TIP Working Party

CO-CREATION PROJECT

2019-2020

Case study from Norway

SFI Klima 2050 - reduce risks in buildings and infrastructure

OECD

Disclaimer

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Executive Summary - SFI Klima 2050

Overview & theme

SFI Klima 2050 | Risk reduction through climate adaptation of buildings and infrastructure is running from April 2015 – April 2023. The overall budget is 230 000 Euros and the Norwegian SFI scheme – The Centres for Research-based Innovation gave rise to the project.

Klima 2050 will reduce the societal risks associated with climate changes and enhanced precipitation and flood water exposure within the built environment. Emphasis is placed on the development of moisture-resilient buildings, stormwater management, blue-green solutions, measures for prevention of water-triggered landslides, socio-economic incentives and decision-making processes.

The Centre aims to be an effective instrument for the development and implementation of adaptive innovations for the Centre participants and society nationally and internationally. The thematic focus corresponds to *Theme 1* (Co-creation's contributions to digital innovation and AI and effects of data sharing)

Partners

The initiative to the project came from the research institutions SINTEF and NTNU and a project proposal was developed together with both industrial- and public partners.

The Centre partners represent the "whole value chain" of the Norwegian construction industry, relevant public stakeholders and governmental actors. In addition to 5 research organisations, there are 15 partners, all of whom have key roles in activities to reduce societal risk in the built environment.

The partners meet in thematic meetings which are organised activities with the aim of contributing towards knowledge dissemination, experience/research exchange, and innovation. There are organised 8 meetings a year. .

Management & evaluation

The host SINTEF manages the initiate through the Centre Director, the Centre management group and the Centre Board.

The partners have signed a legal agreement which states: Each partner shall have ownership rights to the Project results produced by that participant, its employees or sub-contractors. When a Project result has been produced by several partners in a collaborative effort, and where their respective share of the work cannot be ascertained, they shall have joint ownership of such Project result. Results from the initiative is also published on the web-site klima2050.no

The Centre has a set of KPIs (Key Performance Indicators) beyond the performance indicators reported to the Research Council of Norway. The KPIs are a tool that promotes the vision and draws in the right direction. The KPIs act as a performance management for the Centre Board and measure relevant partner benefits and partner involvement. Quotation of the KPIs is made by the centre board with input from the Centre Management Group and applies for one year at a time.

Key learnings & takeaways

Success factors are: "the value chain" of actors involved, involvement of master and PhD-students, and collaboration in pilot projects. Pilots are the Centre's main arena for product development and the testing of research results. They are also regarded as an effective means of disseminating know-how generated. A Centre also need a well structured organisation with good

routines. A strong focus on both scientific publication but also popular science dissemination strengthens the collaboration between fields and actors.

Challenges and learnings; The challenges are mostly related to the wide scope of the initiative. It is difficult to engage all the partners in the many tasks and challenges.

1. GENERAL CHARACTERISTICS OF THE CO-CREATION INITIATIVE

Name of the initiative*:

SFI Klima 2050 | Risk reduction through climate adaptation of buildings and infrastructure [SFI = Centre for Research-based Innovation]

Start date*:

April 2015

Expected end date*:

April 2023

Country/ies where partners are based*:

Norway

Project budget *:

230 000 000 NOK (approx. 230000EUR)

Share of budget co-funded by partners: 60 %

Share of ~~public~~ funding (please provide details of the public authorities providing support):

40 % from the *Research Council of Norway*,

20 % from public / governmental actors

15 % from SINTEF as host and the other research partners

25 % from industry/private sector

Share of budget co-funded by VC or other sources (please specify):

-

Main focus (please select)*: Research / Economic / Social / Other (please specify)

Research

Goal and objective of the co-creation initiative

1*. What is the vision of the co-creation initiative? (e.g., stimulating research and discourse about a new model of global governance; platform for outcomes-based innovation to save and improve lives in low-income countries)

The vision of SFI Klima 2050 is to be synonymous with excellence within risk reduction through climate adaptation of buildings and infrastructure exposed to enhanced precipitation and flood water. The SFI (Centre for Research-based Innovation) aims to be an effective instrument for the development and implementation of adaptive innovations for the Centre partners and society.

1A. What is the rationale behind the vision of the co-creation initiative?

The built environment is particularly vulnerable to climate change. If climate adaptation is not addressed now, the predicted effects of climate change will have a profound negative impact on society. The construction industry is a pillar of the Norwegian economy as the second largest mainland sector and by far the most important regional industry. The industry has a gross revenue of more than 200 billion NOK (Goldeng & Bygballe, 2013)[1]. The construction sector contributes 15% to the Norwegian onshore economy. In the next 25 years, it will create turnover worth 5000 billion NOK, currently equal to the Norwegian Government Pension Fund Global ("Oljefondet").The BCT (building, construction and transportation) sector is service providers for everyday activities, and is as such a key to the quality of life. The BCT sector needs to rethink on needs and practices for profitable investments to adapt to future climate-related challenges. To provide the necessary tools to implement the solutions are of utmost importance for a safe, sustainable and cost-effective development of the Norwegian community.

1B. Was it someone's initiative or was it jointly set by all partners? Please provide details on the mechanisms implemented to co-develop the vision.

The initiative came from the two research partners SINTEF and NTNU, and these institutions had the leading role in initiating the Centre, getting partners onboard and writing the proposal for funding.

The Research Council of Norway have a program *SFI – The Centres for Research-based Innovation scheme*. The Centres for Research-based Innovation are to develop expertise in fields of importance for innovation and value creation. Through long-term research conducted in close collaboration between research-performing companies and prominent research groups, the SFI centres are to enhance technology transfer, internationalisation and researcher training. The scientific merit of the research must be of high international calibre. The SFI centres may receive support for a total of eight years (an initial five-year period with the possibility of a three-year extension). The Centre is envisioned as a start of a permanent research and innovation centre on technology for climate adaptation of buildings and infrastructure. As time progresses there will be a continues need to enhance the development of the built environment with implementation of new technologies (e.g digitalization), improvements of approval- and certification schemes and regulations (e.g The Norwegian Planning and Building Act).

1C. Has the vision of the initiative ever been revised? Why?

[1] Goldeng & Bygballe (2013). *Building, construction and property industry's importance to Norway - update 2013.* Rapport 1/2013, Handelshøyskolen BI, Senter for byggenæringen. In Norwegian

No, we have not seen any needs

2*. What are the main objectives of the initiative?

Klima 2050 will reduce the societal risks associated with climate changes and enhanced precipitation and flood water exposure within the built environment. Emphasis is placed on the development of moisture-resilient buildings, stormwater management, blue-green solutions, measures for prevention of water-triggered landslides, socio-economic incentives and decision-making processes. Both the effects from extreme weather and gradual changes in the climate will be addressed.

The Centre, Klima 2050, will be recognised for its research training within the field of climate adaptation of the built environment. Through education of graduate students, training of highly qualified research personnel through PhDs and training of professionals in the sector, the Centre will stimulate new solutions and further research and development in the building, construction and transportation (BCT) sector long after the term of the Centre's existence.

2A. Are there plans to commercialise the co-created products and/or services? Please explain.

The aim is to commercialise products and services. Several innovations have been introduced in the market like a rainbed (Alma regnbed), a collaborative effort offering detaining roofs (urbaneuterom.no), permeable concrete paving stones (Multiblokk lightweight permeable concrete paving stones), calculation tool for stormwater (Leca stormwater calculator), innovative roof constructions (Norgeshus Compact flat wooden roof and Skanska Compact low-sloped wooden roof), a national knowledge platform for stormwater (Ovase.no) and an Expert-Based Landslide Mitigation Portal (LaRiMiT).

3. What are the main motivations of the different partners to collaborate in this initiative (e.g., need for finance, competences and skills, network & connections of partners, risk sharing)?

The Centre partners represent the whole value chain of the Norwegian construction industry, relevant public stakeholders and governmental actors. The group is diverse, to ensure a breadth of knowledge and expertise, and to maximize the opportunities for innovation. In addition to the research organisations, the Consortium consists of 15 merited partners, all of whom have key roles in activities to reduce societal risk in the built environment. The Centre's public sector partners are dealing, on a day-to-day basis, with key challenges. Klima 2050 is, along with the private sector partners, developing risk-reducing measures.

The value chain of the Consortium private partners represent a "pulling force", the partners asking for each other's solutions and measures. Processes, products and solutions developed by one private partner may be carried further by some of the others. The new knowledge through processes, products and solutions can be tested in laboratories, in field tests and in pilot projects. The public partners, responsible for overall regulatory plans, regulations and norms, represents a "pushing force" for implementation of climate adaptation measures. In this way the value chain becomes an "innovation chain".

Functional roles of co-creation partners

4*. Please fill in the table below with the following information:

4A*. Specify all partners involved in the co-creation process (specifying the number of partners per type)

4B*. Choose the co-creation process project initiator(s)

In some way most of the partners initiate co-creation. Se e.g the Centre pilot projects initiated her

http://www.klima2050.no/definition

4C*. Specify where partners are located

We regard this a national team, all partners are located in Norway.

4D*. Specify what are the main activities and responsibilities of partners

See table below/next page

The WPs are

WP1: Climate exposure and moisture-resilient buildings

WP2: Stormwater management in small catchments

WP3: Landslides triggered by hydro-meterological processes

WP4: Decision-making processes and impact

Partner	*Role in society*	Active participation			
	Special role and/or competence for Klima 2050	WP1	WP2	WP3	WP4
	Authority				
NVE	The Norwegian Water Resources and Energy Directorate (NVE) ensure an integrated and environmentally sound management of the country's water resources, promote efficient energy markets and cost-effective energy systems and contribute to efficient energy use. From 2009 assigned the greater national responsibility for the prevention of damage caused by landslides		x	x	x
	Building commissioner, property manager and property developer				
Avinor	Responsible for planning, developing and operating the Norwegian airport network. The responsibility includes runways and terminal buildings.	x	x		x
Statsbygg	The Norwegian government's key advisor in construction and property affairs, building commissioner, property manager and property developer.	x	x		x
Statens vegvesen	The Norwegian Public Roads Administration is responsible for the planning, construction and operation of the national and county road networks		x	x	x
Jernbaneverket	The Norwegian government's agency for railway services. Responsible for building and maintance of railway infrastructure and stations.		x	x	x
	Consulting engineer & designer				
Multiconsult	One of the leading companies of consulting engineers and designers in Scandinavia, with expertise spanning a wide range of disciplines including building and infrastructure.	x	x	x	x
	Project developer and contractor				
Mesterhus Norgeshus	Two of the larges housing manufacturer in Norway. Make plans and construct homes in wooden structures. Responsible for both single houses and housingfield developments.	x	x		x
Skanska	A leading contractor with expertise in construction, development of commercial and residential projects and public-private partnerships.	x	x	x	x
	Manufacturer of components for the construction industry				
Saint-Gobain Weber	Leading producer of prebatched mortar, and develops solutions for construction and refurbish-ments. The specter of products include façade solutions, Leca-solutions and masonry solutions.	x	x	x	
Isola	Leading producer of roofing, windows, and a wide range of different membranes for the building industry. Leading moisture problem solver for roofs, walls and slab on ground.	x	x		
Spenncon	The nation's leading provider of concrete building systems and prefabricated concrete elements for use in construction and infrastructure projects.	x	x	x	
	Insurance & financing				
Finance Norway	Representing some 200 financial institutions operating in the Norwegian market with purpose to strive for a strengthened Norwegian financial industry		x		x
	Research & education				
NTNU	The Norwegian University of Science and Technology (NTNU) is research partner covering all the research areas of the Centre. Main responsible for the PhD education	x	x	x	x
BI	BI Norwegian Business School is research partner and responsible for PhD education within the topic social economic, buisness models and innovation				x
MET Norway	Norwegian Meteorological Institute (MET Norway) is research partner covering climate exposure	x	x	x	x
NGI	Norwegian Geotechnical Institute (NGI) is research partner covering water-triggered landslides and risk analysis		x	x	x
SINTEF	Host institution and research partner covering all the research areas of the Centre	x	x	x	x

Note *Spenncon* is no longer a part of the consortium,

We have three more partners

Skjæveland Group consists of Multiblokk, Skjæveland Cementstøperi and Storm Aqua. The three companies together deliver complete systems for stormwater management (WP 1,2 and 4)

Trondheim municipality is the third largest municipality in Norway with 200.000 inhabitants. The municipality is responsible for physical planning and public services, and owns public properties and land. (WP 1, 2 and 4)

Powel - develops business-critical software solutions and related services for energy companies, municipalities and contractors (WP 2 and 4)

	A.	**B.**	**C.** Location	**D.** Main activities

	Partners for co-creation	Project initiator(s)	Local/regional	National	International	Priorities setting	Research	Designing products	Experimentation and development	ommercialization / Suppo (marketing, consultancy, etc.)	Product launch	Financial engagement (share of funding, %)
Firms:												
Service												
Manufacturing												
Research organizations:												
Public research institutes												
Universities												
Civil society:												
Non-governmental organisations (NGOs)												
Personal engagement												
Government:												
Public authorities												
Government agencies												
Transnational organizations												

Notes: there are no civil society partners involved

5*. Were there any conditions to participate the co-creation initiative? (e.g. amount of funding provided, data sharing conditions, type of expertise, etc.)

All partners have to contribute financially, with cash and in-kind donations. The share of cash and in-kind differs between public and private partners.

Q5A. If there were any criteria for selecting partners, please, name them

For each co-creation partner, please, provide the following information:

6*. Name of organization and its scope of activities (local/regional/national/international) and website (if available)

Please see

http://www.klima2050.no/partners-private

http://www.klima2050.no/partners-public

http://www.klima2050.no/research

7*. Please explain the rationale of involving this partner in the co-creation project

The Centre partners represent the whole value chain of the Norwegian construction industry, relevant public stakeholders and governmental actors. The group is diverse, to ensure a breadth of knowledge and expertise, and to maximize the opportunities for innovation. In addition to the research organisations, the Consortium consists of 15 merited partners, all of whom have key roles in activities to reduce societal risk in the built environment. The Centre's public sector partners are dealing, on a day-to-day basis, with key challenges. Klima 2050 is, along with the private sector partners, developing risk-reducing measures. Our partner group is diverse, to ensure a breadth of knowledge and expertise, and to maximize the opportunities for innovation.

The value chain of the Consortium private partners represent a "pulling force", the partners asking for each other's solutions and measures. Processes, products and solutions developed by one private partner may be carried further by some of the others. The new knowledge through processes, products and solutions can be tested in laboratories, in field tests and in pilot projects. The public partners, responsible for overall regulatory plans, regulations and norms, represents a "pushing force" for implementation of climate adaptation measures. In this way the value chain becomes an "innovation chain".

8*. Please explain the role and main responsibilities of this partner in the co-creation project

Please see table in section 4

9*. What is the financial engagement of this partner in the co-creation initiative (i.e. what is the share of funding they provide overall and for each of the activities of the co-creation project)?

Details cannot be shared.

All partners have to contribute financially, with cash and in-kind donations. The share of cash and in-kind differs between public and private partners.

See section 1.

2. MANAGEMENT STRATEGY

10*. Who is responsible for co-creation process management?

The host SINTEF through the Centre Director, the Centre management group and finally the Centre Board. The former SINTEF director is the deputy chair of the board.

The Centre has a home at SINTEF where most of the PhDs and the SINTEF researchers are permanently placed. But there are also researchers at many institutions located at different premises in Oslo and Trondheim. See http://www.klima2050.no/organization

Q10A*. Was a steering group or advisory committee set up? If so, please provide details on its role and frequency of interactions.

The Centre has a General Assembly and a Centre Board. The General Assembly includes all partners. The Board is comprised of the Centre management and partner representatives (3 from public partners, 3 from private sector and 3 from research). The user partners (public and private sector) have majority of the Board and are selected from different groups of user partners. The Centre board advises the Centre Management Group on the direction, priority and control of all high level managing issues such as planning, financial and technical matters. The Chair of the Board is appointed by the host institution (SINTEF) and represent a user partner (Multiconsult)

11*. What is the frequency of interaction between co-creation partners? (please select) If necessary /Once every few months/ Several times a month / Regularly

Regularly

Q11A*. Please describe the nature and frequency of interaction between all couples of partners

Structures to facilitate innovation and societal engagement

The Centre has established structures to ensure successful societal engagement, and to facilitate innovation;

- The annual Klima 2050-day brings all the partners together and highlights the span of our activities. The focus is on presenting results, partner needs and innovation opportunities.
- A number of thematic meetings covering various topics are held 8 times throughout the year to ensure knowledge exchange, secure cooperation between partners and facilitate innovation.
- User partners are responsible for the pilot projects, which function as innovation arenas for product and process development, as well as for the testing of results. Collaboration and dissemination are further facilitated through these activities.
- PhD Candidates and master students play an active role in all activities. All user partners are encouraged to invite a PhD Candidate to visit their office for at least a week or two. Close engagement with the partners leads to recruitment opportunities, providing in the long run skills required by society.
- The Centre emphasizes collaborating in international projects and other forums. This contributes to the acquisition and sharing of knowledge, ensuring the scientific quality of the research.

- Last but not least, career development for researchers is now systematised through the Klima 2050 Researcher Training initiative

12*. What are the main means of communication among co-creation partners? (Please choose all appropriate answers)

a) Official meetings at the end of the reporting period (quarterly, yearly)

b) Sharing of newsletters, documents, reports, publications ; http://www.klima2050.no/phd-thesis , http://www.klima2050.no/press-leases, http://www.klima2050.no/news etc.

c) Digital tools (e.g., email communication, conference calls, internet platforms) ; www.klima2050.no

d) Conferences, workshops, etc. engaging external stakeholders

e) Personal meetings

f) Other (please specify); Pilot projects http://www.klima2050.no/definition

13. Is there an partnership agreement for the co-creation initiative? Yes / No (go on to question 13C)

Yes

13A. Is the agreement formalised? Yes / No

Yes

13B. Please specify the type of the agreement:

a) Legal agreement

13C. Are legal issues related to the ownership of jointly developed IPRs settled in a partnership agreement?

Yes

14A*. Who is the owner of data from the co-creation initiative?

From the legal agreement:

Each Consortium Participant shall have ownership rights to the Project results produced by that participant, its employees or sub-contractors.

When a Project result has been produced by several Consortium Participants in a collaborative effort, and where their respective share of the work cannot be ascertained, they shall have joint ownership of such Project result.

The joint ownership agreement shall as a minimum include:

- A definition or relevant Project results having joint ownership
- A description of which of the joint owners that shall have the operative responsibility for protecting (through registration of intellectual property rights and otherwise), and managing the jointly owned Project results (hereinafter named IP Manager), including a clear description of the IP Manager's Power of Attorney,

- A detailed description of how the jointly owned Project results shall be protected, defended, managed and used.

14B*. Who is the owner of IP from the co-creation initiative?

See 14A*.

15*. How is the process of accessing research results (for partners) organized?

Through the legal agreement

16*. How do you set the balance between data sharing and IP protection?

Formally it is regulated in the legal agreement, but practically sharing and protection was thought of in the construction of the Klima 2050. We have a value chain of actors, no real competitors.

17. Is public access to either co-creation results or products granted?

To a certain degree, through the web-page, but we also have some co-creation results internally in the consortium/partnership (eRoom/Sharepoint)

18*. What types of intellectual property (IP) protection mechanisms are used (e.g., patents, trademarks, industry design, utility model, complexity)?

Industry design

18A*. What types of IP are more important for your co-creation processes?

-

PROJECT EVALUATION

19*. Are milestones and key performance indicators (KPIs) set for the co-creation initiative?

Yes

19A. Are they settled in a partnership agreement?

In a steering document agreed by the Centre Board, text in 19 C. is from the document

19B. Are they essentially qualitative or quantitative? Qualitative / Quantitative / Both See 19 C.

19C. Please provide the main KPIs (provide up to 5 indicators)

The Centre Board sees the need for a set of KPIs (Key Performance Indicators) for Klima 2050 beyond the performance indicators reported to the Research Council of Norway. The KPIs should be a tool that promotes the vision and draws in the right direction. The KPIs shall act as a performance management for the Centre Board and measure relevant partner benefits and partner involvement. Quotation of the KPIs is made by the centre board with input from the Centre Management Group and applies for one year at a time. *Example for 2019, see below*

KPI	***2019***	**Comments**	**Can answer the Research Council's success criterion for Innovation and Value Creation for SFIs**

Pilot projects	*At least one pilot established in each work package*	May involve all partners. Is a driver to look for opportunities and to increase the collaboration between industry, public and research partners	The Centre's research has created or is expected to create opportunities for innovation and increased competitiveness at user partners and expectations of social ripple over and above the partners that directly participate in the Centre's business.
Thematic meetings	*At least 2 thematic meetings per work package*	Can involve and engage all partners	The Centre has taken measures to ensure that the expertise and results obtained through research are transferred to and utilized by the partners in an efficient manner.
PhD and master student visit to user partners	*Ten partners should have taken a sponsorship for a PhD student and/or master student in 2019*	All PhDs should be at least one week at one of the partners. Important to account for the user partners so that the initiative to be sponsors is taken by the user partner.	The Centre has mutual mobility of personnel between the Centre and the user partners. Researchers from partners work in the Centre and fellow researchers and researchers from the host institution work in periods with the user partners.
External publicity - visit the website	*9000 unique users and 80,000 page references on klima2050.no*	Can measure the results of the activities we choose to focus on and if we succeed The user partners needs to share publications from the web on their channels	It is facilitated that results that fall outside the core of the user partners can be commercialized in other ways, e.g through research-based new establishments.

20*. At what stages is the evaluation implemented? (Please choose all appropriate answers): Ex-ante / Interim / Ex-post/ No evaluation procedure

Ex-ante; Through an application process to the Research Council

Interim; After halfway – Midterm evaluation

For each evaluation stage, please, provide the following information:

20A. What approaches are used?

Ex-ante; By an international scientific review and a national review judging the relevance and impact. The Research Council of Norway make the final decision.

Interim; By an international evaluation committee. 4 experts in innovation (2) and science(2). All the Centre partners made written self-evaluations. These were distributed to the evaluation committee before a whole day meeting with the Centre leadership and representatives from the user partners (public and private actors).

20B. What types of data are used?

?

20C. How is the evaluation process organised? Who is responsible for it? Are there any external evaluations conducted?

The Research Council of Norway are responsible. See also 20A

21. Are the evaluation results open (e.g. published on the website, reports, structured databases, etc.) or closed (used only for the internal goals)? If they are open, please specify.

Not open for the public, but for the partners in Klima 2050

22. What are the implications of any evaluations conducted so far (e.g., revision of KPIs; suspension or termination of funding; penalties and rewards associated to performance)? Please explain.

The worst implication of the midterm evaluation can be that the Centre is terminated of funding after 4 years. Another implication can be that you have to make changes and "proof these" for the Research Council. The third implication is that you can proceed with no obligatory changes.

23. What are the key success factors of this co-creation initiative?

- The national team and the value chain of actors involved (research, public-/ governmental sector and private sector
- The involvement of master and PhD-students. More than 70 master students have worked with challenges related to the Centre up to now.
- The collaboration in pilot projects. Pilots are projects that are designed and administered by one or more of the Parties at the Centre. Our experience demonstrates that pilots promote productive interaction between the partners involved. Pilots are the Centre's main arena for product development and the testing of research results. They are also regarded as an effective means of disseminating know-how generated at the centre. Such projects also represent excellent opportunities to showcase the Consortium. It is often easier to demonstrate the innovation potential linked to a given system, process, etc. by employing a pilot rather than by other forms of research. In general terms, user partners (public and private sector partners) find pilots more focused and thus more attractive. However, if the criteria and guidelines defined for a pilot are too diffuse, misunderstandings and a poor working atmosphere may result. At the other extreme, if guidelines are too rigid, innovative thoughts can be strangled by red tape.
- A well structured organisation with good routines.
- The strong focus on both scientific publication and popular science dissemination. This makes it more easy for everybody to collaborate and learn about topics which are rather complex from a scientific view. This also strengthens the collaboration between fields and actors.

24. Were there any challenges during the co-creation process? Please provide details and explain what caused them.

The challenges are mostly related to the wide scope of the Centre. It can be difficult to engage all the partners in the many tasks and challenges the Centre is dealing with.

25. Based on your experience, what would you recommend to a new co-creation initiative for it to be successful? Please explain the main lessons learned from your experience.

See 23. And 24.

4. THEMATIC FOCUS

Please select one of the two themes below and answer the corresponding questions:

Theme 1. Co-creation's contributions to digital innovation and AI and effects of data sharing

Please explain:

 What are the ways in which the co-creation initiative features digitalization and AI? Please provide examples.

Klima 2050 connects several business case examples built around a data opportunity:

-Insurance companies are investigating new business models involving a transition from their traditional roles as claims managers to risk management.

-Norwegian municipalities use historic damage data as a basis for making better-informed decisions on the quantification of risk costs and the mitigation strategies to reduce them.

-Private sector IT providers support relevant stakeholders in risk planning activities by transforming data into knowledge and business insights.

-The research organisations are contributing by developing taxonomies of climate change risks and impacts.

 What are the roles of stakeholders? Are they different from traditional ones? Please provide examples.

The goal, reduction of societal risks associated with climate changes and enhanced precipitation and flood water exposure within the built environment, demands researchers, actors and stakeholders with highly different knowledge and expertise. All these people have to understand the overall aim of the Centre and how their expertise can make a difference and how they can contribute.

The Centre has paved the way for an important collaboration between experts in technology and experts in social sciences, and the holistic approach is strong. This leads to more interest in other disciplines, way of working, methodologies and cooperation in a much stronger extent than in project with more narrow research and collaborative fields.

 How are data sharing and intellectual property protection organised? Please provide details.

See 13 and 14

 What are your best practices? What would you recommend to a new co-creation project involving digital innovation and AI?

See 23.

5. POLICY CONTEXT

26*. Was the initiative supported by a specific policy initiative? If so, please provide details on the policy initiative and type of support provided (e.g. amount of funding, conditions of support, selection criteria, reporting obligations, etc.).

See 1B.

27*. What are the factors (e.g. related to regulations, policy, business environment etc.) supporting and/or hindering co-creation in your country? A hinder can be a gap between political will and (research) funding.

28*. What do you think are most effective types of policy support for co-creation? I think programs like the SFI schemes are effective.

For further information about the Centre please see the Annual Reports

2018: https://www.sintefbok.no/book/index/1209/annual_report_2018

2017: https://www.sintefbok.no/book/index/1176/klima_2050_annual_report_2017

2016: https://www.sintefbok.no/book/index/1115/klima_2050_annual_report_2016

Name: Berit Time

E-mail: berit.time@sintef.no

Location (country): Norway

Affiliation: SINTEF

Your role in the co-creation process: Centre Director

Your main activities in the co-creation process: Leadership