GLOBAL RESEARCH COUNCIL

21st Century Public Engagement and Mission-orientated Research: **ADVANCING SUSTAINABLE FUTURES FOR ALL**

Expanded Case Studies

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Department of Science and Innovation (DSI) – National Research Foundation (NRF) Centres of Excellence (CoEs)	National Research Foundation, South Africa	South Africa
The Strategic Innovation Programmes (SIP)	Swedish Research Council for Sustainable Development; Vinnova, Sweden's innovation agency; Swedish Energy Agency	Sweden
National Research Programmes	Vetenskapsrådet, Swedish Research Council	Sweden
National Research Priority Programme (NPRP) – Cluster Track, NPRP-C	Qatar National Research Fund	Qatar
Thematic Grand Challenge Research Programme, TGRP	Qatar National Research Fund	Qatar
Global Challenges Research Fund	UK Research and Innovation	United Kingdom
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EXTENDED CASE STUDIES

PUBLIC ENGAGEMENT STUDIES

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SCIENCE EDUCATION AND CAREER AWARENESS APPROACHES

"HIRAMEKI☆TOKIMEKI SCIENCE – Welcome to a University Research Lab – Science That Inspires and Inspirits" (Japan)

Launched by the Japan Society for the Promotion of Science (JSPS) in 2005, this initiative involves communicating the results achieved in KAKENHI-funded research by researchers themselves to elementary, middle, and high school students in an easy-to-understand way. The aim is to promote science by offering opportunities for students to experience the cultural value and social significance of science, as well as strengthening their understanding of the meanings of science and its application in their everyday lives.

Partnerships and collaborations are formed by researchers supported by KAKENHI and research institutions with which the researchers are affiliated. The upper grades of elementary, middle and high school students are those who can participate in and benefit from this initiative.

The programme is evaluated by external experts and the Minister of Education, Culture, Sports, Science and Technology every year as a part of the annual JSPS project evaluation. Evaluation reports can be viewed here (available in Japanese only):

- https://www.jsps.go.jp/hirameki/kako_jisshi_list.html
- https://www.jsps.go.jp/j-outline/data/tenken_30_3.pdf
- http://www.mext.go.jp/component/b_menu/other/__icsFiles/afieldfile/2019/09/12/1421008_09.pdf
- Further information:
- https://www.jsps.go.jp/hirameki/

Science Dialogue Programme (Japan)

The Science Dialogue Program is designed to provide Japanese high school students with the opportunities to listen to lectures given by the Japan Society for the Promotion of Science (JSPS) Overseas Fellows on their research in English. Launched in 2004, the goal of the programme is to stimulate young students' interest in research and deepen their understanding of science through interacting with Fellows. Also, it offers Fellows a great chance to communicate with local communities and strengthen their ties with Japan.

Further information:

- https://www.jsps.go.jp/english/e-plaza/e-sdialogue/index.html
- https://www.jsps.go.jp/english/e-plaza/e-sdialogue/past_lectures.html

Motivate the Younger Generation to Engage in Science and Technology Fields (Saudi Arabia)

The initiative was introduced in 2017 by King Abdulaziz for Science and Technology (KACST) in order to achieve one of the country's national strategic goals aimed at "...increasing qualified national competencies to support the development of local content". This initiative is aligned with one of the Saudi Vision 2030 goals related to "...providing quality knowledge to the distinguished students in priority areas" through launching several projects that contribute to involving the younger generation in the fields of science, technology and scientific research in order to make it more interesting and to enhance its relevance and effectiveness in their daily lives to motivate them to join scientific and technological fields. The initiative includes 18 programmes divided into five groups as follows:

- Scientific Multimedia: TV and radio episodes, short scientific clips, documentary films, animations and audio clips.

- Scientific books, journals, magazines and reports (Translation or authorship): Nature Journal, Science and Technology Magazine, Science and Technology Magazine for Teens, scientific books, scientific journals (with Springer Nature), Issuing scientific reports about Saudi Arabia (in collaboration with Springer Nature).
- Students' skills: Supporting general education students' research (for high schools), future scientists (for talented students).
- Scientific Events: Scientific conferences, scientific events, scientific workshops, scientific exhibitions.
- Programmes and Websites: Launching and updating several sites and electronic applications.

The main target audience for the initiative is students between 12 and 18. However, some of the intuitive programmes target the general public. The main stakeholders for the intuitive are the Ministry of Education; King Abdulaziz and his Companions Foundation for Giftedness and Creativity (Mawhiba); Ministry of Media; Ministry of Communications and Information Technology; and Mishkat Interactive Centre. A number of KPIs where set to measure the performance of the initiative. The initiative accomplishment percentage was 44% at the end of the Second Quarter of 2019 with a diversion of 6% from planned.

Science Exposed, research image contest (Canada)

Science Exposed/La preuve par l'image is an annual contest devoted exclusively to images of scientific research in all fields of study except the arts. Canadian researchers in both the public and private sectors submit research images along with a catchy title and a brief, accessible description of their research. Introduced in 2016, the contest is hosted every year by the Association francophone pour le savoir (Acfas) in Quebec and the Natural Sciences and Engineering Research Council (NSERC), a federal research funding agency. It showcases images of Canadian research, fosters interest in science across all audiences, builds a database of scientific images of Canadian research, advances knowledge and provides new uses for scientific images.

Each year, 40 finalists research images are selected by a jury. From that selection, the general public votes for their favourite images. Jury and People's Choice awards are given to the individual researchers or the group. Throughout the years, partnerships have been created with Radio-Canada and science museums to showcase the images to larger audiences. Research images are published online and can be used as wallpaper for cell phones, desktop computers and tablets.

Finalists' images have been assembled in a travelling exhibition, a digital exhibition and fun guessing game all hosted in a variety of institutions (universities, museums, science centres, libraries, festivals, etc.) across the country. These public engagement initiatives are excellent opportunities to reach out to the public, including the youth. Through this contest and associated products, Canadian researchers have a unique avenue to showcase their work in a creative way and tell their story to a broader audience.

Every year, there are a growing number of research images submitted to the contest from a wider variety of research labs. When possible, winners are invited to present their research at science festivals where their research images are shown. The travelling exhibition is often displayed at a winner's host institution.

Support for Female Students in Choosing Science Courses (Japan)

In order for women to lead the next generation and play an active role in the future of science and technology innovation, more efforts are required to understand the interest and motivations for junior and senior high school girls and their parents. We must encourage girls, parents, and teachers to increase awareness about the merits of choosing science and engineering; understand the contents of work in the science and engineering field; work styles; and careers of those who are from science and engineering.

To raise interest of female junior and senior high school students in science fields and to support them to advance to science fields, the Japan Science and Technology Agency (JST) initiated this programme in 2006 to provide opportunities for female students to interact with female researchers who are also engineers, university students, etc. and who are active in the field of science and technology. In addition, the initiative supports universities and other organisations that carry out initiatives in cooperation with local communities and companies.

Up to ¥3 million per institution/year for two years has been made available for this initiative. In addition to efforts aimed at female junior and senior high school students in all prefectures, it promotes close collaboration with junior high schools, accelerates activities at local school sites, and strengthens the approach to the junior high school stage. In FY2019, 15 organisations were participating in this programme, whilst 10 531 students participated in this initiative in FY2018.

Global Science Campus (GSC) (Japan)

The Japan Science and Technology Agency (JST) provides support for projects in which universities develop advanced, systematic, educational programmes in science that include international activities and allow students to attend these educational programmes by recruiting and selecting high school students possessing distinguished levels of motivation and ability from the local areas around each university.

Introduced in 2014, educational projects make use of universities as local centres for education and improvement, to cultivate students' talents in cooperation with the entire local community by organising consortiums in association with regional and prefectural boards of education.

To develop capable personnel in the fields of science and technology, universities implement commonly shared initiatives targeting large numbers of students as well as initiatives for developing talents in line with students' personal characteristics, while keeping in mind the goals of engendering diversified outlooks and bestowing an international mindset.

Furthermore, universities select several students from among the attending student and conduct activities with a focus on research. Universities then appropriately ascertain the extent to which students have improved in ability by establishing evaluation criteria corresponding with the ideal type of human resources that the university wishes to cultivate. Universities also utilise this information in follow-up guidance and project improvement.

Parameters for these projects include papers published in international journals, research presentations at international conferences, participations in international science and technology contests, etc. Universities promote projects that integrate multiple different fields and utilise the unique characteristics of the local area. JST provides support for four years and supports ¥30 million per institution/year.

As a result of this initiative, many research results have been published in overseas journals. Many students who participated in GSC also participated as representatives in domestic and international science contests such as the International Science Olympics and the International Student Science and Technology Fair (ISEF). The participating students furthermore entered major universities in Japan and overseas universities such as the Massachusetts Institute of Technology. After the end of support, the programme continues to be funded by the university, and has been expanded to include the Faculty of Humanities.

Fostering Next-generation Scientists Programme (Japan)

For the development of outstanding human resources who will drive science and technology innovation through the learning of science and mathematics and information fields, this program supports the finding of elementary and

junior high school students with high motivation and outstanding ability and develops a systematic development plan that further expands their ability. The programme was launched in 2017 by the Japan Science and Technology Agency (JST). In FY2019, 24 organisations have been selected.

Elementary and junior high school students who want to participate (targeted from 5th grade of elementary school to 3rd grade of junior high school) can apply to each institution through recommendations from their school committee, school or by self-recommendation. Each institution selects about 40 students, whilst providing lectures, experiments, and tours of research facilities as the first step, and encourages the discovery of fields of their interest. Each institution furthermore selects about 10 students from 40, assigning them to the laboratory and providing individual guidance for research and writing papers.

For the purpose of training, once per year students from each implementing organisation participate in the "Student Presentations" in which the students make research presentations whilst participating in other learning opportunities. In addition, a "liaison council" is held once a year to collect the representatives of the executing institutions to share their good practices and discuss common issues. For the graduates, JST actively promotes connections to "Super Science High Schools" and "Global Science Campuses" in the high school to support the continuation of students' efforts.

According to a questionnaire survey of participating students, 98% of the students answered, "interest in the unknown (curiosity) has increased", 95% "willing to work actively (independence, motivation, challenge), 93% "the desire to create something with their own ideas (creativity) has increased ", and 89% "want to get a job related to science and technology in the future". So it can be said that there was impact for the participating students on their interest in science and technology.

Super Science Highschool (SSH) (Japan)

With a specific focus on the development of future international science and technology personnel, the Ministry of Education, Culture, Sports, Science and Technology (MEXT) has, since 2002, designated high schools that carry out advanced science and mathematics education as Super Science High Schools (SSH). These schools provide the necessary support to promote developmental activities.

The number of designated schools was 212 in FY2019, which means MEXT supports about 4% of high schools in Japan. In the SSH designated schools, a wide range of initiatives are implemented including 1) curriculum development and practice not based on the ministry's curriculum guideline; 2) experiential learning, promotion of subject research; 3) science class in English and presentation exercises; 4) development of teaching methods and teaching materials to increase creativity and independence; and 5) dissemination of the results to other schools.

During 2018, 114 061 students participated in SSH programmes. The Japan Science and Technology Agency (JST) organises student research presentations and information exchange meetings, and supports various expenses for SSH designated schools.

There are many achievements in science and technology contests. For example, about 50% of the representative students from Intel ISEF (International Research Contest, 2017) were from SSH designated schools. In a survey conducted for graduates who were the main target of SSH activities, about 80% of the respondents majored in the science field of universities and the rate of graduates going to graduate school is about twice that of science university students nationwide. The importance of "study research", which is a unique initiative of SSH, is widely recognised, and a new subject "Science and Mathematics" has been positioned as a new subject in the new course of study that will be implemented from 2022. Exploration of mathematics" and "Basics of science and mathematics exploration", which are exploratory subjects covering mathematics and science, will be newly established.

Little Inventors (Canada)

The Little Inventors programme was founded in the UK in 2015 and brought to Canada by the Natural Sciences and Engineering Research Council of Canada (NSERC) in 2016. This programme inspires students to think up and draw invention ideas that are ingenious, funny, and often fantastical. It offers a creative way to explore STEAM topics in the classroom by encouraging children to explore their own creativity and become the inventive thinkers of the future.

Students are invited to think up ideas that will help solve a particular issue and make the world a better place. Teachers are supplied with online tools and a full resource pack to support the idea-generation phase with their students. Selected students work with a maker or artisan to develop their invention idea into a concrete object. The winners are announced at prominent events including the Canada-Wide Science Fair, which occurs during Science Odyssey.

In 2017, NSERC teamed up with the Canadian Space Agency for a once in a lifetime space opportunity. Little Inventors ideas have been showcased at exhibitions in prestigious museums including the Ontario Science Centre, Canada Aviation and Space Museum, Montreal Science Centre, and Little Canada Museum (Toronto), and at events such as the Canada Wide Science Fair. The Canadian Commission for UNESCO has signed up as NSERC's global partner. NSERC also works with science outreach partners such as Let's Talk Science on the development of the resource pack materials for teachers.

The Little Inventors programme reaches children and youth (ages 5 to 15) through workshops with lessons delivered by teachers and partner organisations including libraries, museums, and science centres. Makers and artisans from across the country are matched with students (either in person or virtually) to turn the invention ideas into concrete objects, with the students' input.

NSERC relies on three basic indicators to measure impact: the number of children exposed to Little Inventors; the number of idea submissions; and the number of participating schools. To date, over 600 children have been reached across all provinces, whilst close to 600 invention ideas have been submitted. The Little Inventors space challenge (2017) reached over 83 000 children, whilst close to 3 000 invention ideas were submitted.

Further information:
The Little Inventors website (English and French) is https://nserc.littleinventors.org
The Little Inventors programme is also active on various social media channels including Facebook, Twitter, Instagram and YouTube:

- https://www.facebook.com/littleinventors
- https://twitter.com/littleinventors
- https://www.instagram.com/littleinventors/
- https://www.youtube.com/channel/UC52S24PiJm7ud6JMyp_164w

Science Literacy Week (Canada)

Science Literacy Week is a week-long celebration of science-based activities that showcase the excellence and diversity of Canadian science and show how exciting science is. Through this initiative, the Natural Sciences and Engineering Research Council of Canada (NSERC) encourages science literacy and culture amongst both younger and older audiences. Science Literacy Week first started in 2016 as an invitation to Canadians to read more about science and has grown to become a nationwide festival with a variety of activities and events.

Science Literacy Week is open to a wide variety of partners across the country, such as government departments,

museums, science centres, universities, schools, educators, parents, and libraries. These organisations and individuals host science activities for the public reflecting their own strategic goals and interests. There is no cost associated with being part of the initiative.

Some of the notable partnerships include: NSERC partners with Science pour tous to lead la Semaine de la culture scientifique with Quebec-based organisations. NSERC partners with Microfiches and an organisation closely linked to the identified theme of each edition to develop educational posters (English and French) available for distribution. NSERC partners with science magazines Les Explorateurs, Les Débrouillards, Curium and Owl Kids to celebrate National Science Reading Day. These magazines organise national contests (French and English) that encourage classrooms and individuals to dedicate part of their day to read a science book.

The partner organisations benefit from the exposure provided by Science Literacy Week and their participation in a nation-wide event, which allows them to showcase their work and accomplishments. Members of the general public who participate in events benefit from a greater understanding of the societal and economic role of science in the world and increase their curiosity and interest in science.

NSERC relies on three basic indicators: the number of events; the number of organisations; and the number of cities and communities hosting an event. A survey is conducted to gather feedback and areas of improvement from the partner organisations who registered an event. In 2019, 300 partners joined the initiative, whilst 650 events were launched in 250 cities.

Further information:
The Science Literacy Week website is available in both official languages:

- English: http://www.scienceliteracy.ca/
- French: http://www.culturescientifique.ca/
- Social media presence:
- Facebook English: http://facebook.com/scilitweek
- Facebook French: https://www.facebook.com/SemaineCultureScientifique
- Twitter English: http://twitter.com/scilitweek
- Twitter French: https://twitter.com/SCultureSci

SFI Discover Programme (Ireland)

In support of its mission to have the most engaged and scientifically informed public, the purpose of the Science Foundation Ireland (SFI) Discover Programme Call is to support and develop the STEM education and public engagement sector in Ireland by investing in, developing and extending activity and ability in this area, and exploring and encouraging novel means of engaging the public in STEM.

The SFI Discover Programme funds education and public engagement projects through a competitive process which is internationally peer-reviewed. The programme includes two annual calls: the key programme which supports a range of activity, and a specific call for Science Week Festivals and Events. The type of projects supported include formal and informal education activity, STEM festivals, theatre productions, competitions, online and live events and capacity building in the education and public engagement sector, etc. The annual call is open to a wide variety of applicants from academic institutions to private companies, industry associations, city/county councils etc. Funding of up to €50 000 can be awarded to one-year projects, while funding of up to €300 000 can be awarded to Projects of Regional or National Impact which are typically two years in duration. Funding above this threshold is available if the applicant can demonstrate matched cash funding for the full amount requested.

The Science Week Festival and Events Call funds a range of regional festivals that occur during National Science Week (November) each year. Support is also given to events in areas where no festival is funded. This call is also open to a variety of applicants and funding is typically for a maximum of €35 000 for a festival and €8 000 for an event. Approximately 15 festivals and 15 events are funded on an annual basis.

Over 400 awards totalling almost €25 million have been funded under the SFI Discover Programme Call between 2013 and 2019. A key aim of the programme is to engage with communities that are underrepresented in STEM and this has been achieved across the projects previously awarded funding.

Further information:
https://www.sfi.ie/engagement/sfi-discover/

Science Week (Ireland)

Science Week is an annual week-long event which takes place each November across Ireland. This nationwide event celebrates the science in our everyday lives. Science Week is an initiative of Science Foundation Ireland, and brings together significant partners from across industry, higher education institutes, schools, libraries and other organisations. It acts as a key engine to bring together different role models and champions from the world of TV and comedy, to writers, to renowned experts, many of whom volunteer their time to support the ethos of Science Week. The aim of this effort is to contribute to Ireland having the most engaged and scientifically informed public.

Science Week is the largest science festival in the country, engaging hundreds of thousands of the general public in workshops, talks, regional festivals, as well as through media such as podcasts and radio, and television programming with RTÉ, Ireland's national broadcaster. 2020 marked the 25th anniversary of Science Week in Ireland.

Science Week is designed to stimulate interest, excitement and debate about STEM through accessible and entertaining interactions with the public to engage and inspire people of all ages and backgrounds. Science Week specifically aims to reach communities that are less engaged or that have less access to STEM engagements than others. This is enabled through a collaborative approach between the national coordination by SFI and the significant output by local event organisers. In support of this, Science Foundation Ireland provides financial and other supports to several regional Science Week festivals and events that reach, and are co-created with, communities at a local and regional level.

Science Week 2019 focused on climate action, seeking to help people understand climate change, how science and technology can help us create a positive climate future and the impact we as individuals can have on climate change. Over 1 300 events took place nationwide, as well as 13 regional festivals offering a range of opportunities for the public to engage with Science, Technology, Engineering, and Maths.

Further information:
https://www.sfi.ie/engagement/science-week/

SFI/RTE Joint Initiative (Ireland)

Science Foundation Ireland (SFI) provides funding for broadcast programmes through a joint initiative with RTE – the national broadcaster in Ireland. The initiative has been in place since mid-2015 and is subject to annual review. Its aim is to weave scientific content into lifestyle and documentary-type programming that is topical and

relevant to the Irish public. Since its inception the initiative has supported programming that specifically targets peak schedule slots, with content that engages with those audiences not easily accessed through face-to-face STEM engagements.

A range of science related programming has been funded under the initiative including documentaries on the effects of stress in our lives (Stressed); data (Hacked and Cloud Control); why humans like to win (Henry Shefflin – Winning); commemoration of the 50th anniversary of the Moon landings (50 Years to the Moon and Back); and the role of robots in relation to jobs currently undertaken by humans (Will a Robot Steal My Job?).

To reach Ireland's large rural and agricultural community, SFI supported four series of Big Week on the Farm through the initiative. These week-long live event series looked at the role of science and technology in agriculture and rural life and the future of farming – the first three examined springtime on the farm with the final series taking place at harvest time in September.

Another live series which was broadcast during Science Week 2018 looked at the development of human beings at various stages of the life cycle (Growing Up Live). In November 2019, a series related to sustainable living was broadcast (What Planet are you on?) to complement the Climate Action theme for Science Week 2019. This programme was very successful in a peak schedule slot, competing against the highest performing TV broadcasts. The initiative also covers cross platform activity on RTE to support Science Week each year and provides a small amount of development funding to kick-start projects.

Further information:
https://www.sfi.ie/research-news/news/rte-science-programming/

SFI Discover Primary Science and Maths Programme (Ireland)

The Science Foundation Ireland (SFI) Discover Primary Science and Maths (DPSM) programme originated in 2003 with the aim of introducing primary school students to science in a practical, hands-on, enjoyable and interactive ways, and to support the roll out of a new primary school science curriculum in Ireland. Since 2010 the programme has been run in conjunction with the European Space Education Resource Office (ESERO) Ireland, which uses space as a theme to inspire and engage young people in science and technology in the world around them. The key elements of the programme include:

- CPD for teachers, in partnership with ESERO Ireland
- The SFI Discover Science and Maths Awards.
- A network of SFI Discover Centres offering SFI accredited primary STEM workshops and outreach programmes.
- Resources to support teaching STEM through Inquiry

To date 7 003 SFI Discover Science and Maths Awards have been presented to 1 733 primary schools across Ireland (52% of total), with 600+ schools participating annually. Furthermore in 2018, 43 403 pupils from 1 229 primary schools across Ireland attended a DPSM accredited workshop in one of the 59 SFI Discover Centres, indicating that this network is a key resource for SFI to support informal STEM learning. DSPM has undergone annual external evaluation since 2015 (with the assistance of St Patrick's College, DCU and the National STEM Centre, UK) which has repeatedly shown that participation in the programme is having a positive impact on teachers' approaches to, and confidence in, teaching STEM.

Through DPSM, SFI has a strong working relationship with the Department of Education and Skills (DES) and related support services. This engagement with the DES has led to SFI's intrinsic involvement in the development of the first STEM Education Policy Statement. SFI is recognised in the policy as a key partner in terms of funding and promoting public engagement and SFI has been specifically mentioned in the delivery of key actions from the government's STEM Education Implementation Plan, published in 2017. The DPSM programme plays a pivotal role in supporting the delivery of many of these actions, as it has been shown to be an effective programme to support STEM learning at primary level.

Further information:
https://www.sfi.ie/engagement/discover-primary-science-and-maths/

UK School Seismology Project (United Kingdom)

The UK's British Geological Survey (BGS), funded by the Natural Environment Research Council, has had an active schools engagement programme since 2007, including the UK Schools Seismology Project which enables schools to detect signals from large earthquakes happening anywhere in the world.

The sheer destructive power of earthquakes has always held a fascination for children. This long-term project capitalises on this natural interest by making use of earthquakes and seismology as a unifying theme in a set of simple classroom activities that teach a range of basic science concepts. The project also creates a "wow" moment in the classroom by enabling schools to operate their own seismic recording station which is sensitive enough to record signals from large earthquakes that have happened on the other side of the world. Detecting signals from events of global significance has a dramatic effect on school children, making them realise that science is not a set of abstract ideas but rather a way of understanding how the real world actually works.

It is one of several projects that aims to improve science education in the UK. It aims to:

- Make science more interesting for students aged 11-16
- Improve the participation rates in physical sciences for students aged 16+
- Influence curriculum development in the UK
- Raise awareness of geoscience as a scientific discipline for pre-university students.

The project has developed a simple school seismometer system that can be used by schools to detect and record signals from distant large earthquakes. The project website includes teaching resources and data from recent earthquakes that schools have recorded. The project has promoted the installation of over 500 seismometers in schools across the UK and around the world.

The project also promotes and facilitate links between UK schools and schools in other countries that are also recording signals from large earthquakes (or even experiencing the actual earthquakes).

Further information:

- UK School Seismology Project (project website)
- School seismology development in the UK and around the world

PUBLIC DIALOGUE APPROACHES

Public debate series Science On (Germany)

The public debate series, Science On, is organised by the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) in cooperation with the Art and Exhibition Hall of the Federal Republic of Germany – otherwise known as the Bundeskunsthalle. It takes place twice a year and focuses on topics that are of high societal importance and are widely (and sometimes controversially) discussed in the public sphere. The series focuses on the scientific perspective on these topics and aims to shed light on the background to an issue, make wider contexts understandable and enrich societal debates with scientific findings and assessments. On the podium, usually four scientists discuss with a moderator known from television. A second moderator addresses individuals in the audience and passes on their questions and comments to the podium. In this way, the format is designed to involve the audience in as many ways as possible. Electronic voting also takes place among the audience in the hall on specific questions.

The talk on antibiotic resistance in October 2019 followed on from five previous events since 2017, which included discussions on artificial intelligence, genome editing, the future of democracy, brain research and freedom of art and science. These topics required a discussion with depth of content, but at the same time, the events had to be comprehensible and attractive to a large and diverse audience. The public debate series engages with the public in the Cologne/Bonn region, but also specifically a younger university audience and even school pupils with their teachers. So far, all events have been well attended or even fully booked (300-500 visitors). Approximately 50% of the audience were students and other young people. Video recordings are made available via YouTube, thus making the debates accessible to a larger audience. Through this debate series the DFG and the Bundeskunsthalle aim to emphasise their commitment to making Bonn a strong place for science.

Further information:
https://www.dfg.de/dfg_magazin/veranstaltungen/talkreihen/science_on/index.html (only in German)

exkurs and Leibniz Lecture (Germany)

In the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) lecture series, exkurs - Einblick in die Welt Wissenschaft (Excursus - Insights into the World of Science), DFG-funded researchers present their work to a lay audience in a way that is clear and easy to understand. The exkurs series currently comprises approximately eight events per year in three different German cities. 100 to 300 people attend the live events. They consist of 50-minute lectures followed by a moderated Q&A. Topics of recent talks included microplastics in the environment, digital language assistants, restitution research, risk research, the development of super telescopes and robots as helpers in everyday life. The lectures are recorded and the audio files are distributed via the DFG Media Library.

The Leibniz Lectures, which the DFG organises at different international venues, are similarly structured. The lecturers are not only top researchers but also recipients of the DFG's renowned research award known as the Gottfried Wilhelm Leibniz Prize, which comes with a large prize fund. They act as "ambassadors" for German science and research.

Further information:
https://www.dfg.de/dfg_magazin/veranstaltungen/exkurs/index.html (only in German)

Nobel Prize Dialogue (Japan)

With the Nobel Prize Dialogue initiative, The Japan Society for the Promotion of Science (JSPS) invites the world's leading scientists, including Nobel laureates, to carry out a dialogue via open lectures and panel discussions with the general public, including students and young researchers, for the purpose of fostering public interest in science and technology, whilst contributing to the advancement of science and technology.

JSPS organises the Nobel Prize Dialogue with Nobel Media AB, the public relationship arm of the Nobel Foundation. A partnership with corporations has been set up to finance each event. The general public, including students and young researchers, are invited to apply.

One of the measuring points is the number of participants in the Dialogue. Generally, they seem to be very interested in understanding scientific themes given through the communication with Nobel laureates. In addition, JSPS asks participants to answer a questionnaire after the event so as to measure the participants' composition, their satisfaction with the event contents and the degree of their understanding about the theme.

Further information:
- https://www.jsps.go.jp/english/e-nobel_prize_dialogue/index.html
- https://www.jsps.go.jp/english/e-nobel_prize_dialogue/npd_tokyo2018/data/ NPD2018%20report_en.pdf

Fine Particle Control and Management R&D Programme

The objectives of the Fine Particle Control and Management R&D Programme are to establish and promote problem-solving oriented R&D systems for solving fundamental societal problems. Since 2017, the Fine Particle Control and Management R&D Programme has aimed to fundamentally and scientifically solve problems of public health.

The National Research Foundation of Korea (NRF Korea) recognised that the previous R&D achievements contributed less to public life. The foundation analysed R&D, patents, and markets, and monitored social issues. Public opinions were generated and core research areas were selected, including disaster, dementia, environment, and life safety. Citizens were asked to join the planning of R&D programme through websites. 66 ideas were submitted, with seven of them developed into preliminary planning research in 2018.

Opinions and ideas of the general public were generated through websites. The following engagements occurred:
- Public dialogue on disaster/safety policy: 338 participants, specific areas selected as disaster response, disaster preparation.
- Public dialogue about solving social problem by science and technology: 575 participants, specific areas selected as life safety, energy, etc.
- Public dialogue about PM2.5 solving research: 139 ideas submitted, nine ideas selected to be promoted.
- Public dialogue about nuclear power safety solutions: 22 ideas submitted, six ideas selected, three projects are ongoing.

Partnerships included the whole of society. Previously the researchers only collaborated with each other, but the researchers, the people, the government, and related organisations are encouraged to collaborate. This initiative aims to establish the scientific management of Fine Particle Control to solve fundamental problems.

Further information:
NRF Korea (https://www.nrf.re.kr/eng/index)

Fridays for Future – Dialogue between FfF activists and scientists (Germany)

As the 'Fridays for Future' protests attracted more and more interest among Berlin pupils in early 2019, the Museum für Naturkunde – Leibniz Institute for Evolution and Biodiversity Science, began to invite activists to the museum to discuss different aspects of climate change with scientific experts from Leibniz institutes and from further research organisations and universities. The initiative has evolved into a standing invitation, gathering hundreds of pupils on a weekly basis and achieving great public awareness.

The activity informs pupils about current research on climate change, covering different aspects (mitigation, adaptation, biodiversity impacts, climate economics, food production, etc.). It taps into their commitment and enthusiasm, allowing them to draw informed conclusions on which to base their policy demands. Furthermore, it acquaints pupils with the scientific process and the fact that scientific results may vary depending on the approaches or presumptions they are based upon.

Pupils are invited to the museum free of charge to meet with numerous experts, with an emphasis on interactive discussions, Q&A sessions and workshops rather than on lectures. The invitation to a research institution bestows activists with recognition from an 'established' institution, while the formats of debate contribute to lower the burden of hierarchy between 'scientists' and 'laypersons'. The inclusion of various disciplinary perspectives as well as Leibniz institutes involved in policy advice familiarises activists with the diversity of scientific assessments and the process by which these can influence actual policy. Participants gain awareness for scientifically sound approaches and arguments.

The Museum invites experts from various thematically related Leibniz institutes (economic research, climate impact research, agricultural research, biodiversity, etc.) and further research institutions and universities. The initiative has gained significant public and political recognition while upholding 'science's' role as a provider of sound expertise (rather than an activist itself). The museum presents itself as an accessible and open research institution that serves as a platform and marketplace for debate.

Further information:

- https://www.museumfuernaturkunde.berlin/en/press/press-releases/museum-fur-naturkunde-berlin-continues-support-friday-future-dialog
- https://www.museumfuernaturkunde.berlin/en/press/press-releases/museum-fur-naturkunde-workshop-series-and-action-day-global-climate-strike

Vetenskapsrådet – Swedish Research Council initiatives (Sweden)

The Swedish Research Council supports public engagement in several forms, in addition to its main task of science communication. It arranges communication channels and platforms for science communication and public engagement: Public talks on various topics in science policy;

- Dialogue forums on research results;
- Forum for Science communication (Forum för forskningskommunikation) a conference arranged in conjunction with the annual International Science Festival. 2020's conference featured a workshop on scishops;
- The science information platform forskning.se where research results are made available to the public;
- The web magazine Curie devoted to the world of research;
- Researchers' Grand Prix, a competition in presenting your research in as captivating, inspiring and educational a way as possible – in just four minutes;

The Council supports the activities of the Swedish Civil society organisation Vetenskap & Allmänhet which works comprehensively with public engagement. For example, under the umbrella of ForskarFredag, the Swedish version of Researchers Night, an annual citizen science project for Swedish pupils and citizens is organised.

It participates in the design and funding of the Transfer Call on public engagement explicitly within the partnership programme ERA Cofound Aquatic Pollutants. Synergies between public engagement and open science are identified.

The Council has initiated a new set-up of its calls for research funding so as to include and encourage public engagement activities. A pilot study is set to be implemented in natural sciences and engineering sciences. It has also considered introducing specific calls for PE activities and science communication. The Council has expert and NCP functions within the H2020 SwafS, Science with and for Society programme which includes PE activities.

It trains and educates scientists and communication staff in the areas of science communication and PE, both nationally and internationally.

'Science Agora' and Satellite Events (Japan)

Science Agora is an open forum established in 2006 by the Japan Science and Technology Agency (JST) to connect science and society, and to deepen the interaction between STI and society. The initiative provides diverse programmes selected through open calls for proposals:

- Very highbrow/academic dialogue sessions
- Showcasing good practices addressing challenges & public engagement
- Sessions for high school students to present their studies
- Booth exhibitions to highlight to children the fun of science

Partnerships and collaborations include science museums, national R&D Institutes, private companies such as environment and chemical engineering, aerospace, publishing and future alliance centres, attending as exhibitors or giving talks. Speakers from global partners such as AAAS, EuroScience, DSI in South Africa, KOFAC (Korea) and CAST (China) are invited.

The success of the initiative is measured by monitoring participant numbers and analysing its attribution every year. Feedback has also been collected from participants in several ways by using graphic recording, sticky notes, touch panel and submitting reports from session organizers. These feedbacks are visualised at the main stage of the venue. Reports are available from the link as below:
https://www.jst.go.jp/sis/scienceagora/en/reports/

Further information:
https://www.jst.go.jp/sis/scienceagora/en/

PUBLIC ENGAGEMENT AND NETWORK DEVELOPMENT AND SUPPORT

ERC Public Engagement with Research Award (European Union)

The European Research Council (ERC) Public Engagement with Research Award 2020 is designed to recognise and celebrate ERC-funded researchers who have demonstrated excellence in public engagement and outreach. The first competition was launched on 24 September 2019 with the deadline for submitting applications on 10 January 2020. More than 130 applications were received in the following three categories: public outreach; press and media relations; online and social media. A jury composed of international experts select one winner in each category and the three winners were announced at an award ceremony in July 2020.

The prize for each winner includes a trophy; complimentary registration to EuroScience Open Forum (ESOF); reimbursement for reasonable travel and hotel expenses for attending the award ceremony; and visibility at the award ceremony. In addition, winning projects are be featured prominently on the ERC communication channels, expanding the visibility of the project beyond the national level, to EU audiences. The expected benefit for the ERC is to gauge public engagement activities carried out by ERC funded researchers, relay them in its communication activities, while encouraging its grantees to engage in such activities by providing examples.

Furthermore, The ERC is funding researchers who have an obligation to communicate on their research. This is, however, the first time an award has been designed to recognise researchers who not only excel in research but also in public engagement around their ERC-funded research. The ERC direct-mailed all eligible researchers and handled the pre-selection of proposals. Jury members are invited to select the best proposals - professionals in communication as well as representatives of public engagement organisation and European political bodies.

Only ERC-funded researchers are eligible to apply. The aim is to encourage ERC grantees but also communication officers in their host institutions/research organisation to engage with the public with their research content.

https://erc.europa.eu/managing-your-project/public-engagement-research-award

Grants-in-Aid for Scientific Research Database (KAKEN) (Japan)

Hosted since 1987 by the National Institute of Informatics (NII) in cooperation with MEXT and Japan Society for the Promotion of Science (JSPS), the database is open to the general public who wish to read the results of KAKENHI-funded research on the internet. It aims at advancing the practical application of research results in society and increasing general understanding about KAKENHI programme. The project hence provides resources (founded on publicly funded KAKENHI research) for the purpose of public engagement.

Partnerships and collaborations have been established with the National Institute of Informatics (NII) in cooperation with MEXT and JSPS. Everyone who is interested in the research supported by Grants-in-Aid for Scientific Research (KAKENHI) can apply.

The KAKEN database is evaluated by external experts and the Minister of Education, Culture, Sports, Science and Technology every year as a part of the annual JSPS project evaluation.
https://www.jsps.go.jp/j-outline/data/tenken_30_3.pdf (Japanese only)
http://www.mext.go.jp/component/b_menu/other/__icsFiles/afieldfile/2019/09/12/1421008_09.pdf (Japanese only)

Further information:
https://nrid.nii.ac.jp/en/

Science Odyssey (Canada)

With a focus on youth, Science Odyssey is a national 16-day campaign to raise public awareness and interest in science, technology, engineering, arts, and mathematics (STEAM). The campaign contributes to a robust science culture that values STEAM and allows the Natural Sciences and Engineering Research Council of Canada (NSERC) to take a national leadership role and provide a focal point for science promotion efforts. Every year in May it brings together almost 600 public engagement and outreach leaders who deliver over 1 000 events and activities in more than 350 cities with almost 600 000 people attending the events.

Science Odyssey builds on more than two decades of experience with the National Science and Technology Week (NSTW), which invited all science-based departments and agencies in the federal government to showcase their achievements in science and technology and the benefits of government-funded research. Under the Science Odyssey brand since 2016, the initiative is now open to a wider variety of stakeholders including government, universities, colleges, polytechnics, institutes, science centres, museums, libraries, schools, educators, parents, and in particular, Canadian youth interested in STEM.

Science Odyssey allows each partner to organise their own activities and events according to their own strategic outreach goals. By aligning activities with Science Odyssey and registering them on the SciOd.ca website, partners increase their visibility and impact and create synergies towards a true national celebration of STEM. There is no cost associated with participating in Science Odyssey.

Firstly, the organisations and stakeholders involved in delivering events and activities and showcasing the best of Canadian research and accomplishments in STEM. Secondly, curious and engaged Canadians, including policy and decision makers, and the general public. NSERC takes relevant indicators from a survey of participant organizations, combined with information they provide when they register. The agency also develops metrics based on social media activity and website traffic.

For NSERC, the key indicators are the number of events, the number of organisations taking part, and range of cities and communities hosting an event. During 2019, 1 027 events were held, while 508 partners joined and 286 cities were involved.

Further information:
Science Odyssey website

- http://www.sciod.ca/ (English)
- http://www.odsci.ca/ (French)
- https://www.facebook.com/ScienceOdyssey/ https://www.facebook.com/OdysseeDesSciences/
- https://twitter.com/Sci_Od https://twitter.com/od_sci
- https://www.instagram.com/Sci_Od/ https://www.instagram.com/od_sci/

Monitoring the Dissemination of Research Outcome to the Public (Qatar)

The Qatar National Research Fund (QNRF) changed its projects monitoring scheme to include public engagement as an assessment criterion, where awardees are required to report on their project's public engagement activities, e.g. public lectures, seminars, training, information material, events, etc. This, it is believed, will:

- Encourage awarded researchers to communicate their research outcome with the public;
- Give ownership of the publicly-funded research outcome to the public; and

- Stimulate public interest in research and help recruit future researchers and research stakeholders.

The initiative, which was introduced in 2017 and took effect in 2018, enables researchers to participate in public engagement, not only in their ongoing research but also in their future research proposals.

Trans.MISSION (United Kingdom)

The Natural Environment Research Council (NERC) and Hay Festival worked together to deliver the Trans.MISSION projects. NERC is the UK's main agency for funding environmental science and Hay Festival is an annual event that showcases the latest ideas in the arts, sciences and current affairs, alongside a rich schedule of music, comedy and entertainment for all ages.

Trans.MISSION I paired leading environmental scientists with award-winning artists to communicate cutting edge research to new audiences at Hay Festival 2018 and beyond. Each pairing produced a piece of work - an animation, a series of still pictures with text, an infographic or animated text – that were launched during a series of public events in Hay Festival's 'Hay on Earth' programme (24 May - 3 June 2018). For example:

- Climate scientist and mathematician at the British Antarctic Survey (BAS), Emily Shuckburgh, joined award-winning designer, author and illustrator, Chris Haughton, to explore polar science and climate change. Watch their Message from Antarctica video: https://www.youtube.com/watch?v=JvILjKV7Cd8
- Atmospheric chemist, Ally Lewis, paired with Aardman Studios' Director, Dan Binns, to look at air pollution. Watch their Clean Air Starts At Home video: https://www.youtube.com/watch?v=z2rK_s7XjvI
- Climate scientist, Ed Hawkins, joined children's author, Nicola Davies, to analyse extreme weather events. videos: https://nerc.ukri.org/planetearth/stories/1892/

TransMISSION II is a global project that pairs leading environmental researchers with storytellers to communicate science to new audiences. The project pairs NERC researchers from Peru, Colombia and the UK with artists and storytellers in each country to create new stories about ongoing research projects. An artist, illustrator or animator will be commissioned to create an overarching piece - an animation, infographic or animated text - that will combine and communicate the common themes. These pieces will aim to inform, engage and inspire members of the public and future researchers regarding environmental science and the processes of research.

Trans.MISSION II is the first international public engagement collaboration project for NERC, with each new piece being launched at Hay Festival events in Arequipa, Peru (7-10 November 2019); Cartagena, Colombia (30 January - 2 February 2020) and in Hay-on-Wye, Wales (21-31 May 2020).

Further information:

- NERC and Hay Festival launch Trans.MISSION films merging climate science and art
- Hay Festival and NERC launch Trans.MISSION II global project merging science and art
- Hay Festival and NERC merge climate science and art with 'Trans.MISSION II' in Peru

INTEGRATED PUBLIC ENGAGEMENT INITIATIVES

Resourcing for Public Engagement/Integrated Public Engagement initiatives (Germany)

The Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) supports researchers in their efforts to communicate the topics and results of their scientific work to lay audiences. In all DFG science funding programmes, researchers can apply for support for self-selected formats of scientific communication.

Examples include workshops or videos for students and teachers; exhibitions and participation in science days; public discussions; and industrial trade shows. Suitable projects may also pursue longer-term PR strategies, such as developing and maintaining a communication platform aimed at the general public. Methods may be chosen freely but must relate clearly to a funded project and significantly go beyond the host institution's standard public-relations activities. However, the public relations department should be notified of these endeavours and its expertise should be used when planning and conducting public relations activities.

The Collaborative Research Centres funding programme makes particularly intensive use of the Science Communication module. For example, a Collaborative Research Centre in the field of geoarchaeology has designed a travelling exhibition entitled "2 Million Years of Migration" to show that migration is part of the history of human development. The exhibition is aimed primarily at school groups (as the most important social group that has to cope with the largest proportion of migration in everyday life today) and families, but also at people who are involved with the topic of migration on a professional or voluntary basis and migrants themselves. The exhibition was shown in several cities in Germany and received a lot of media coverage.

Another Collaborative Research Centre, in the field of materials science, developed a "speed dating" format with scientists called "Meet Your Scientist". Scientific staff members made themselves available for a short question and answer session in this dialogue-based format. Passers-by were involved in discussions at public events. Due to the relaxed and personal format, participants on both sides reported that in the future they would be more likely to have the confidence to enter into discussions at public events.

Further information:

- https://www.dfg.de/dfg_magazin/aus_der_dfg/aktuelles/181109_forum_wiko/index.html (in German only)
- The form, which gathers all the information about the module, can be downloaded here: https://www.dfg.de/formulare/52_07/index.jsp

National Research Agenda (NWA) (The Netherlands)

The National Research Agenda, initiated by the Dutch Research Council (NWO) in 2015, must ensure that cross-fertilisation and smart collaboration among all the various partners lead to the whole being more than the sum of its parts. That is, after all, how science can excel and combined with applied and practice-based research, make an important contribution to the quality of our lives, our society, and our economy.

The agenda should fire the imagination, challenge, and inspire researchers and society in general to achieve pioneering breakthroughs. It should ensure that research is closely aligned with societal and economic opportunities and requirements and identify those subjects in which Dutch research excels and is distinctive. Promoting Dutch research with its own, unique agenda will boost the Netherlands's position in international alliances and put our country in the international vanguard in specific fields. This is important if we are to play a leading role in prestigious international alliances, so that the Netherlands becomes a magnet for talented scientists and knowledge-intensive business.

The agenda should not focus on the full spectrum of research, but rather on those themes that benefit from coordination and collaboration. In particular, it should feature research that would be less efficient and effective if conducted by organisations or institutes working separately. The agenda should inspire and remove barriers between organisations, scientific disciplines, or sectors. By making connections and encouraging cooperation, it will enhance and revitalise existing agendas.

Further information:
https://www.nwo.nl/en/common/policies/dutch-research-agenda/index

The National Strategy for Research and Development 2040 (Oman)

The main objective of public engagement in the development of the National Strategy for Research and Development 2040 is to enhance the role of civil society and different public segments in the formulation of national plans and strategies. The Research Council of the Sultanate of Oman's engagement plan, launched in 2019, considered the role of public participation and recommended different tools of engagement. With its motivation to co-construct the experiences of strategy formulation, it adopted the neo-institutionalisation perspective in documenting all the stages of the project using ethnographic tools. The changes throughout the process are analysed and the outcomes be published to share the process as an example of institutional innovation.

The approach was tailored to adopt three main principles of stakeholder's engagement: (1) promotion of an inclusive and diverse stakeholder engagement through identification and mapping of potential stakeholders; (2) engage stakeholders early on and throughout the project phases through effective communication; and (3) monitor, evaluation and documentation of the progress. These principles were applied to identify five core stakeholders and the tools of engagement were designed to allow maximum partnership and participation. In addition, the tool of pull/push communication was used to engage the wider public.

The project team adopted the social constructionist epistemological position, which involves co-production of knowledge and joint experience with the core stakeholders and the wider public. It was planned to enhance the spirit of ownership among the core groups as well the public.

These tools targeted different segments of the public in order to enrich the project with views and experience of diverse actors of the R&D ecosystem.

Two main indicators are used to determine whether the initiative has been a success: (1) total number of participants at different project activities; and (2) the nature of inputs from this participation. Data were collected through five-question questionnaire that was sent to selected stakeholders (high interest/high influence + High interest). Ethnographic tools of observation and taking notes were also applied during two main sessions: high-level stakeholders' dialogues and youth dialogues.

RESOURCING (INCLUDING FUNDING) FOR PUBLIC ENGAGEMENT

International Prize for Biology (Japan)

The International Prize for Biology was established in 1985 to advance the biological sciences in a global context by annually awarding a biologist who has a superlative record of achievement in the subject field.

The Committee on the International Prize for Biology is called every year to select a specific branch of biology for which the prize is awarded. The award ceremony is held in the presence of imperial family members, followed by a commemorative symposium and a public lecture to raise awareness to the field. A Prize Fund has been established in the Japan Society for the Promotion of Science for receiving and managing donations.

Partnerships and collaborations include the Committee on the International Prize for Biology (composed of biologists and leaders in the business communities); the Ministry of Education, Culture, Sports, Science and Technology (MEXT); the Japan Academy; donors who have supported the prize for a long time; and the Japan Society for the Promotion of Science.

The selection committee invites nominations of candidates for a specific research field of biology from relevant universities, research institutions and individuals each year.

One of measuring points is the number of participants in the commemorative symposium held directly after the award ceremony. It indicates how far the year's subject was interesting or attractive to the general public including biologists/scientists and laypeople.

https://www.jsps.go.jp/j-biol/data/30th_commemor_booklet.pdf

The track-records of the prize for 35 years demonstrate the strong commitment of stakeholders to this initiative.

We publish a commemorative booklet of the award every 10 years. Currently, a commemorative booklet celebrating the 30th anniversary of the Prize has been posted on the Japan Society for the Promotion of Science (JSPS) website.

Further information:
https://www.jsps.go.jp/english/e-biol/index.html

PromoScience (Canada) 2000
NSERC's PromoScience Programme is the only national programme in Canada supporting initiatives that focus on science, technology, engineering and math (STEM) learning. The objectives of the programme are to increase science literacy among young Canadians, to boost the number of students who pursue studies and careers in STEM fields and to promote diversity in STEM through initiatives for girls, young women and indigenous populations.

PromoScience grants support organisations that inspire young Canadians to take an interest in science and engineering, that motivate students to study STEM and pursue careers in these fields and that create interactive, hands-on science experiences for youth. In addition, the programme supports organisations that focus on groups that are traditionally under-represented in scientific and engineering careers, and/or provide instruction and resources for science, math and technology teachers.

PromoScience supports hands-on learning experiences for young students and their teachers through grants for improvements to program content or delivery, as well as for new programmes and activities. Grants can also be

used to cover operational costs such as salaries, travel, and supplies, provided that they relate to the promotion of science and engineering.

To be eligible for a PromoScience grant, organisations must be a Canadian registered non-profit organisation, a post-secondary institution, or a non-federal museum or science centre. Organisations must also demonstrate ongoing involvement in the promotion of the natural sciences and engineering to young Canadians. Organisations may request funds for up to three years at a time. All eligible applications are peer reviewed by a selection committee. Members are selected from the science and engineering promotion community, and the education community, based on their stature and expertise.

In addition to the extensive evaluation done in 2016 (see link below), NSERC tracks the number of applications received as an indication of funding demand (2015=191, 2016=166, 2017=169, 2018=188, 2019=221). Given NSERC's increased focus on equity, diversity and inclusion (EDI), the agency tracks the number of PromoScience applications and awards that have been identified as having a focus on underrepresented groups, e.g. girls and indigenous youth. Sixteen case studies were conducted as part of the 2016 Evaluation (see link below).

Further information:
2016 Evaluation of the Science and Engineering Promotion Initiative: PromoScience

- English: https://www.nserc-crsng.gc.ca/Promoter-Promotion/PromoScience-PromoScience/Index_eng.asp
- French: https://www.nserc-crsng.gc.ca/Promoter-Promotion/PromoScience-PromoScience/Index_fra.asp

Solution-Driven Co-creative R&D Programme for SDGs (SOLVE for SDGs) (Japan)

SOLVE for SDGs is a funding programme launched by Japan Science and Technology Agency (JST) in 2019 to support integrated activities of stakeholder's engagement and action utilising STI aiming at achievement of SDGs in local areas. The aim is to support not only R&D phase but also scenario creation phase processes. The initiative aims to focus on creating solutions to solve challenges, not pursuing advancement of science and technology (new seeds are not essential requirements). Requiring team-building exercises are imperative before application, which will also include the persons who are responsible for implementation.

This initiative is conducted by two departments at JST: Department for Promotion of Science in Society, Research Institute of Science and Technology for Society (RISTEX).

Participants and beneficiaries are any organisations based in Japan (university, private company, NGO, local government etc.) working to solve the societal challenges in Japan.

Further information:
https://www.jst.go.jp/ristex/examin/sdgs/solve.html (Japanese Only)

STI for SDGs Award (Japan)

The STI for SDGs Award is a new initiative (2019) awarding successful activities of stakeholder engagement and action that tackles societal challenges in local areas utilising STI. These these effective solutions have spread to other regions where people face similar problems resulting in contribution to local SDGs.

Encouraging utilisation of STI is a key tool of the activities in a co-creative and inclusive manner. Awarded projects are widely disseminated through JST media and events to accelerate STI for SDGs activities in each region.

Special awards are given in collaboration with Ministry of Education, Culture, Sports, Science and Technology (MEXT). Beneficiaries and participants are any organisations based in Japan (university, private company, NGO, local government etc.) working to solve the societal challenges in Japan.

Further information:
https://www.jst.go.jp/sis/co-creation/sdgs-award/ (Japanese Only)

KNOWLEDGE CO-PRODUCTION APPROACHES

Strategic Basic Research (SBO) (Belgium)

The SBO financing channel grants innovative research was initiated in 2004 by Research Foundation Flanders (FWO), and aims to open up prospects for later economic or societal applications. The evaluation is based on a score grid that deals with scientific quality of the proposals as well as the perspective of and vision on utilisation. Both aspects are equally important. The evaluation of the utilisation includes the assessment of the applicant's vision on the potential for translation into concrete applications and the plan on how to bring innovation to the field.

The SBO programme breaks down into two parts: an economic programme part for projects with a primarily economic finality and a societal programme part for projects with a primarily societal finality. The ultimate purpose of an SBO project is to contribute to an influx of new ideas and concepts that, at a later stage, may be the basis for a new generation of products, processes or services in the business community and/or may solve issues that impede innovation (economic), respectively, the resolution of societal issues or the creation of new opportunities with a societal added value for Flanders (Societal). To reach this goal, applicants should embark in a joint project definition with economic and/or societal stakeholders (social profit organisations, professional groups and government departments/entities), whereby the latter indicate their needs and strategic interests, and knowledge centres then respond to these by formulating a research project. SBO is thus not aimed at pure and one-directional knowledge dissemination, but at the acquisition of new knowledge in a dialogue between, on the one hand, one or more research centres that carry out the research and, on the other hand, the companies and/or societal actors, that will subsequently translate the results into concrete applications.

Eligible organisations are all Flemish research institutions with, additionally, optional involvement (max. 20% of budget) of non-Flemish Research institutions.

Further information:
https://www.fwo.be/en/fellowships-funding/research-projects/sbo-projects/

CITIZEN SCIENCE APPROACHES

Citizen Science projects and initiatives (Germany)

The Leibniz Association and its research institutes are proud supporters and promoters of citizen science initiatives. Citizen science is a well-established approach within Leibniz and a myriad of citizen science projects are in place at Leibniz institutes, much in line with the organisation's mission to pursue excellent research with societal impact.

In addition, the Leibniz Association and its institutes play a decisive role within German and European citizen science networks, structuring and nurturing the further development of the field. Leibniz has established a Leibniz Citizen Science Network gathering 21 institutes especially active in this field and elected a Representative of its Executive Board for Citizen Science. One of its institutes, the Museum für Naturkunde – Leibniz Institute for Evolution and

Biodiversity Science, runs the central German Citizen Science collaboration platform ("Bürger schaffen Wissen", Citizens Create Knowledge) and hosts and chairs the European Citizen Science Association (ECSA).

Citizen science projects contribute to the pursuit of large research projects that rely on the non-systematic (or partially) systematic collection of large amounts of data and samples, thus lowering costs and efforts and increasing the coverage of such projects. On a wider perspective, citizen science also contributes to the co-design of research projects with societal implications and serves to communicate research and the scientific process. The networking efforts serve to exchange best practices and to establish standards for Citizen Science.

Further information:

- Research with societal impact - some current examples can be found here.
- Leibniz Citizen Science Network
- "Bürger schaffen Wissen"
- European Citizen Science Association (ECSA).

EXPLORA Programme (Chile)

This initiative, Scientific Research at Schools, aims to motivate students from 5th to 12th grade to ask questions arising from their curiosity and motivation concerning natural or social phenomena and to develop them through research projects. The expected benefits are that students develop critical thinking and scientific skills, such as exploring, questioning, predicting, experimenting, analysing, and investigating.

This initiative was established in 1995, and focuses on students who, accompanied by a teacher, develop the different stages of research. In the process of Scientific Research at Schools, the questions must arise from the students according to their interests and motivations. The areas of study may be social sciences, natural sciences or technology. After defining the question, the stages of the research (hypothesis, objectives, experimental design, results analysis and conclusions) are developed during the academic year. Throughout the process, students are expected to gain autonomy as they contribute to teamwork.

An innovative aspect of this initiative is that students are not only guided by their teachers, but also by a scientific advisor according to the chosen topic. To achieve this synergy, the Explora Programme plays a fundamental role in this process, since it is the articulator between the schools and the world of science.

The Explora Programme implements this initiative throughout the country, linking educational establishments with researchers, ensuring that students interested in carrying out research receive scientific advice from experts on the chosen topics. The role of the scientific advisor is to support the research process of the group, monitoring the progress of the work and providing recommendations if necessary, always respecting that the research questions emerge from the students. The research papers are presented at the Regional School Congresses, where the students present their research and the winners compete in the National School Congress.

This initiative is directed at primary and secondary school students. In this way, the participants are children and adolescents from 5th to 12th grade, who must conduct their research in groups of two to four members.

Further information:
The investigations selected to participate in the regional congresses, are presented in the summary book of the respective congress and are stored in the following website: https://www.explora.cl/blog/investigacion-escolar-1/.

Public Participation in Science (USA)

Citizen science has emerged as a powerful tool in the sphere of public policy and decision making. For instance, in the United States, governments (federal, state, and local) work together with citizens and communities to plan for and respond to natural hazards and emergencies. Objectives and benefits of citizen science include addressing societal needs; providing hands-on learning in STEM; and connecting the public to federal agency science missions. U.S. federal agencies adopting crowdsourcing and citizen science approaches have benefitted from data and analysis they could not otherwise collect or perform.

A particularly innovative aspect in the U.S. federal context is CitizenScience.gov, an online 'one-stop shop' with a toolkit of resources to aid project management, and a government-wide listing of projects spanning a wide range of topics, geography, scale and complexity. There is clear, easy-to-find information on the what/how/where/why of each project and about privacy, data ownership, intellectual property, and other terms of participation; participants can therefore make informed decisions. Furthermore, a Federal Community of Practice for Crowdsourcing and Citizen Science, a grassroots group that works across the government to share lessons learned and develop best practices.

Another innovative idea, online crowdsourcing games bring together cutting edge technologies, such as game mechanics and sophisticated artificial intelligence algorithms, with human innovation and creativity for a "best of both worlds" solution to complicated scientific problems.

In terms of partnerships, several U.S. federal agencies and science philanthropies have provided funding for researchers to involve citizen scientists in their projects. A growing number of organizations (e.g., Citizen Science Association in the United States, European Citizen Science Association, Australian Citizen Science Association, etc.) seek to connect citizen science projects in-country and globally, and disseminate scholarship and best practices. These connections are key to answering questions at global scales.

In June 2019, a report titled, "Implementation of Federal Prize and Citizen Science Authority: Fiscal Years 2017-18" was released, the first comprehensive report on crowdsourcing and citizen science activities conducted by federal agencies. This document can be accessed at:
https://www.whitehouse.gov/wp-content/uploads/2019/06/Federal-Prize-and-Citizen-Science-Implementation-FY17-18-Report-June-2019.pdf

Further information:

1. CitizenScience.gov – a U.S. government-wide citizen science online portal
2. www.zooniverse.org – citizen science web portal by the Citizen Science Alliance
3. www.scistarter.org – connects people to citizen science projects, citizen scientists, and resources

HUMAN CAPITAL AND SKILLS DEVELOPMENT INITIATIVES FOR PUBLIC ENGAGEMENT

Youth Science and Technology Journalism Programme (South Africa)

The Youth Science and Technology Journalism Programme primarily seeks to develop capacity in the community media for covering science and technology topics in indigenous languages and to advance the science journalism skills of post-graduate students. Introduced in 2016 by the National Research Foundation (South African Agency for Science and Technology Advancement), this programme seeks to contribute towards popularising science, awakening interest in science and developing a critical public that actively engages and participates in the national discourse of science and technology.

The objectives of the project are:

- To develop basic science journalism skills in the youth and to enhance career opportunities.
- To enhance interest in science and technology in local communities and ensure the recognition of indigenous and grassroots innovation existing in communities.
- To enhance understanding of the importance of science and technology reporting in community media organisations.
- To communicate specific Department of Science and Innovation (DSI) - previously the Department of Science and Technology-funded technology demonstration projects and general science stories in a variety of languages to local communities.

The project has been rolled out in three phases. The first phase of the project, prioritised the district municipalities where the DSI was implementing the Innovation Partnership for Rural Development Programme (IPRDP) innovative technologies in 2016. The second phase of the project was completed in 2018, where the project was expanded to Gauteng and Northern Cape Province. The project focused on densely populated areas in Gauteng to ensure that the greatest number of people had access to the media coverage. The third phase of project to Western Cape and Free State Provinces was expanded in 2019.

The project is aimed specifically at unemployed youth with undergraduate and postgraduate qualifications in science and technology, communications and/or journalism studies. The programme is monitored through tracking and documenting all media produced by the science journalism interns and reporting on this quarterly.

Data has been collected on each cohort of interns and this can be shared. There are numerous examples of further engagement with the interns after completion of the 12-month programme, including some interns having started businesses in the science journalism and engagement space.

Further information:
https://www.saasta.ac.za/programmes/nurturing-talent/youth-journalism-programme/

POLICY DELIBERATION APPROACHES

Senate Commissions (as policy advisors)/Alliance of German Science Organizations (Germany)

As laid down in its statutes, the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) "...advises parliaments and institutions working in the public interest on scientific issues and fosters relations between the research community and society and the private sector." It was for this purpose that the Senate Commissions were established. They support the DFG with policy advice by, for instance, preparing statements on research-related issues that are relevant to society in accordance with purely scientific standards. The Senate Commissions are divided into two categories: Permanent Senate Commissions and Senate Commissions.

The Senate can establish Permanent Senate Commissions whose mandate extends over the longer term. This may be for important social, political or economic fields with a long-term perspective, in which new scientific findings must be processed continually and across disciplines to serve as the basis for government action, both nationally and internationally, or for politically and socially controversial, rapidly evolving scientific topics in which a recurring need for legislation with considerable relevance to research is anticipated. When establishing a Permanent Senate Commission, the need for the results of the Commission's work must be substantiated and its establishment on a permanent basis must be justified.

The Senate can appoint Senate Commissions in areas with a strong need for research, coordination and multi-layered structuring with the mandate to develop interdisciplinary approaches for complex coordination, improvement of the research infrastructure and establishment of structures conducive to research, where necessary in cooperation with other national and international organisations.

There are currently seven commissions on the following topics: Animal Protection and Experimentation, Food Safety, Genetic Research, Investigation of Health Hazards of Chemical Compounds in the Work Area, Key Questions in Clinical Research, Fundamental Issues of Biological Diversity, and Earth System Research.

One of the latest policy advocating statements, to give an example, was the publication "Towards a scientifically justified, differentiated regulation of genome-edited plants in the EU" (https://www.dfg.de/download/pdf/dfg_im_profil/reden_stellungnahmen/2019/191204_stellungnahme_genomeditierte_pflanzen.pdf)

Further information:
General information about the Senate and its commissions:
https://www.dfg.de/en/dfg_profile/statutory_bodies/senate/index.html#anker3662414

CHAllenge-driveN Convergence Engine (CHANCE) (Japan)

The objectives of the CHAllenge-driveN Convergence Engine initiative, which was introduced in 2018, is the integration of activities of stakeholder's engagement envisioning future society, setting shared goals, making strategy including policy deliberation, building community and acting together.

The approach includes the following innovative initiatives:

- Dialogue beyond boundaries (break silos!) to get together knowledge of diverse players to co-design an ideal future society with novel ideas & STI;
- Create synergy combining each players' businesses and networks to accelerate implementation of scenarios to tackle challenges;
- Popularize concept of 'Co-design/Co-creation' to establish a solution-driven innovation ecosystem introducing convergence and diversity.

Partnerships and collaborations includes companies, academia, NPOs, start-ups, research organisations, citizens and local communities.

This initiative is led by Japan Science and Technology Agency (JST) itself. Currently, 32 activators from private company, university, national research institute and NPOs have agreed to be members of CHANCE.

Successes are measuring by gathering feedback from participants in each event/workshop/meeting through questionnaires to be analysed and reported MEXT. Several activities initiated under the CHANCE from last year are as below:

- 'SAKIGAKE'* Convergence Camp
- Dialogue events involving young & promising researchers and stakeholders of the same generation, from private sectors, academia, and NPOs.
- 'CHANCE networking event' on specific research project
- Dialogue event for specific R&D project on novel STI such as AI, Artificial meat
- 'JAPAN 2050' project

Foresight project to identify challenges Japan will face soon, e.g. issues caused from hyper aging/declining population, and solutions.

Further information:
https://chance-network.jp/ (Japanese Only)

Engaging Stakeholders in Setting Research Priorities (Qatar)

Qatar National Research Fund (QNRF) organised a series of meetings for the stakeholders during 2016 to deliberate and generate its research priority themes for its leading funding programme. The approach resulted in a comprehensive set of priorities that spanned all four pillars of QNRF, namely; Energy & Environment, ICT, Biomedical and Social Science. The stakeholders included decision makers and strategists from government, public sector and industry. The benefits of the approach include:

- Publicly ownership of research priorities
- Priorities that are relevant and significant
- Research proposals and projects that have better chance of being co-funded by stakeholders

EXTENDED CASE STUDIES

MISSION-ORIENTATED RESEARCH

Type of Activity	# of Cases
Research funding programme	14
Capacity building initiative	6
Policy deliberation approaches	1
Centres or other infrastructure	5
Mobility and exchanges	1

RESEARCH FUNDING PROGRAMMES

The Strategic Innovation Programmes (SIP) (Sweden)

In 2013, the Strategic Innovation Programme (SIP) was launched as the result of a collaborative initiative between the Swedish Research Council for Sustainable Development, together with Vinnova, Sweden's innovation agency and the Swedish Energy Agency. The Strategic Innovation Programmes are public-private partnerships that define strategic research agendas, involving large networks consisting of companies and research and development performers. SIP furthermore organises calls for proposals to perform research and innovation projects that involve programme actors. They work on 17 different areas, for example bio-innovation, IoT, Sustainable (Smart) Cities.

SIP's big networks make strategic cooperation between different spheres of Swedish life possible, which is an important precondition for finding sustainable solutions to global social challenges. Businesses, academia, and organisations join forces under the umbrella of these programmes to develop the sustainable products and services of the future.

The programmes are based on a joint nationally established strategic innovation agenda. The success of the programme has been guaranteed by the unique way that sector stakeholders have united behind the initiative. New stakeholders are also welcomed during the entire programme duration.

Further Information
SIP: https://www.vinnova.se/en/m/strategic-innovation-programmes/

Information on the evaluation of SIP (Only in Swedish)

- Meta-evaluation of the first round of strategic innovation programmes after six years: https://www.vinnova.se/contentassets/bfa910681fec4fc4ad92d064bdcf9e3c/metautvardering_2019-12-10.pdf
- Seminaronevaluationofstrategicinnovationprogrammes:https://www.vinnova.se/kalenderhandelser/2019/12/utvarderingar-av-sipar/
- Evaluation of strategic innovation programmes after six years: 2019: https://www.vinnova.se/publikationer/metautvardering-av-forsta-omgangen-strategiska-innovationsprogram-efter-sex-ar/

Strategic Basic Research – Selection advantage for SDG focus (Belgium)

The SBO financing channel grants to innovative research, which opens up prospects for later economic or societal applications. This initiative was launched in 2020 by Research Foundation Flanders (FWO). The term 'strategic' refers to the problem-driven and application-oriented focus of the programme. Projects should address a specific economic or societal need or challenge. The term 'basic research' refers to the need to gain knowledge beyond the current state-of-the-art before the problem can be solved. The evaluation is based on a score grid that deals with scientific quality of the proposals as well as the perspective of and vision on utilisation.

Projects with an elaborated focus on sustainable development may receive a selection advantage. For the purpose of giving a broad but still differentiating evaluation basis to the concept of sustainability that goes beyond the narrow 'environmental' interpretation, FWO delineates research topics as eligible for a 'bonus point' on sustainable development, if they deal with SDG indicators that lag behind in Flanders.

For SDGs that lag well behind their targets, remedial actions generate the greatest impact. Where adequate solutions for achieving the targets do not yet exist, strategic basic and applied research is an essential link in the societal value chain that could make the SDGs feasible. Obviously, such research can only meet its promises provided it is done in consultation with the other stakeholders of the societal pentagon (companies, government, financial institutions and citizens/associations). The latter should be supported by Letters of Intent and is subject to evaluation.

Eligible organisations are all Flemish research institutions with, additionally, optional involvement (max. 20% of the budget) of non-Flemish Research institutions.

Further information:

SDG dashboard: https://www.sdgindex.org/

Leibniz Research Alliances (Germany)

Leibniz Research Alliances (LRA) pool complementary expertise from different Leibniz institutes to pave the way for longer-term institutional collaboration and inter- and transdisciplinary research programmes with wide scientific appeal and societal relevance. LRAs also serve to mark the expertise of the Leibniz Association in large fields of research. They are central points of contact for policymakers, industry representatives, supporters, the media and the general public.

LRAs and the associated funding mechanisms have been in place for more than a decade. As of 2019/2020 a new mode of selection for LRAs is in place. It seeks to combine the bottom-up initiative inherent to scientific knowledge-creation with a strategic approach that reacts to societal needs and strategic considerations, allowing to combine research from different Leibniz institutes along different research missions, grand challenges and/or themes.

In their new mode of selection, LRAs seek to approach tasks that are of current relevance to science and society, allowing to pursue a mission-oriented research from a perspective that emphasises the strength of bottom-up research. They allow to form a critical mass, drawing together the expertise of different Leibniz institutes (and external partners), thus allowing to surpass disciplinary boundaries and to address transdisciplinary needs.

This is done mostly by two means. Firstly, proposals for new LRAs can now be handed in not just by the leadership of interested Leibniz institutes but may also be developed by Leibniz Strategy Forums (interdisciplinary lead groups, often formed by younger researchers, and nominated by the Leibniz Association's Board) and by further actors.

Secondly, research proposals are put to examination by the Leibniz Board early on in the selection process and later reviewed by external scientific experts. The Board of the Leibniz Association consists of the leadership of the organisation, including representatives from the different scientific sections of the Association, and thus seeks to ensure an interdisciplinary and strategic approach.
LRAs are open to collaborations reaching beyond the Leibniz Association, e.g. with universities, non-university research and infrastructure facilities, international research groups and industry partners.

Further information:

- Current LRA scheme: https://www.leibniz-gemeinschaft.de/en/research/leibniz-research-alliances.html
- New selection process (currently only in German): link (https://www.leibniz-gemeinschaft.de/fileadmin/user_upload/Bilder_und_Downloads/Forschung/Forschungsverb%C3%BCnde/Programmdokument_LFV_aktualisiert.pdf)

Global Challenges Research Fund (GCRF) (United Kingdom)

The Global Challenges Research Fund (GCRF) is a £1.5 billion fund announced by UK Government (UK Research and Innovation (UKRI)) in late 2015 to support cutting-edge research that addresses the challenges faced by developing countries. Alongside the other GCRF delivery partners we are creating complementary programmes that:

- Promote challenge-led disciplinary and interdisciplinary research, including the participation of researchers who may not previously have considered the applicability of their work to development issues
- Strengthen capacity for research, innovation and knowledge exchange in the UK and developing countries through partnership with excellent UK research and researchers
- Provide an agile response to emergencies where there is an urgent research need.

The GCRF provides a unique opportunity to build a global community of researchers committed to sustainable development and the eradication of poverty. It complements, but also significantly expands and develops, other forms of international and multinational funding for development research, including governments, non-governmental bodies and foundations. The GCRF will allow UK research excellence to be deployed in a strategic way to generate solutions to the most significant and complex problems faced by developing countries while at the same time strengthening their research capability.

The GCRF is aimed first and foremost at addressing global sustainable development challenges, and is intended to transform the lives of the worlds' poorest. The starting point for research and innovation funded through GCRF should therefore be a significant problem or development challenge. One particularly innovative aspect of the GCRF is The GCRF Challenge Leaders, who are responsible for the building and success of individual GCRF challenge portfolios and together collectively responsible for maximising the portfolios' overall research excellence and real-world impact.

The GCRF looks to develop strategic relationships with key partner organisations in developed and developing countries, to ensure complementarity and avoid duplication, and explore, where appropriate, opportunities for joint or aligned activities. The GCRF furthermore focuses on challenges that are manifest within countries on the OECD Development Assistance Committee (DAC) list. Delivery partners have oversight of the portfolio to ensure that, in line with the UK aid strategy, the potential for impact on countries where development challenges are most acute is realised.

Further information:

Global challenges research fund:

- https://www.ukri.org/research/global-challenges-research-fund/
- GCRF Evaluation Foundation Stage:

- GCRF Evaluation Foundation Stage – final report: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/810137/GCRF_Evaluation_Foundation_Stage_Final_Report.pdf

FAPESP and Canada's International Development Research Centre (IDRC): Innovations for marginalised youth economic inclusion

In December 2017, FAPESP (São Paulo Research Foundation) and IDRC (International Development Research Centre) signed a research collaboration agreement to "…support scientific and technological cooperation between researchers supported by IDRC, and researchers supported by FAPESP, through the funding of joint research projects". The aim of the agreement is to build connections and networks among researchers in Latin America working to address similar development challenges. In the framework of this agreement in 2018, IDRC and FAPESP carried out a joint call for proposals on "Innovations for marginalized youth economic inclusion".

The objective of the call for proposals was to support the generation and systematisation of knowledge, innovation and evidence to foster economic inclusion for marginalised youth in Brazil and other Latin American and Caribbean countries. The call aimed to identify promising innovations and support piloting, learning and evaluation. It also wished to identify innovations that are being implemented and can be scaled up.

The joint call selected the project Coletiva Jovem (Youths Do Collective), a research and action project aimed at supporting production-oriented youth groups in the outskirts of São Paulo and Buenos Aires. This project is a collaboration between researchers at the Universidad Federal de San Carlos (UFSCar, Brazil) and the Facultad Latino Americana de Ciencias Sociales (FLACSO, Argentina). The research team located in Sao Paulo and led by Maria Carla Corrochano, while the research team in Buenos Aires led by Ana Miranda.

The project duration is two years and has two phases. During the first phase the central objective is to identify and analyse the employment and income creation initiatives on the part of youth groups and institutions in the peripheral areas of Sao Paulo and Buenos Aires. During the second phase of the research support centres will be created in both Sao Paulo and Buenos Aires for the productive inclusion of youth, with the participation of youth organisations, unions, commercial entities, government agencies, and civil society representatives.

Further information

Call for proposals:

- https://fapesp.br/en/11598/call-for-proposals-fapesp-and-canadas-international-development-research-centre-idrc-innovations-for-marginalized-youth-economic-inclusion
- Coletiva Jovem (Youths Do Collective): a research and action project aimed at supporting production-oriented youth groups in the outskirts of São Paulo and Buenos Aires:
- https://fapesp.br/en/12158/fapesp-announces-call-results-with-idrc-canada
- Community strategies for social inclusion:
- https://www.conicet.gov.ar/estrategias-comunitarias-para-la-inclusion-social/

Grant Programme for Universities and Research Centres (Saudi Arabia)

Launched by the King Abdulaziz City for Science and Technology (KACST) in 2017, the Grant Programme for Universities and Research Centres aims to improve Saudi Arabia's ability in producing world-class technical content, by developing the infra-structure, workforce, and tools needed for R&D in order to sustain technical content production, which ties strategically to achieving the vision of Saudi Arabia 2030.

The programme was designed to distribute funding with the aim to increase potential outcomes by allowing entities to compete within specific subcategories. One subcategory was the Targeted Research Program (TRP) which introduced four grant competitions that have a serious and short-term impact on the country. The first program launched was The MERS-CoV grant programme, which encouraged research teams around Saudi Arabia with various backgrounds, to tailor their goals and proposals to combat the spread of the MERS-CoV infection in Saudi Arabia. This programme is still running, and initial results are encouraging.

The Grant Programme involved collaborators from around the world. It has participated with hundreds of international researchers and tens of international institutes. It has also engaged in the higher education of multiple students around the world. All Research and Development (R&D) departments and institutes in Saudi Arabia can participate in the programme. The Grant programme aims to produce several scientific papers and patents.

The immediate stakeholders are mainly the research and development groups, and they provide quarterly reports plus day-to-day communication through the GPURC portal. Feedback is collected after each communication and are evaluated and responded to within days. Yearly reports show the general feedback from the R&D groups. Some sub-categories programmes have other stakeholders, e.g. MOH in the case of MER-CoV, and they provide regular feedback through quarterly committee meetings.

Science and Technology Research Partnership for Sustainable Development (SATREPS) (Japan)

SATREPS, introduced in 2008, aims to acquire new knowledge and technology that lead to the resolution of global issues and the advance of science and technology. Through this process, SATREPS seeks to create innovative interventions. International joint research under this programme also aims to enhance the research and development capabilities of developing countries that will work towards sustainable research systems able to address and resolve issues.

SATREPS projects are chosen and developed in accordance with the following innovation criteria, namely:

1. To envisage project outcomes being applied for the benefit of broader society as well as developing countries;
2. To provide research and development and build research capacity for research on urgent issues in developing countries that lacks proper resources and access; and
3. To contribute to the resolution of global issues and scientific and technological progress.

JST and JICA (Japan International Cooperation Agency), which manages ODA, collaborate to fund research projects. JST provides financial support to the Japanese research institutions for the project activities in Japan and JICA provides financial support to the research institutions in the ODA recipient countries within the framework of technical cooperation. The principal investigator (PI; applicant) must be affiliated with a Japanese research institution; be able to fulfil the duties as principal investigator for the international joint research project; and be able to engage in the international joint research from start to finish.

"Japanese research institutions" refers to universities, national institutes of technology, independent administrative institutions, public-sector research and development institutes, public-service corporations, or private-sector corporations.

Each SATREPS project is evaluated according to the programme's aims:

1. Building win-win relationships between Japan and counterpart countries in Science and Technology;
2. Addressing global issues and advancing science; and
3. Boosting self-reliant R&D capacity and sustainable research systems, training human resources and coordinating networking between researchers.

Finally, SATREPS aims for practical utilisation and implementation of research outcomes to contribute to society.

Further information:
SATREPS:
https://www.jst.go.jp/global/english/index.html

National Research Priority Programme (NPRP) – Cluster Track, NPRP-C (Qatar)

In 2018, QNRF (Qatar National Research Fund) launched its NPRP-Cluster, which aimed at funding large proposals that address significant priorities in a holistic approach, which were multidisciplinary, multi-institutional and multi-faceted. The idea was to create consortia of researchers and stakeholders to work together to tackle a topic of national significance and importance. A total amount of $5 million was allocated for five years.

The initiative's topics were generated through consultations with relevant stakeholders. This year's programme called for research proposals in four areas:

1. Carbon Capture and Utilisation
2. Towards Clinical Implementation of Precision Medicine
3. Cyber security of Qatar's Critical Infrastructure, and
4. Education

QNRF received 25 proposals covering all four topics. The applications had significant components of collaboration and co-funding and engagement of national stakeholders.

Solution-Driven Co-creative R&D Programme for SDGs (SOLVE for SDGs) (Japan)

SOLVE for SDGs is a funding programme launched in 2020 to support integrated activities of stakeholder's engagement and action utilising STI aiming at the achievement of SDGs in local areas.

The programme aims to support research and development endeavours, with a specific focus on the scenario creation phase of projects. The focus will be mainly on creating solutions to solve challenges, while the advancement of science and technology will not necessarily be prioritised. Team-building exercises will be a requirement for applicants, and the person responsible for the implementation process will also be expected to participate.

This initiative is conducted by two departments at JST (Japan Science and Technology Agency): Department for Promotion of Science in Society, Research Institute of Science and Technology for Society (RISTEX). Any organisations based in Japan (university, private company, NGO, local government etc.) working to solve the societal challenges in Japan, can apply for funding.

Further information:
https://www.jst.go.jp/ristex/examin/sdgs/solve.html (Not available in English)

Thematic Grand Challenge Research Programme, TGRP (Qatar)

Qatar National Research Fund (QNRF) teamed up with several important national and international partners to jointly launch calls on topics of mutual relevance. Examples of these calls are:

1. Joint call with TUBITAK (the Turkish funding agency). Two calls were launched on Cybersecurity and Smart Manufacturing.
2. OSRA call, jointly funded with the Doha International Family Institute. Four calls launched on topics relating to Arab family issues.
3. Joint call with Belmont Forum. The Forum is a consortium of 12 international funding agencies. Thus far three calls were launched, including the latest one on Disaster Resilience.
4. Food Security call jointly launched with the Ministry of Municipality and Environment, MME, in Qatar. The first call was launched recently and focused on local food production.

The central objective of the TGRP calls is to provide funding for projects that address a "grand challenge". The mechanism of ensuring the achievement of that objective is to team up with a strategic counterpart to ensure availability of resources and uptake of the research findings.

PILOT-E (Norway)

PILOT-E is a mission-oriented instrument addressing the energy challenge by combining funding schemes from three agencies and tailoring them into a one-stop-shop for targeted projects. Launched in 2016 as a collaborative initiative by the Research Council of Norway, Enova and Innovation Norway, the basic idea is to combine existing financial schemes and instruments from the three participating institutes to mobilise and speed up the process for R&D to market. Each project should have a plan all the way to market to get funding.

The innovative aspect of PILOT-E is giving access to different schemes already existing with one application, thus simplifying the application process and reduce the financial risk for the companies in the participating consortia. The consortia are all coalitions of partners from industry, R&D institutes, and end-users.

The simplified and streamlined application process makes it easy for public funding agencies, political structures and those working in the industry, to apply. Finally, the idea is to see the projects materialise in the concrete deliveries planned in the application, e.g. a vessel, a truck, or a new industrial process. If this is the case the project will be considered as successful.

Further information: www.pilot-e.no

SFI Industry Fellowship Award (Ireland)

The Industry Fellowship Award supports a post-doctoral researcher or academic member of staff in an Irish research body to go from academia to industry, or an industrial researcher to spend time in academia to work on an industrially relevant research project.

The Industry Fellowship programme supports collaborative research activities that span most areas of STEM and is open to all industry sectors. It is open to Ireland or internationally-based research-performing companies and academic institutions in Ireland. There is no requirement for the company to have an existing Irish base and if the researcher is moving to the company they can go anywhere in the world.

Fellowships can have a duration of between one and 12 months if full-time, and between two and 24 months if part-time. The maximum SFI contribution to an Industry Fellowship award is €100 000 (which typically funds the salary and other costs of the researcher working in the company). Industry is required to support direct research costs, i.e. materials and consumables, which are not funded by SFI.

At the end of the fellowships, there are no restrictions regarding future engagement of the awardees and the host institutions. In the case of academic researchers moving to industry, the company can employ the person, the individual can move to another company or academia, or the individual can remain in any overseas country (subject

to legal regulations). There is no limit to the number of projects a company can apply for and new applications can be made at any time, in line with the programme calls.

There are two fixed call deadlines annually, one mid-year and one at the end of the year. Submitted proposals are subject to international peer review.

Further information:
https://www.sfi.ie/funding/funding-calls/sfi-industry-fellowship-programme/

SFI Strategic Partnerships (Ireland)

The Strategic Partnerships are a flexible mechanism for industry to engage with world-class academic researchers and have access to infrastructure and generate intellectual property. These partnerships support collaborative research activities that span most areas of STEM and is open to all industry sectors. It is particularly suitable for, but not limited to, pioneering research. It is aimed at supporting stand-alone initiatives of scale with strong potential for economic and societal impact for Ireland.

Any company is eligible to apply, regardless of their size, scale or location. The proposed research programme is funded 50/50 by the company and Science Foundation Ireland. There is no minimum or maximum project duration. It is up to the applicants to propose the most suitable duration for their project.

At the end of the partnerships, these may be expanded, or new partnerships proposed, both subject to satisfactory international peer review of the new proposal.

This programme is always open, and applications can be submitted at any time. Proposals are first evaluated as a simple expression of interest, following which a full proposal is submitted which undergoes international peer review.

Further information:
https://www.sfi.ie/funding/funding-calls/sfi-strategic-partnership/

Challenge-based Funding Models (Ireland)

Science Foundation Ireland (SFI) is currently taking multiple, complementary approaches to the development and implementation of challenge-based funding to enhance delivery of societal impact from government-funded research. As part of the development and design process, SFI has undertaken extensive engagements with international agencies involved in challenge-based funding, such as the Gates Foundation, the Institute of Innovation and Public Purpose (IIIP, UCL), NSF, NESTA, DARPA and INNO+. SFI is taking both a "top-down" and a "bottom-up" innovator-led approach that focuses on supporting small convergent challenge teams to identify and validate challenges in unconventional ways.

"Bottom-up": SFI has to date launched three bottom-up challenge calls. The first call was an open (non-themed) call the SFI Future Ireland Innovator Prize. The key features of this initiative are a significant focus on team formation, convergence of ideas and disciplines, and both challenge and solution validation. The structure is also different to "standard" research calls, as teams participate in a number of workshops – including evidence-based entrepreneurship, systems design, communications and societal impact measurement.

During 2019, SFI launched two additional Future Innovator Prize calls – one in the area of AI for Societal Good and one in the area of Climate Action - Zero Emissions. Research teams were invited to compete for a €2 million prize award to address one of these significant societal challenges This could be through the development of a disruptive STEM-based solution that either leverages artificial intelligence or that has transformative impact potential in achieving net-zero greenhouse gas emissions in Ireland by 2050.

"Top-down": SFI is currently working through the identification and validation of compelling challenges for Ireland through analysis of national policy, consultation with key stakeholders, evaluation of Ireland's competitive edge and evidence and awareness of societal importance, prior to launching a number of top-down (narrow focus calls). Certain factors may be identified as part of this process which would strengthen the argument for taking the challenge-based route. These might include: the need to incentivise activity directed a particular problem, the need to raise awareness of a problem, the need to bring expertise from different disciplines together, the need to include non-technical expertise in the scoping of the solution and the adoption and regulation of the proposed solution.

Further information:
- https://www.sfi.ie/challenges/future-innovator-prize-18/
- https://www.sfi.ie/funding/funding-calls/future-innovator-prize/
- https://www.sfi.ie/funding/funding-calls/future-innovator-climate/

CAPACITY BUILDING INITIATIVE

ArcticNet (Networks of Centres of Excellence) (Canada in collaboration with 11 other countries)

ArcticNet is one of 63 networks of researchers, universities, public and private partners to be funded during the 30 year history of the Networks of Centres of Excellence Programme of Canada's federal science funding agencies. ArcticNet represents Canada's largest commitment to date to explore the social, economic and environmental impacts of climate change and modernisation on the coastal Canadian Arctic. More than 150 researchers from 34 Canadian universities collaborate with federal, provincial and territorial agencies and departments, Inuit organisations and industry partners to conduct complex assessments of the regional impacts of climate change. ArcticNet's vision is a future where improved observations, modelling, capacity-building and knowledge exchange enable researchers, Inuit, Northerners and decision-makers to jointly develop adaptation strategies minimising negative impacts and maximising positive outcomes resulting from the transformation of the Canadian Arctic. ArcticNet's activities relate closely to Sustainable Development Goals #13 – Climate Action.

ArcticNet reports to a diverse board, with day-to-day operations led by an administrative centre. Federal granting agency funds flow to the network's host university and are strategically and competitively distributed by the network to investigators based at other post-secondary institutions who become network members. A Research Management Committee evaluates responses to calls for proposals and recommends funding decisions to ArcticNet's Board of Directors. ArcticNet researchers collaborate with research teams in Denmark, Finland, France, Greenland, Japan, Norway, Poland, Russia, Spain, Sweden, the United Kingdom and the USA. Partners involved include federal and provincial government departments, Inuit organisations, mining, fishing, shipping, and tourism industries. Partners are involved in the governance of the network at the Board level and in network committees.

As indicted above NCE grantees are evaluated annually by a peer review committee that helps ensure grantees deliver on promises. Furthermore, granting agency staff sit on observers on network Board and committees to ensure programme rules are followed and share best practices. Networks are evaluated against progress on five criteria: Management of the Network; Excellence of the Research Programme; Development of Highly Qualified Personnel (HQP); Networking and Partnerships; and Knowledge and Technology Exchange and Exploitation (Knowledge Mobilisation).

Further information:
Annual reports from ArcticNet available on the following website:

- https://arcticnet.ulaval.ca/annual-reports
- An evaluation of the NCE programme is available from 2015:
- https://www.nce-rce.gc.ca/ReportsPublications-RapportsPublications/ProgramEvaluations-EvaluationsProgrammes_eng.asp
- Photos are available from the ArcticNet website:
- https://arcticnet.ulaval.ca/

IC-IMPACTS Canada-India Research Centre of Excellence (Networks of Centres of Excellence) (Canada & India)

The India-Canada Centre for Innovative Multidisciplinary Partnerships to Accelerate Community Transformation and Sustainability (IC-IMPACTS) is one of 63 networks of researchers, universities, public and private partners to be funded during the 30-year history of the Networks of Centres of Excellence Program of Canada's federal science funding agencies. IC-IMPACTS is funded through a specialised NCE initiative known as the Canada-India Research Centre of Excellence (CIRCE) initiative designed to strengthen research ties between Canada and India in areas of mutual strategic importance.

IC-IMPACTS and its partners are developing and implementing community-based solutions to meet the most urgent needs faced by some communities in Canada and India: poor water quality, unsafe and unsustainable infrastructure, and poor health from water-borne and infectious diseases. Research projects are co-led by a Canadian PI and an Indian PI and funding is provided by both the Canadian and the Indian government through the Indian Department of Biotechnology (DBT) and Department of Science and Technology (DST). IC-IMPACTS activities relate closely to Sustainable Development Goals #3 (Good Health and Well Being), #6 (Clean Water and Sanitation) and #9 (Industry, Innovation and Infrastructure).

IC-IMPACTS reports to a diverse board, with day-to-day operations led by an administrative centre. Like other NCE grantees, IC-IMPACTS was awarded funding in a two-stage competition. NCE grantees are evaluated annually by a peer review committee that helps ensure grantees deliver on promises. Oversight, monitoring and support of all grantees is undertaken by the granting agencies through a dedicated NCE Secretariat. NCE Secretariat staff liaisons sit on boards and sub-committees. Granting councils will have contributed $22 million to IC-IMPACTS over the period 2014-2021.

As indicted above NCE grantees are evaluated annually by a peer review committee that helps ensure grantees deliver on promises. Furthermore, granting agency staff sit on observers on network Board and committees to ensure programme rules are followed and share best practices. Networks are evaluated against progress on 5 criteria: Management of the Network; Excellence of the Research Programme; Development of Highly Qualified Personnel (HQP); Networking and Partnerships; and Knowledge and Technology Exchange and Exploitation (Knowledge Mobilisation).

Further information:
Annual reports from IC IMPACTS are available on their website:

- https://ic-impacts.com/about/reports/
- An evaluation of the NCE programme is available from 2015:
- https://www.nce-rce.gc.ca/ReportsPublications-RapportsPublications/ProgramEvaluations-EvaluationsProgrammes_eng.asp
- Photos are available from the IC IMPACTS website
- https://ic-impacts.com/

PrioNet (Networks of Centres of Excellence) (Canada)

PrioNet was launched in 2005, and is one of 63 networks of researchers, universities, public and private partners to be funded during the 30-year history of the Networks of Centres of Excellence Programme of Canada's federal science funding agencies. PrioNet was established to respond to a targeted call for a national Canadian network on Bovine Spongiform Encephalopathy (BSE) and other Transmissible Spongiform Encephalopathies (TSE) in 2005. BSE was a global grand challenge that caused an estimated $6 billion in economic losses to Canada suffered when domestic BSE was identified in Alberta in 2003. PrioNet Canada achieved international attention for scientific advances and risk management strategies directed at controlling prion diseases, and after NCE funding ended, it directed capacity into therapeutic solutions for prion-like diseases of aging, such as Alzheimer's and Parkinson's.

PrioNet partnered with over 90 government and non-government partners during its seven-year mandate and developed patented technologies for prion detection as well as an integrated risk model for prion disease expansion that helped form the basis for public policy. The network funded 82 research projects and quadrupled the number of prion researchers in Canada from 29 in 2005 to 122 in 2012.

Like other NCE networks, PrioNet was initiated by a scientist but the network was required to incorporate as not-for-profit organisation that reports to a diverse board, with day-to-day operations led by an administrative centre. Federal granting agency funds flow to the network's host university and are strategically and competitively distributed by the network to investigators based at other post-secondary institutions who become network members.

As with all NCEs, PrioNet was awarded funding in a two-stage competition. NCE grantees are evaluated annually by a peer review committee that helps ensure grantees deliver on promises. Oversight, monitoring and support of all grantees is undertaken by the granting agencies through a dedicated NCE Secretariat. NCE Secretariat staff liaisons sit on boards and sub-committees. Granting councils contributed $35 million to PrioNet over the period 2005-2012.

As indicted above NCE grantees are evaluated annually by a peer review committee that helps ensure grantees deliver on promises.

Further information:
An evaluation of the NCE programme is available from 2015: https://www.nce-rce.gc.ca/Index_eng.asp

Science & Technology Support Programme (Korea)

The National Research Foundation of Korea (NRF KOREA) launched the Science and Technology Support Programme during 2006, to reinforce S&T development and R&D capabilities of developing countries by supporting cooperation of universities and research institutes between Korea and developing countries.

The support programme consists out of two types of programmes:

- The International cooperation programme between institutes from Korea and partner countries. This programme supports a variety of collaborating activities, such as doing research together, studying local demands and condition, technology transfer and technical guidance, etc. in order to reinforce research capabilities of partner countries. Each project is supported by KRW 100 million(≈ USD 90 000) per year, for three years.
- The Global problem-solving centre programme. This programme supports the establishment of a centre in the partner country and send Korean scientists to the centre, to help with research, develop human resources, commercialise, etc. Each project is supported by KRW 500 million(≈ USD 450 000) per year, for four years.

Partnerships and collaborations are formed between Korean institutes and partner countries' institutes, who sign MOU's and do research together. The beneficiaries of this programme are researchers, universities, and citizens in partner countries. This programme supports 20 countries, including 16 international cooperation teams, four centres in 2019. We have supported advanced technologies in Sri Lanka, Nepal, Cambodia, Myanmar, etc., and established local centres to develop local technologies in Cambodia, Laos, Tanzania, Vietnam, etc.

One example of a great outcome of the programme, is the international cooperation between Yeonsei university dental college, Korea, and Peradeniya Dental College, Sri Lanka. In order to address the problem of oral cancer, Researchers in Sri Lanka have been sent to Korea for education, and both universities held international conferences on oral cancer together to improve research capabilities.

The global problem-solving centre in Nepal generates $36 000 in sales through technology transfer and commercialisation, and trains 772 people through entrepreneurship training.

Further information:
NRF Korea (https://www.nrf.re.kr/eng/index)

National Science Challenges (New Zealand)

The National Science Challenges are a government-funded initiative, established by the Ministry of Business, Innovation and Employment (MBIE) in 2014 to tackle the biggest science-based issues and opportunities facing New Zealand. This initiative enables a long-term (10-year) strategy for managing and co-ordinating mission-led science investments, and provide an opportunity for New Zealand's top researchers to work collaboratively across disciplines and institutions. Collectively, they are expected to deliver measurable progress on the national-scale issues, but they will also enhance the reputation of New Zealand science, build research capability and lead to better engagement between researchers, end-users and Māori.

The 11 Challenges represent a new way of funding research in New Zealand. Each has a host organisation (NZ research institute or University) and Governance Group, and individual Challenges are given the responsibility, freedom and flexibility to develop a research and business plan. The Challenge framework supports the integration of new ideas and allow for researchers and collaborations to refresh and renew. In addition, all research must give effect to the Vision Mātauranga policy – a government framework that recognises Māori as important partners in Science and Innovation in New Zealand.

As the Challenges represent national-scale issues, they are intended to deliver national benefit in areas such as health, housing, biodiversity, technology, agriculture and climate change.

MBIE regularly monitors and assesses the performance of each Challenge individually, based on information gathered at meetings or informal interactions, and assessment of annual progress reports and updates. A mid-way review was conducted in 2018 by MBIE's Science Board; the statutory body responsible for making independent investment decisions for a number of MBIE funds. The Science Board's decisions were informed by independent review panels, which conducted assessments of each Challenge's future strategy and past performance. The Board agreed to fund all 11 Challenges at the maximum funding amount for 2019-2024, bringing the total investment to $680.8 million.

MBIE commissions an independent survey of stakeholder satisfaction with individual NSCs. This includes feedback on involvement, engagement and collaboration with the Challenge, as well as Māori engagement and use of Mātauranga Māori (traditional knowledge).

Link to Mid-way review:
https://www.mbie.govt.nz/science-and-technology/science-and-innovation/funding-information-and-opportunities/investment-funds/national-science-challenges/mid-way-review/

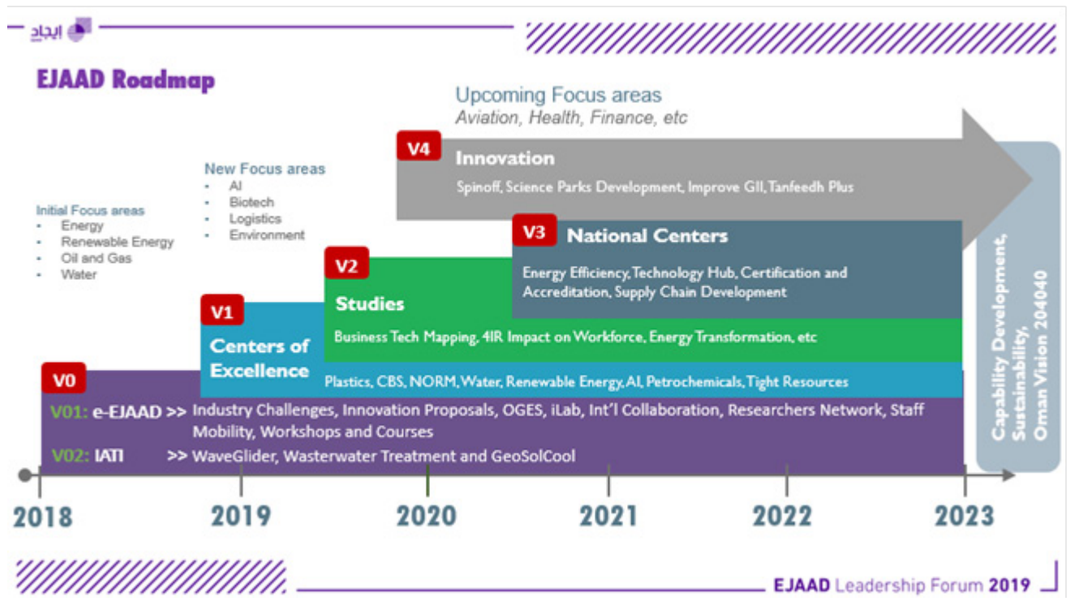
Further information about the National Science Challenges can be found below:

- https://www.mbie.govt.nz/science-and-technology/science-and-innovation/funding-information-and-opportunities/investment-funds/national-science-challenges/
- https://www.mbie.govt.nz/science-and-technology/science-and-innovation/funding-information-and-opportunities/investment-funds/national-science-challenges/key-documents/

EJAAD (Oman)

EJAAD – as a national mission oriented innovation vehicle – was established in 2018 with a shared vision of more than 50 stakeholders from industry, academia and government in the Sultanate of Oman. EJAAD has the following objectives: (1) strengthen synergies between industry, academia and government; (2) provide the industry with applied, practical and competitive technological solutions; (3) stimulate the establishment of Centers of Excellence; and (4) develop to be Oman's Consultancy Corporate in the areas of focus. EJAAD is expected to considerably impact Oman's ranking in Global Innovation Index, Global Competitiveness Index and certainly in Oman Vision 2040. EJAAD features in 69% of the Vision Priorities and has a direct link to more than one third of its Key Performance Indicators.

A simple R&D and Innovation Protocol was created to resemble the main roles and responsibilities each sector should play, i.e. industry, government, academia. The protocol also highlights the integrative value proposition of this approach. This protocol was the 'innovative' framework to engage with more than 50 players in the market. EJAAD has also created focal points within each institution to govern and assure sustainable growth. The protocol was then translated to the following working roadmap:



Locally partnerships and collaborations include all energy industry sectors, all local academia and research institutions and governmental organisations. International partners are the IEA, Hydrogen Council, UNIDO and the EU Commission.

Stakeholders from industry, academia, biotech, logistics and environmental sectors can apply, as well as government stakeholders.

Further information:
Website: www.ejaad.om

POLICY DELIBERATION APPROACHES

National Research Programmes (Sweden)

In 2017, the Swedish government initiated seven national research programmes to address societal challenges. The national research programmes are broad, 10-year initiatives with the purpose to address societal challenges. Key objectives of the national research programmes are: to contribute to solve societal challenges; to be long term (duration of ten years); and to create synergies between existing actions, to avoid unnecessary overlap and to build on cooperation and coordination. The national programmes are based on strategic research agendas, which will provide and orientation of the research fields, of research funding institutions and of actors active in research communication.

The responsibility of these national research programmes are shared among national research funders in Sweden. The Swedish Research Council is responsible for the research programmes on migration and integration, as well as on antibiotic resistance.

The set-up is a programme management within the Research Council and a broad participation from other agencies and entities in management boards and reference groups.

Specific calls are launched for the national research programmes.

Alignment is made with international cooperation, when possible (such as with Nordic collaboration for migration and integration and the JPIAMR partnership programme for antibiotic resistance).

Further information:
- https://www.vr.se/english/mandates/funding-and-promotingresearch/
- migration-and-integration---national-research-programme.html
- https://www.vr.se/english/mandates/funding-and-promoting-research/antibiotic-resistance---
- national-research-programme.htm

CENTRES OR OTHER INFRASTRUCTURE

Department of Science and Innovation (DSI) – National Research Foundation (NRF) Centres of Excellence (CoEs) (South Africa)

Established in 2004 and with a combined investment of USD 84 million thus far, the Department of Science and Innovation (DSI) - NRF Centres of Excellence (CoEs) are physical and virtual centres of research committed to developing novel ideas that focus on critical matters facing South Africa. The CoEs concentrate on existing capacity and resources to enable researchers to collaborate on projects that are locally relevant and internationally competitive. There are fourteen CoEs, as well as the National Institute for Theoretical Physics and the Centre for Indigenous Knowledge Systems, both of which are implemented aligned to the CoE modalities. The aims of a CoE are to: (1) promote knowledge and human capital in areas of strategic importance to South Africa; (2) Promote collaborative research; (3) promote and develop interdisciplinary research; (4) systematically develop a creative research training environment that is internationally competitive; (5) strive for the highest standards of quality, international competitiveness and esteem of their science; and (6) diffuse knowledge to where it is needed.

The implementation of COEs is significantly dependent on four models of partnerships: (1) local collaborations- with national, provincials and local government, national research facilities, science councils, and independent research institutes; (2) universities (local and abroad)- COEs are often hosted by more than 2-3 universities with a host of collaborators from international university partners; (3) international development and other partners.

CoEs are awarded on a competitive basis through a combination of open and focused calls to publicly funded Higher Education Institutions (HEIs) including Science Councils. CoEs are annually monitored by suitably appointed Steering Committees. Of particular interest is a CoE's strategic direction and financial control. Steering Committees can recommend the closure of Centres if progress is not satisfactory and aims and targets are not met. Stringent external renewal/continuation evaluation are performed in year five indicating outputs, outcomes and (expected) impact of NRF support.

Both the CoE Funding Instrument and the individual CoEs are subjected to reviews and which include interviews with representatives of the affected stakeholder communities, and which are captured in the review reports of the independent review panels.

Further information:
- Centre for Invasion Biology: http://academic.sun.ac.za/cib/
- Centre for Tree health biotechnology: https://www.fabinet.up.ac.za/research-groups/dst-nrf-centre-of-excellence-in-tree-health-biotechnology
- Centre for Catalysis: http://www.catcentre.uct.ac.za/
- Centre for Strong materials: https://www.wits.ac.za/strongmaterials/
- Centre for Epidemiological Modelling and analysis: http://www.sacema.org/
- Centre for Biomedical TB Research: http://www.tuberculosis.org.za/
- Centre for Birds as Keys to Biodiversity Conservation: http://www.fitzpatrick.uct.ac.za/fitz/about/excellence
- Centre for Theoretical Physics: https://nithep.ac.za/
- Centre for Palaeosciences: https://www.wits.ac.za/coepalaeo/
- Centre for Human development: https://www.wits.ac.za/coe-human/
- Centre for Mathematical & Statistical Sciences: https://www.wits.ac.za/coe-mass/
- Centre for Food security: https://www.uwc.ac.za/Faculties/CHS/soph/Pages/The%20Centre-of-Excellence-in-Food-Security.aspx
- Centre for Integrated Minerals & Energy Resource Analysis:
- https://www.uj.ac.za/faculties/science/geology/Pages/Cimera.aspx
- Centre for Scientometrics & STI Policy: http://www.sun.ac.za/english/research-innovation/Research-Development/dst-nrf-centre-of-excellence-in-scientometrics-and-science-technology-and-innovation-policy
- Centre for HIV prevention: https://www.caprisa.org/

MEOPAR (Networks of Centres of Excellence) (Canada)

The Marine Environmental Observation, Prediction and Response Network (MEOPAR) facilitates partnerships between academia, government, the insurance industry, the oil and gas sector, the marine transportation sector, ocean

technology firms, coastal communities and not-for-profits, to reduce Canada's vulnerability to marine hazards and emergencies. MEOPAR funds leading-edge, multidisciplinary and collaborative research, trains the next generation of marine professionals, and connects with partners, stakeholders and end users to anticipate, plan and adapt to the opportunities and challenges of a changing ocean environment. MEOPAR's activities relate closely to Sustainable Development Goal #13 (Climate Action) and #14 (Life Below Water).

A particularly important achievement of MEOPAR is co-creation of the Canadian Integrated Ocean Observing System (CIOOS). Formally announced in 2019, the pilot programme has established regional nodes nationwide, creating formal partnerships with the Ocean Frontier Institute (OFI), Dalhousie University, the Coastal and Ocean Information Network (COIN) Atlantic, the Fisheries and Marine Institute of Memorial University of Newfoundland, the Ocean Tracking Network (OTN), the St. Lawrence Global Observatory, the Tula Foundation, and Ocean Networks Canada (ONC) at the University of Victoria. This initiative links Canadian researchers and connects Canada to the international research community, and improves our ability to observe, predict and respond to a changing marine environment.

Like other NCE networks, MEOPAR is initiated by a scientist but the network must incorporate as not-for-profit organisation that reports to a diverse board, with day-to-day operations led by an administrative centre. Federal granting agency funds flow to the network's host university and are strategically and competitively distributed by the network to investigators based at other post-secondary institutions who become network members. In any given year over 30 research projects are ongoing involving over 90 research investigators, over 120 partner organisations and over 30 Canadian universities.

As with all NCEs, MEOPAR was awarded funding in a two-stage competition. NCE grantees are evaluated annually by a peer review committee that helps ensure grantees deliver on promises. Oversight, monitoring and support of all grantees is undertaken by the granting agencies through a dedicated NCE Secretariat. More than 700 highly qualified persons have been trained by MEOPAR.

Further information:

- Annual reports from MEOPAR are available on their website: https://meopar.ca/key-documents-policies/
- An evaluation of the NCE programme is available from 2015: https://www.nce-rce.gc.ca/ReportsPublications-RapportsPublications/ProgramEvaluations-EvaluationsProgrammes_eng.asp
- Photos are available from the MEOPAR website.

NSF Convergence Accelerator (USA)

The National Science Foundation's (NSF) Convergence Accelerator effort is a new capability aimed to accelerate use-inspired, convergence research in areas of national importance via partnerships between academic and non-academic stakeholders. The NSF Convergence Accelerator programme brings together teams of experts from across disciplines to focus on pre-identified grand challenge problems. The goal is to fund efforts that have a high probability of resulting in deliverables that will benefit society within a relatively short, fixed term of less than three years. The key characteristics of the grand challenges and the Convergence Accelerator approach are: to use-inspired and application-oriented problems with a focus on deliverables in a fixed-term, fed by basic research and discovery across disciplines, worked on by integrated teams including industry, academics, not-for-profits, government entities, and others.

The NSF Convergence Accelerator is a pilot programme, which issued its first grant awards in Sept. 2019, focused on two of NSF's Big Ideas: Harnessing the Data Revolution (Track A) and Future of Work at the Human-Technology Frontier (Track B). We highlight below Convergence Accelerator Track A, focused on the NSF Big Idea Harnessing the Data Revolution (HDR) that seeks to enable new modes of data-driven discovery.

To help advance the progression from data to information to knowledge - to fully harness the data revolution - NSF seeks to create an Open Knowledge Network (OKN). A knowledge network allows stored data (both structured and unstructured data) to be located and its attributes and relationship to other data and to real-world objects and concepts to be understood at a semantic level. Today, technology companies develop largely proprietary knowledge networks, often specialised for customer needs, e.g. web search, advertising placement, and question answering. Instead, the Open Knowledge Network will build public-private cooperation and engage convergence teams from all areas of data science and science and engineering domains to create a shared, non-proprietary infrastructure.

Innovative aspects include a participatory design approach that considers the needs and perspectives of the many user communities, and intensive education and mentorship which includes the "Convergence Accelerator Curriculum" of innovation, team science, as well as domain-relevant information.

Further information:

- NSF Convergence Accelerator: https://www.nsf.gov/od/oia/convergence-accelerator/
- List of grant awards for Track A: Harnessing the Data Revolution: https://www.nsf.gov/od/oia/convergence-accelerator/Award%20Listings/track-a.jsp
- NSF 10 Big Ideas: https://www.nsf.gov/news/special_reports/big_ideas/

SFI Research Centres Programme (Ireland)

The Science Foundation Ireland (SFI) Research Centres Programme was launched in 2012 to achieve this objective by creating new Research Centres and building on previously made significant large-scale investments. Seven Research Centres were funded as a result of the first Research Centres Call in 2012, five in 2013, and a further five in 2016. A key feature of SFI Research Centres is the consolidation of research activities across higher education institutes to create a critical mass of internationally leading researchers in strategic areas which become a key attractant to industry and lay the foundation for effective and productive academic and industrial partnerships. Additionally, these centres should serve as international beacons for attracting talent and leveraging non-Exchequer funding with particular emphasis on industry and Horizon 2020. The goal of SFI is to develop a dynamic Research Centre ecosystem that can evolve to meet the changing needs of industry and society. Award duration is six years, and award size can range from €1-5 million per annum in direct costs. SFI fund up to 70% of the overall Research Centre budget. A minimum of 30% of the Centre budget must be secured from industry, at least one-third of which must be cash.

The objectives of the Research Centres Programme are:

- To achieve, maintain and enhance research excellence and leadership, as measured through indicators such as publication in top-tier journals and conferences, citations, editorship of top-tier journals, and giving invited lectures at top-tier conferences;
- To deliver significant economic and societal impact – research excellence with impact – which will be aligned with areas of strategic opportunity for Ireland;
- To increase the level of industrial and commercial investment in R&D activities with existing Ireland-based companies;
- To spin out new, high-technology start-up companies that have the potential to raise external angel or venture funding;
- To transfer technology, through licences, to Multinational Companies (MNCs) and Small and Medium Enterprises (SMEs) based in Ireland;
- To transfer knowledge, expertise and know-how to MNCs and SMEs based in Ireland; and
- To engage the general public and equip them with the tools to confidently understand and debate science, technology and engineering research in Ireland.

Further information:
https://www.sfi.ie/sfi-research-centres/

Spokes Programme (Ireland)

The Spokes Programme is a flexible mechanism for industry to engage with Science Foundation Ireland (SFI) Research Centres. This programme can fund areas of STEM that are aligned with the research areas of one or more SFI Research Centres. The current Research Centres are focused on:

- Pharmaceutical Manufacture
- Software
- Digital Content
- Big Data
- Telecommunications
- Photonics
- Medical Devices
- Nanotechnology
- Marine and Renewable Energy
- Functional Foods
- Applied Geosciences
- Agri-Food
- Advanced and Smart Manufacturing
- Neurological Diseases
- Bioeconomy

Any research-active company is eligible to apply, regardless of their size, scale or location. The proposed research programme is funded 50/50 by the company and Science Foundation Ireland. At the end of the Spokes award projects may be expanded, or new projects proposed, both subject to satisfactory international peer review of the new proposal.

The Spokes Programme is always open, and applications can be submitted at any time throughout the year. Proposals are first evaluated as a simple expression of interest, following which a full proposal is submitted which undergoes international peer review.

Further information:
https://www.sfi.ie/funding/funding-calls/sfi-research-centres-spokes/

MOBILITY AND EXCHANGES

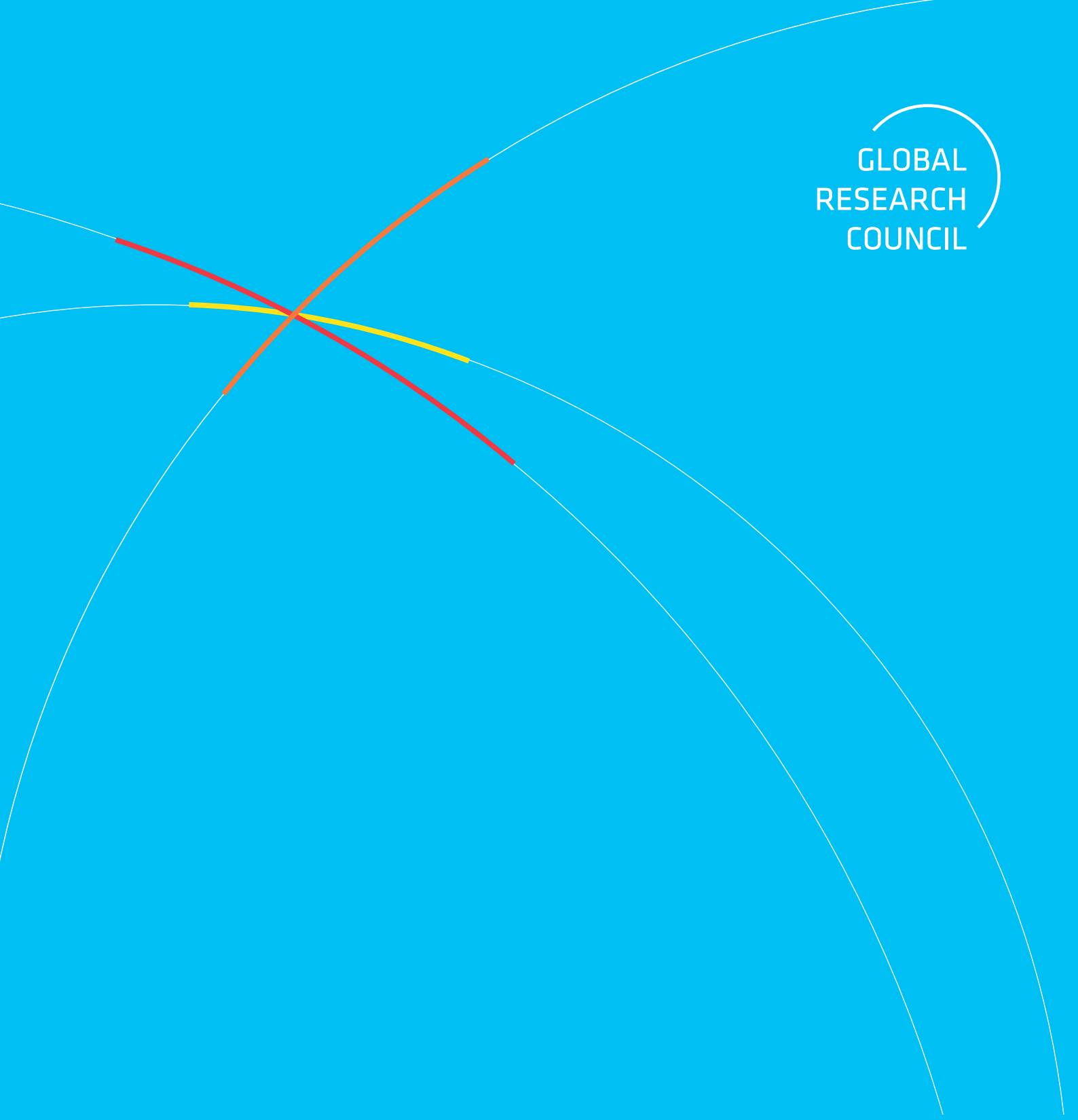
Mission-Oriented Research: Experience of National Natural Science Foundation of China (China)
Focusing on the major strategic needs of China and scientific frontiers, the National Natural Science Foundation of China (NSFC) has set up key programmes, major programmes, major research plans and other mission-oriented programmes to address major economic and social challenges. The NSFC focus on the important and frontier scientific issues to meet societal needs. With increased and continuous support, it also pays attention to the possible directions of major breakthroughs in interdisciplinary fields.

From 2018 to 2019, the NSFC allocated the special funding for "Research on major basic scientific issues–African swine fever" to address the emergency, and launched key programmes clusters "Preventing and reducing financial risks", major research plans including "Toxicology and health effects of the particulate matter in the atmosphere " and "Basic research on the causes and coping mechanism of air pollution in China", and set eight priority areas of key programmes including "Urban sewage regeneration and ecological storage".

The NSFC have strengthened the connection with the departments of various industries, establishing a systematic, normalised and in-depth coordination mechanism while taking the major national economic and social needs as an important basis for the allocation of science funds. The NSFC has also established the "joint fund for regional innovation and development" and the "joint fund for enterprise innovation and development" according to the issued paper titled the pilot work programme of the joint fund for the new era of the NSFC.

Furthermore, the NSFC has launched the "The International Cooperation Programme for Sustainable Development Goals" in 2019. Guided by the principle of "joint investment, mutual benefit and win-win cooperation", NSFC has coordinated with other funding agencies on issues of scientific research and talent cultivation targeting United Nations sustainable development goals (SDGs) to promote scientific development and enhance cultural exchanges and promote win-win cooperation.

For the partnerships or collaborations involved, the NSFC have signed framework agreements of "joint fund for scientific research of comprehensive national science centre and large-scale scientific device" with State Development and Reform Commission, the Chinese Academy of Sciences, local authorities of Beijing, Shanghai and Anhui to jointly strengthen support for the comprehensive national science centre.



These extended case studies were submitted by GRC participating organisations in support of the GRC Case Study Book. May 2021.

https://www.globalresearchcouncil.org/