Observing Summit serving as SAON's major outreach event, in addition to a web site and Facebook presence.

Funding for the Secretariat functions is provided by AMAP and IASC. All other SAON activities are funded by the participants or by financial sponsors in response to proposals from the participants. SAON does not collect funds to support travel or any other activity. Thus participants on the SAON Board are responsible for covering their own expenses or for finding a funding source.

The SAON Board has established an External Review Committee to conduct an external review of SAON. The plan for the review states that the Committee should organise a survey among Arctic stakeholders. The survey will be conducted using two different versions: a general version for those less familiar with the inner workings of SAON, and a version that also asks about internal processes and structures of SAON. The outcomes of the survey will be used to inform the External Review Committee's deliberations and be part of the report that the External Review Committee delivers to the SAON Board in 2016.

The External Review Committee was provided with a background document from the SAON Secretariat, which included specifics on the functioning of SAON to assist in ensuring that the External Review Committee was well informed.

There are 25 questions in the survey, and two of these are mandatory. They are marked with an '*'.

1. General information

* 1. Your Country/City/Region?

2. Your Organization/Role/Position?

* 3. What is your area of expertise?

4. Gender?

5. Age (Years)?

6. If you are involved in SAON, what is your role?

2. The Need for SAON / The SAON Mission, Vision and Goal

7. The SAON Mission, Vision and Goals are:

- Support and strengthen the development of multinational engagement for sustained and coordinated pan-Arctic observing and data sharing systems that serve societal needs, particularly related to environmental, social, economic and cultural issues.
- Promote the Vision of well-defined observing networks that enable users to have access to high quality data that will realize pan-Arctic and global value-added services and provide societal benefits. Implement the Goal
- to enhance Arctic-wide observing activities by facilitating partnerships and synergies among existing observing and data networks ("building blocks"), and promoting sharing and synthesis of data and information.

Do you believe that the Mission, Vision and Goals provide a clear articulation of SAON's purpose?

- ◯ Yes
- ◯ No
- ◯ Don't know

Please specify:

8. What do you see as the current role of SAON?

Please rank these options:

	No importance				Very important
Coordination	○	○	○	○	○
Information exchange	○	○	○	○	○
Data management	○	○	○	○	○
Outreach	○	○	○	○	○
Conferences	○	○	○	○	○
Funding	○	○	○	○	○
Data policy	○	○	○	○	○
Facilitating partnerships and synergies among existing observing and data networks	○	○	○	○	○

Other (please specify):

9. Do you believe that SAON's current activities are helping it fulfil its original mission?

○ Yes

○ No

○ Don't know

Please specify:

10. What kind of role would you like to see SAON play in the future?

11. Do you believe that community based observations and indigenous traditional knowledge are adequately supported by SAON?

- ◯ Yes
- ◯ No
- ◯ Don't know

Please specify:

3. Awareness and Outreach

12. Do you know about the Arctic Observing Summit?

- ◯ Yes
- ◯ No

13. Do you know that the Arctic Observing Summit is a SAON sponsored outreach event?

- ◯ Yes
- ◯ No

14. Do you feel sufficiently informed about SAON activities?

- ◯ Yes
- ◯ No

15. If 'Yes', how are you informed of these activities?

16. If 'No', what would be required to provide you with sufficient information?

17. In your view, what are the most effective communication platforms that SAON should use? Please rank these options:

	No relevance				Highly relevant
Web site	◯	◯	◯	◯	◯
Newsletter	◯	◯	◯	◯	◯
Facebook	◯	◯	◯	◯	◯

Twitter	○	○	○	○	○
Google+	○	○	○	○	○
LinkedIn	○	○	○	○	○

Other (please specify)

18. What has been your own contribution to communicating about and raising the awareness of SAON?

4. Outcomes

19. Given the current structure and funding, do you believe SAON is achieving its goals?

○ Yes

○ No

20. The Mission says that SAON should "support and strengthen the development of multinational engagement for sustained and coordinated pan-Arctic observing and data sharing systems that serve societal needs, particularly related to environmental, social, economic and cultural issues"
Please rank these statements:

	Totally disagree				Totally agree
SAON is meeting these expectations when it comes to environmental issues	○	○	○	○	○
SAON is meeting these expectations when it comes to social issues	○	○	○	○	○
SAON is meeting these expectations when it comes to economic issues	○	○	○	○	○
SAON is meeting these expectations when it comes to cultural issues	○	○	○	○	○

21. Given the SAON mission, what kind of outcomes/services would you like to see from SAON?

22. From your perspective, should SAON improve its relationships with any particular organization(s) representing

- [ ] Scientists
- [ ] Funding agencies
- [ ] Educators
- [ ] Arctic Indigenous Peoples
- [ ] Arctic residents
- [ ] International organizations
- [ ] NGOs
- [ ] Don't know

Other (please specify)

23. Do you feel that that national level of coordination of SAON related activities is sufficient in your country?

24. In your opinion, what are the three most critical contributions by SAON over the past 5 years (2011– 2016)

5. Comments

25. Do you have any other comments that you would like the Review Committee to consider?