



Digital Transformation
National Research Programme

Second call for proposals



FONDS NATIONAL SUISSE
SCHWEIZERISCHER NATIONALFONDS
FONDO NAZIONALE SVIZZERO
SWISS NATIONAL SCIENCE FOUNDATION

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What are National Research Programmes (NRPs)?

Research carried out by National Research Programmes consists of research projects that contribute to the solution of contemporary problems of national importance. Under the provisions of Article 10, paragraph 2, of the Federal Act on Research and Innovation of 14 December 2012 (version of 1 January 2018) the Federal Council selects the topics and foci to be researched in NRPs and mandates full responsibility for implementing the programmes to the Swiss National Science Foundation.

The Federal Ordinance on the Federal Act on Research and Innovation of 29 November 2013 (version of 1 January 2018, Article 3) describes the NRP funding scheme as follows:

¹ The National Research Programmes (NRPs) of the Swiss National Science Foundation (SNSF) are a means of generating and conducting coordinated research projects that pursue a common goal.

² Topics of research are generally appropriate for National Research Programmes if:

- a. Swiss research can make a significant contribution to the resolution of the problem;
- b. solutions require research contributions from multiple disciplines;
- c. research on the problem can be expected to produce research results that have practical applications within a five-year period.

³ In exceptional cases, an NRP may also be used for the targeted creation of additional research potential in Switzerland.

⁴ The following criteria are also taken into consideration in setting forth the topics of National Research Programmes:

- a. the programmes can provide the scientific basis for decision-making by the government and administration;
- b. the programmes can be conducted with international collaboration".

1. Background and introduction

The ultimate objective of NRP 77 “Digital transformation” is to generate knowledge about the opportunities, risks, challenges and solutions that digitalisation creates for society. The NRP will (1) analyse the impacts of digital changes in Switzerland as well as (2) develop possible interventions, experiments and solutions that will make it easier to leverage the opportunities and respond adequately to the risks, thereby paving the way for the optimal management and governance of ongoing and future digital transformations.

These objectives will be reached by:

- Analysing formal and informal education content, tools and institutions as they relate to ongoing digital change, covering the whole life span of an individual, all groups of society and considering all levels and types of education as well as the educational institutions and their systemic dynamics;
- Understanding how digital transformation (1) can alter peoples’ conception of ethical behaviour (on the individual and societal level) as well as the development of trustworthiness and (2) how it can be managed to the benefit of people and societies, while safeguarding trustworthiness, public values and fundamental rights;
- Generating knowledge about the opportunities and risks of digital transformation at all levels of the Swiss economy (macro-, meso- and microlevels) and for the individual regions and environment types (urban and rural spaces), identifying the related interdependencies in view of the transformation and studying opportunities and risks in the labour market. These results will be gathered with a special focus on the Swiss political, social and economic setup by considering the impact of these changes on policy areas, such as regional and spatial development, mobility, health and the environment.

Following the initial call for proposals, the National Research Council approved 37 projects based on the recommendations made by the NRP 77 Steering Committee. According to the Committee, there are relevant gaps with regard to the topics addressed in modules 1 and 2, and there is still funding available for these modules.

For this reason the Steering Committee has approved an amount of CHF 5.4 million to support potentially two to three further research projects for module 1 and approximately five to six research projects for module 2 in the context of a second call for proposals. No additional funds are available for projects in module 3, and consequently no further submissions are possible for this module.

2. Purpose and themes of the second call

Module 1: “Education, learning and digital change”

The Steering Committee expects to finance three more projects in module 1. A total of CHF 1.8 million is available for projects that address the following topics:

This module investigates the implications of digitalisation for education and learning in society, analyses the opportunities, challenges and risks, and develops strategies for managing the transformation of the education system. Research proposed for this module may concern all facets of learning and education from early childhood through to older adults and specific subgroups of society, including all types (formal, informal) of educational settings (compulsory and grammar school, vocational training, universities, job-related, volunteering-related, etc.) as well as how these changes impact teachers’ training and professional practice.

Thematic clusters in this module with regard to the second call are:

1. Individuals in the second half of their lives, and from different educational backgrounds, in the face of continuous digital change (with specific consideration of sustainability in the face of cohort changes)

(a) What are the bodies of knowledge as well as the types of skills (including meta-skills), with regard to occupational skills as well as general knowledge and competences? (b) Which digital tools could be helpful during this phase in life given aging-related changes? (c) What are the implications for teacher / trainer education? (d) In which educational institutional frameworks could these needs be addressed and what would be the impact on the overall educational system? Ideally, these research questions would be covered in a single project.

2. Individuals with disabilities and with different educational backgrounds in the face of continuous digital change (with specific consideration of sustainability in the face of cohort changes)

(a) Would disabled individuals (e.g. visually impaired, hard of hearing, with a learning disability, speech impaired) benefit from digital change in the realm of occupational development or (b) in the context of compensatory efforts to remedy disablements, and if so, how?

3. Impact of digitalisation on the education system

Projects are sought that provide a science-based analysis of the (Swiss) educational system, of the changes that may occur in the wake of digitalisation, and how to address them. Digitalisation will impact where, when and with whom individuals learn, as well as the education providers that are favoured and chosen by different stakeholders. For example: large companies may bypass traditional education, recruiting, selecting and training for their prospective employees; powerful actors may provide world-wide education addressing specific knowledge and skills, even views, to selected audiences; learners may want to put together their own specialised curricula encompassing assets from

miscellaneous and potentially diverse education providers (actors) and ultimately graduate with internationally recognised certificates, etc. Switzerland urgently needs to understand the stakeholders and dynamics of this process, obtain perspectives on possible future scenarios, as well as instruments to anticipate, monitor, potentially regulate and govern them. Ideally, these topics would be covered by a single project.

Module 2: “Ethics, trustworthiness and governance”

In module 2, the Steering Committee expects that it will finance five to six more projects. A total of CHF 3.6 million is available for projects focusing on the following topics:

The aim of the module is to analyse opportunities and risks, to assess how they relate to each other, and to develop and propose practical solutions at all societal levels (macro, meso, micro) with a view to, on the one hand, an ethical assessment of the opportunities and risks of digitalisation and of the compatibility with basic norms and fundamental rights in Switzerland and, on the other hand, with regard to the conditions for the creation of trustworthy digital infrastructures/services by various users and user groups in business, government and society. These topics are of particular importance in the light of risks related to cybersecurity and terrorism as well as changes in the cultural context due to the worldwide availability of cultural assets.

Thematic clusters in this module with regard to the second call are:

1. Impact of digitalisation on the public sphere and/or journalism

How do changes in digital information and communication technology (AI, data analytics, robot and chatbot, block chain, personalisation, digital virtual assistants, etc.) affect the functioning of the media, the democratic role of the media and of journalism, the diversity and health of the public sphere, and the overall media landscape in Switzerland? How does digitisation enable new business models in media, new forms of producing, distributing and using media content? What are the implications of these changes for the way citizens obtain information, including, but not limited to, the run up to elections and popular votes? What are the implications for the realisation of public values, professional ethics, effective governance and media accountability? What are the implications of new digital platforms and monopolies for the Swiss market and how can we develop safeguards for journalistic independence and promote the diversity of alternative platforms and media outlets?

2. Governance and legal framework of digital technologies

What are the new governance challenges resulting from the development, implementation and use of digital technologies (AI, block chain, data analytics, robotisation, etc.) for states, regulators, self-regulatory bodies, etc.? How can we enhance the transparency, explainability, fairness and accountability of different forms of governance, such as formal regulation, informal norms and technological design? Are new governance and legal responsibility frameworks needed for digital infrastructures and services?

3. Cross-cutting issues

There are several cross-cutting topics that are relevant to all modules.

Focus of proposals

This call focuses on academic research and will not finance the development of applications, platforms or infrastructure for the commercial sector. Combinations involving the social sciences, humanities and technical disciplines are strongly encouraged, but applicants will have to prove that their team has the relevant expertise.

Also strongly encouraged are projects that include an empirical component and data collection, provided they are feasible and the responsible handling of (personal) data is guaranteed.

Data and data observatories

One possible output of the projects could be to aid in the development of new datasets and/or data observatories (i.e. research infrastructures for the continuous collection/analysis of data) as well as to establish new links between existing or new datasets where these are necessary for research into topics that are relevant to the NRP. It is vital that the future re-use of such data (by third parties) is explicitly considered. Also, where possible, this should be done in collaboration with existing institutions.

In the development of new data sets for economic analyses and data observatories for trend analyses, we particularly welcome studies leveraging innovative, non-registry datasets gathered and analysed via novel methods, such as mobility data, process data, or self-contributed data based on sensors.

The Steering Committee strongly encourages coordination with databases of official institutions at all levels of government (e.g. the cantonal authorities for the module “Education, learning, and digital change”).

All projects must show that the data owners cooperate/consent to/support the use of their data and ensure that all data was obtained in line with current data protection laws and ethical standards.

Agility and foresight

Digitalisation is rapidly changing our environment. Hence, the projects of NRP 77 should not only analyse changes in retrospect, but also try to address current issues and anticipate possible future developments. Research projects need to ensure that the outcomes will still be relevant after the five-year research phase, how the research can produce sustainable outcomes and, ideally, responses to future changes.¹ Agile project management is essential and applicants should describe how they take into account fast-changing requirements (in terms of both methodology and topics), how they may respond to ongoing changes.

¹ Digitalisation has already caused various changes, which have often gone unrecognised and unstudied. Hence retrospective data analysis, assuming it helps in predicting future developments, is also encouraged.

A number of projects are expected to shed light on the possible emergence of new institutions in the digital society and how they might help to create and shape new opportunities.

The quantification of activity

Digital technology drives the quantification of numerous phenomena, often moving society into a new era of information gathering, assessment and judgement (e.g. health apps, activity apps, performance tracking). What are the consequences? Are they desirable and, if so, under what circumstances? How can we ensure that goals that are difficult to quantify or measure will not fall by the wayside?

Further issues

NRP 77 especially welcomes interdisciplinary approaches that reflect the richness and diversity of multiple disciplines. Connecting the social and behavioural sciences with computer science and engineering seems particularly warranted in NFP 77 and, as an additional asset, the projects may also include transdisciplinarity.

Proposals need to be state of the art and competitive compared to international research standards and need to address practical questions that are relevant for Switzerland, ideally using or generating Swiss data sets.

4. Submission procedure and project selection

Researchers interested in applying are strongly encouraged to submit (1) a letter of intent first and (2) a research proposal 2 months later (see schedule on page 11). The letters of intent provide the Steering Committee with the information it needs to select international experts for the review panel. If the research described in the letter of intent clearly does not conform with the goals of the second call, the authors will be notified accordingly by the Administrative Offices of the SNSF. Project proposals that were rejected in previous calls may be resubmitted, provided they are adequately revised and address the specifics of the present call.

General conditions

Letters of intent and full proposals are expected to be submitted in English.

The start of research for these new projects is scheduled between 1 September 2020 and 1 December 2020. The projects must be limited to a duration of no more than 48 months. No prolongations and additional funding will be possible. projects lasting under 48 months and employing one or more PhD students must ensure their salaries are guaranteed for 48 months at project selection.

The average budget of a project is expected to lie between CHF 300,000 and 600,000. These figures are provided as a benchmark, and budgets below are not ruled out.

Collaboration with research groups in other countries is possible, provided the cooperation either generates significant added value that could not be achieved without cross-border cooperation, or that substantially enhances the proposed research with respect to content or methodology, or if the competence of researchers from abroad is essential for the successful completion of the project. As a rule, the funding share requested for researchers abroad may not exceed 30% of the overall budget. For applicants from abroad, the norms and salary rates of the relevant country will be applied *mutatis mutandis*, with the SNSF maximum rates as the upper limit. Before submitting a proposal with a cross-border component, please contact the programme managers of NRP 77.

Collaboration with other NRP 77 projects is strongly encouraged. Projects should plan an equivalent of approximately one month per year, spread across the year, for inter-project collaboration. Collaboration at the national level, with projects outside NRP 77 is welcome and encouraged.

To allow for optimal coordination, approved projects must start no later than four months after the approval date.

The present Call document of NRP 77, the Funding Regulations of the SNSF and the General implementation regulations for the Funding Regulations provide the legal basis for the call. All forms, rules, regulations and instructions for the submission of proposals can be found on the mySNF web portal under 'information/documents' after selecting the corresponding NRP and creating a new application.

Research projects from the second call must adhere to SNSF guidelines. The call document of NRP 77 as well as the funding regulations and instructions for the submission on the mySNF portal must be considered.

Letters of intent

The letter of intent must be submitted on an official form provided specifically for this NRP (2 to 3 pages, max. 1000 words). The letter of intent must contain the following information:

- Applicant's name, main discipline and institution
- Research topic, theoretical framework and project goal
- Methods and data
- National and international cooperation
- Implementation
- Duration
- Estimate of required financial resources

The letter of intent must be sent by e-mail to nrp77@snf.ch. The deadline for submission is **20 February 2020**, 17:00 Swiss local time.

Online submission of full proposals on mySNF

Full proposals must be submitted online via the mySNF portal (www.mysnf.ch). Applicants need to register as mySNF users before they can submit an application. User accounts obtained in the past remain valid and provide access to all SNSF funding schemes. It is advisable to request new user accounts as early as possible via the mySNF homepage.

The deadline for submitting full proposals is expected to be **20 April 2020**, 17:00 Swiss local time.

Besides the administrative data and the data management plan to be entered directly in mySNF, the following documents need to be uploaded in PDF format:

- **Research plan**
Applicants must use the template provided on the mySNF portal under 'Information/documents' in their newly created proposal. The research plan must not exceed 20 pages, including the cover-page, tables, illustrations and the list of references.
- **Short CVs and publication lists of all applicants**
The CVs must not exceed two pages each. Publication lists must be submitted according to the guidelines published on mySNF. Links to full publication lists may be included.
- **Supplementary documents** (support letters, confirmation of cooperation or co-financing, ethical approval, etc.) can be uploaded on mySNF. As stated under the item "Data and data observatories" in section "Cross-cutting topics", please upload here the requested confirmation for the use of existing or the generation of new data sets.

Project selection and selection criteria

The Secretariat of the Programmes division checks whether the personal and formal requirements are met before forwarding the proposal for scientific review (cf. chapter 2 of the Funding Regulations of the SNSF). Full proposals that do not meet the personal and formal requirements will not be processed further.

Proposals will be reviewed based on the following criteria:

- **Compliance with the goals of NRP 77:** Proposals must reflect the programme's objectives, including the cross-cutting topics, as delineated in chapter 4, and comply with the programme's overall framework.
- **Scientific quality:** Proposals need to be state-of-the-art and comply with international research standards in terms of scientific quality and methodology. Proposals must contain an innovative component and they must be relevant compared to completed or running research projects in the same field.
- **Inter- and transdisciplinarity/cooperation projects:** Proposals need to be of an interdisciplinary nature and where applicable they may also include transdisciplinary work, connecting different levels of analysis (micro/meso/macro)

work with stakeholders. Connecting computer science and engineering with the social and behavioural sciences, where suitable, could be of particular interest.

- **Application and implementation:** The potential for practical application and the implementation of results is a key element of NRPs. Projects with high practical relevance and projects that aim to develop answers to current and upcoming challenges in the economy and society are therefore given priority. The selection will also take into account whether the expected results from the programme can serve as a scientific basis for governmental and administrative decisions.
- **Personnel and infrastructure:** Applicants must have a sound scientific track record in the field of the proposal. Adequate personnel resources and an adequate infrastructure must be secured for the project.
- **Response to comments:** The Steering Committee may address comments, suggestions or recommendations to the research teams when inviting them to submit a full proposal. The implementation of such suggestions or recommendations will be assessed in the full proposals.

Based on international peer-review followed by an assessment by the Steering Committee, research proposals will be submitted to the National Research Council for approval or rejection.

Schedule of the second call

The following schedule is set out:

Call for full proposals	December 2019
Deadline for submission of letters of intent	20 February 2020
Deadline for submission of full proposals	20 April 2020; 17:00
Final decision on full proposals	August 2020
Start of research	1 September 2020 – 31 December 2020
End of research phase	31 December 2024
Publication of the programme synthesis	Summer 2026

Research projects cannot be prolonged beyond the duration of the research phase of the programme and will submit their final scientific report at the end of the programme's research phase.

5. Contacts

For questions regarding the submission of pre-proposals and full proposals, please contact the programme managers:

Barbara Flückiger Schwarzenbach, nfp77@snf.ch or 031 308 22 22

Marjory Hunt, nfp77@snf.ch or 031 308 22 22

For questions concerning salaries and eligible costs, please contact the Head of Finances, Roman Sollberger: roman.sollberger@snf.ch or 031 308 22 22.

Technical help with mySNF and electronic submissions

Hotline:

Tel. + 41 31 308 22 99 (Français)

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mySNF Homepage: www.mynsf.ch

6. Actors

Steering Committee of NRP 77

Professor Abraham Bernstein, Department of Informatics, University of Zurich (president)

Professor Irene Bertschek, Centre for European Economic Research, Mannheim, DE (deputy president)

Professor Bert Bredeweg, Institute of Informatics, University of Amsterdam, NL

Professor Joanna Bryson, Department of Computer Sciences, University of Bath, UK

Professor Kevin Crowston, School of Information Studies, Syracuse University, New York, USA

Professor Natali Helberger, Faculty of Law, University of Amsterdam, NL

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