Media Futures.

sfi= UNIVERSITAS BERGENSIS

Host organisation

UNIVERSITAS BERGENSIS

Research partners

Universitas Osloensis · NORCE · UiS

User partners

amedia · Bergens Tidende · fonn group · HIGHSOFT · IBM · NRK · Schibsted · 2 · VIMOND · vizrt

Funding agency

Forskningsrådet

content

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Media Futures
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Photo: Zulfikar Fahmy, UiB

5

Summary

MediaFutures is a new research and innovation centre in Bergen, Norway. The centre is a consortium of the most important media players in Norway and beyond. The University of Bergen is the host of the centre and industry partners include NRK and TV 2, the two main TV broadcasters in Norway, Schibsted, including Bergens Tidende (BT), and Amedia, the two largest news media houses in Scandinavia/Norway, as well as the world-renowned Norwegian media tech companies Vizrt, Vimond, Highsoft, Fonn and the global tech and media player IBM. The centre includes also renowned national research institutions such as the University of Oslo, the University of Stavanger and NORCE, and will work together with high-profile international research institutions. The centre's main objective is to develop the next generation of Artificial Intelligence for the media sector, or as we call it "responsible AI".

Why Responsible AI? Well, AI has shown to be of great value in many different application domains; however, it has also raised significant ethical issues, including, for example, the creation of echo chambers in online media systems, or has caused political polarisation as shown lately by many examples. To address these challenges, we created a novel world-class research centre named MediaFutures. The centre will further develop advanced new media technology for responsible and effective media user engagement, media content production, media content interaction and accessibility, as well as research on novel methods and metrics for precise audience understanding. The centre will deliver research outputs, e.g., in the form of patents, prototypes, papers and software, and will perform significant research training in media technology and innovation, to ensure that the outputs of the centre will sustain and impact the media landscape in the long run, including the creation of start-up companies with an innovation-oriented mindset. The centre is funded by the research council of Norway for the next 8 years and has a total volume of around 264 million Kroners or around 26 million Euros.

**Professor
Christoph Trattner**
Centre Director

6

MediaFutures research and innovation activities are organised in five work packages (WP)

WP1: Understanding Media Experiences

WP1 Understanding media experiences provides fundamental knowledge on media use, analyzing how users will interact with media of the future. We apply and develop innovative quantitative and qualitative methods. Our research will monitor users across media, capture hidden aspects of media use not found in digital traces, and explore media in the life world of young people.

WP2: User Modeling, Personalisation & Engagement

In a world of information overload, the discovery of relevant media content becomes increasingly challenging for consumers. Personalised, machine-generated content recommendations have been shown to be one possible solution to these problems. However, today's automated recommendations can easily lead to undesired phenomena like filter bubbles or the one-sided dissemination of information. In this WP, we develop novel "responsible" techniques that ensure that the provided content recommendations are diverse, transparent, and fair.

WP3: Media Content Production & Analysis

How can we discover manipulation of videos and images and fake news in text? What is a news story really about? Can machines produce the news stories? With the help of natural language processing, knowledge graphs, and machine learning, we analyse multimodal media content with respect to quality and validity; we extract data, information, and knowledge from media content; and we develop computational support for creative content production.

what we do

WP4: Media Content Interaction & Accessibility

In this WP we look at hyper personalisation – how the content or the presentation of content can be adapted to the viewer's wishes or needs. This WP will allow for multi-device setups, for example, using personal devices to perform personal adaption even in social settings. New ways to interact will be explored, like using sensors, along with new visualisations and user understandings, and this will open up for even more democratic and inclusive use of media.

WP5: Norwegian Language Technologies

WP5 adopts theoretical approaches and methodologies primarily based on linguistic data science, including neural learning. Based on language data in the media from our user partners and the data and tools of our research partners, large corpora will be annotated. The labelled examples in these corpora will be used for training and evaluating supervised models that demonstrate advanced approaches in areas such as robust deep language analysis, adaptive language generation, event identification and extraction, and opinion analysis. The partners will cooperate in exploring the use of such models for innovative purposes.

our strategy

7

Vision

To establish a world-class research centre for responsible media technology and innovation that seeks to solve profound global, industrial, and democratic challenges in the media-tech industry.

Primary Objective

The main goal of MediaFutures is to generate substantial innovation and value creation for the Norwegian news media and media-tech industry and to empower them to solve profound global, industrial, and democratic challenges through long-term research into responsible media technologies.

The following are verifiable secondary objectives that will lead to the achievement of the primary objective:

Create an accessible physical and highly innovative research centre in the heart of Norway's premier media cluster, Media City Bergen, for collaboration at a global level (all WPs).

Turn coherent research on societal changes (WP1, WP4), user behaviour (WP1, WP2, WP4), and language technology (WP5) into new products, services, and businesses (all WPs) not only addressing markets in Norway, but also globally.

Maintain regular active communication and knowledge sharing (including secondments/staff exchange, presentations, workshops, and seminars) by both industry and academic partners in order to ensure an easy path from basic research to final products (all WPs).

Research approach

MediaFutures addresses the development of responsible media technology for the media sector, in particular leveraging AI technology, by bringing together the complementary knowledge of the strongest research groups and media tech companies in Norway for the first time. The commitment and involvement from each of MediaFutures' partners is important for ensuring that its activities and research results are relevant for both its user partners and the scientific community at large.

The complimentary yet diverse research lines, e.g., from AI and Machine Learning to Human Computer Interaction (HCI), have been designed to address the pressing needs of a changing media landscape and to supply the industry with the knowledge it needs to create new products and services for whatever comes next.

AI technology has been shown to be of great value in many different application domains; however, it has also raised significant ethical issues, including, for example, the creation of echo chambers in online media systems, political polarisation, and controversial or questionable election outcomes.

Innovations and value creation

MediaFutures will during its 8 years of project life develop advanced new media technology for responsible and effective media user engagement, media content production, media content interaction, and media accessibility, and it will conduct research on novel methods

and metrics for precise audience understanding. Both the research and industry partners participate in the research and innovation activities on topics of relevance for their organisations as well as for the centre.

The knowledge created in MediaFutures will be used by its user partners to build new products and services. This will happen both within the existing companies and within spin-offs resulting from the centre's activities. The different internal strategies, plans, and needs of the user partners have been elicited over the course of the development of the centre proposal.

Research training and recruitment

MediaFutures will produce at least 12 PhDs and will train 9 postdoctoral fellows. The first call for PhD students and postdocs included 9 positions announced via open international calls, and we plan to recruit these research fellows in 2021.

The recruited fellows' projects will be formulated in collaboration with the user partners in order to respond to industry-specific challenges and needs. Master's student projects will also be involved based on user partners' needs. The students will gain research experience as well as valuable industry insights.

MediaFutures will seek to collaborate with relevant research schools and will encourage affiliated researchers to attend summer and winter schools in order to obtain and expand upon on their knowledge and specific skills within relevant research areas, as well as soft skills training (communication, teamwork, work ethics, etc.).

Our organisation

Ethics Committee

Steering Board
Industry Majority; Board Leader = Industry

amedia • Bergens Tidende • fonn group
IBM • NRK • Schibsted • vizrt
HIGHSOFT • 2 • VIMOND
NORCE • uS

Advisory Committee
Northwestern University
ROYAL HOLLOWAY UNIVERSITY OF LONDON
THE NEW SCHOOL
EBU

Executive Board

Centre Management

Technical Group

WP Advisory Group
WP Advisors & International Key Researchers

VU • Stockholms universitet
The Open University • UNIVERSITÄT KLAGENFURT

	WPs	Content	Value Creation	
WP1 Scientific Lead (UiB), Industry Lead (NRK)	Understanding Media Experiences	Media Analysis Software/Tools		
WP2 Scientific Lead (UiB), Industry Lead (TV 2)	User Modeling, Personalisation & Engagement	Personalisation algorithm		
WP3 Scientific Lead (UiB), Industry Lead (TV 2)	Media Content Production & Analysis	Automated Fact Checking & Storytelling		
WP4 Scientific Lead (NORCE) Industry Lead (Vizrt)	Media Content Interaction & Accessibility	Validated Prototypes		
WP5 Scientific Lead (UiO), Industry Lead (Amedia)	Norwegian Language Technologies	AI/ML Language Techniques		
WP 6 Administrative Leader	Administration, Exploitation, Communication & Innovation Management			

Responsible Media Technology

Impact

New Products, New Services, Startups, Spin-outs, Workflows, Follow-up research, IP rights (e.g., Patents), Licenses, Standards, Business etc.

Governance structure

MediaFutures is organised through governance bodies involving all partners as well as leading experts in the field of media and technology:

The day-to-day running of MediaFutures is carried out by the Centre Management supported by a Steering Board, an Executive Board, an Advisory Committee, and an Ethics Committee. Each research WP is run by one scientific leader and one industry co-leader. The WP leaders and the Centre Management meet every other week in the Technical Committee. The WPs are in addition supported by the WP Advisory Group who meet regularly with the WP leaders and the Centre Director to provide feedback and input on the work-in-progress on the WP level.

Collaborators

MediaFutures combines the expertise of nationally and internationally renowned media-tech researchers with the expertise of both the strongest domestic media and media-tech entities (such as NRK, TV 2) as well as Norwegian media-tech multinationals with high global market penetration (such as Vizrt and Highsoft).

We have also established international collaborations through several governance bodies involving leading experts in the fields of media, information technology, ethics, etc. Our collaborators and advisors include internationally renowned experts from The European Broadcasting Union (EBU), Switzerland; The New School's Parsons School of Design, US; Northwestern University, US; Royal Holloway University of London, GB; Massachusetts Institute of Technology, US; Cornell University, US; University of Oxford, GB; The Vrije Universiteit Amsterdam, NL; The University of Klagenfurt, AT; The Open University, GB; and Stockholm University, SE.

Basic Facts

8 years duration

5 research and innovation WPs

12 PhD students

9 Postdocs

~100 people involved (scientists, technical staff, executive level, and supporting staff)

Funding

263.5 million NOK total budget

96 million NOK funding from Research Council of Norway

98.5 million NOK industry funding

69 million NOK research partners' in-kind contribution

International collaborators

Royal Holloway University of London
University of Oxford
The Open University
United Kingdom

Stockholm University
Sweden

EBU
Switzerland

The New School's Parsons School of Design
Northwestern University
Massachusetts Institute of Technology
Cornell University
United States of America

Vrije Universiteit Amsterdam
Netherland

University of Klagenfurt
Austria

Partners

4 research partners
- UiB
- UiO
- UiS
- NORCE

10 industry partners
- Schibsted
- NRK
- TV 2
- BT
- Amedia
- Vizrt
- Highsoft
- Vimond
- Fonn Group
- IBM

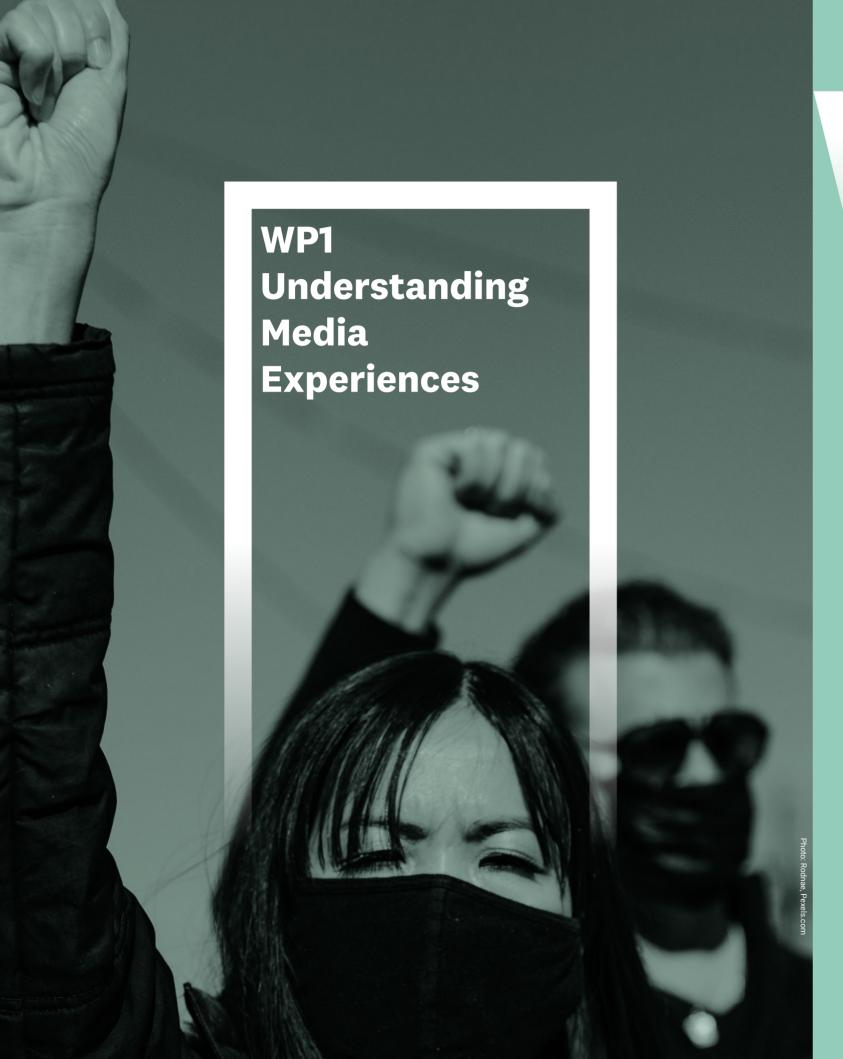**About the Norwegian Scheme for Research-based Innovation (SFI):**

The SFI scheme is a national scheme under the auspices of the Research Council. The Research Council provides the basic funding for the centres that are given SFI status under the scheme for a period of up to 8 years.

The objective of the SFI scheme is to Facilitate active, long-term cooperation between innovation-oriented, R&D-performwming companies and prominent research groups.

Promote the development of outstanding industry-oriented research clusters that are an integral part of dynamic international networks and that enhance the internationalisation of the Norwegian business sector.

Encourage and enhance researcher training and the transfer of knowledge and technology in areas with major potential for future value creation.

WP1 Understanding Media Experiences

WP1

Involved partners
University of Bergen, Vrije Universiteit Amsterdam, BT, NRK, Schibsted

WP objectives
To provide fundamental knowledge on how users will interact with the media of the future by monitoring and understanding users across media through advanced quantitative and qualitative approaches.

WP background
With the datafication of everyday life, increasingly powerful platforms, and intensified competition for attention, media users face a media environment that is increasingly perceived as intrusive and exploitative of their data traces. This situation causes ambivalence and resignation as well as immersive and joyful media experiences. Understanding these experiences is crucial to democracy as media use continues to be central for public connection and citizens' information about and engagement in society. In addition to making sense of media usage through metrics such as clicks, time spent, shares, or comments, critical attention to problematic representations of datafication should be bridged with broader and deeper understandings of media as experience.

New Knowledge
The collaboration between the Bergen Media Use Research Group at UiB and user partners in the centre will generate new knowledge from a dual strategy that will (i) monitor users across media with state-of-the-art tracking devices – with critical attention paid to the limitations of such methods – combined with surveys and survey experiments, and (ii) will seek to understand future media experiences through qualitative in-depth explorations of emerging and transformative media use. The WP will provide a knowledge foundation for other WPs in the centre to build on and will bring novel research insights on audience analysis to industry partners.

Brita Ytre-Arne
Professor, WP Leader,
University of Bergen

Kristian Tolonen
Industry WP co-Leader,
NRK

13

WP2
User Modeling, Personalisation & Engagement

WP2

Involved partners
University of Bergen, University of Stavanger, University of Klagenfurt, Amedia, BT, IBM, Schibsted, NRK and TV 2.
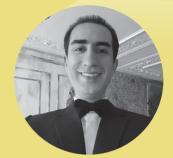
Objectives
To develop user modeling and personalisation techniques capable of effectively eliciting user preferences in order to enhance the user experience when interacting with media content while taking into account important competing factors (e.g., business values, societal values, and individual values).

Background
The use of recommendations enables media applications to support users in discovering additional media content (e.g., news articles, videos) and to keep consumers engaged. The main challenge in this context is that the recommendation approach has little potential for the discovery of new types of content for the consumer, and they might cause popular media content to become even more popular. Such problems can ultimately lead to filter bubbles, echo chambers, or group-think conditions.

New Knowledge
This WP addresses undesired phenomena such as degenerative feedback loops likely originating from current personalisation and recommendation techniques. This will be done by computing responsible (predictive) models for fair recommendations that will enhance user engagement through novel mechanisms by (i) providing explanations of recommendations to users (transparency), (ii) expanding recommendations to cover a rich spectrum of media content (diversity), and (iii) ensuring that niche or minority content is suggested to users (fairness). Another outcome will be novel recommendation algorithms taking into account multiple competing objectives (e.g., relevance vs. information balance).

Mehdi Elahi
Assoc. Professor,
WP Leader,
University of Bergen

Lars Skjærven
Industry WP co-Leader,
TV2

WP3
Media Content Production & Analysis

WP3

Involved partners
University of Bergen, University of Stavanger, Open University, BT, Fonn, IBM, Schibsted, TV 2, Vimond

Objectives
We aim to develop solutions that produce verified and relevant content while employing engaging narratives. We will collaborate closely with media production companies to integrate and test the methods and tools we develop in realistic production settings, thus increasing industry relevance. Our ultimate objective is to analyse user-generated and other media content with respect to quality and validity, to extract data, information, and knowledge from media content, and provide this to algorithms that support (semi-)automated multi-modal content production.

Background
WP3 will produce novel tools for computational journalism to produce quality content in terms of both trustworthiness and engagement and will produce fact-checking software. Central research questions are: How can we computationally produce unbiased, high-quality, multi-modal content? How can we analyse user-generated content in order to generate more valuable insights?

New Knowledge
Computational support for fake news detection – encompassing multimedia forensics techniques and fact checking – will be integrated within an adaptive platform supporting new content generation. The latter will be supported not simply through domain-specific search engines, and we will also employ sophisticated AI techniques for narrative generation. Here, the key element will be the use of news angles as a mechanism to support the creation of genuinely original content.

Andreas L. Opdahl
Professor, WP Leader,
University of Bergen

Are Tverberg
Industry WP co-Leader,
TV2

17

WP4
Media Content
Interaction
& Accessibility

WP4

Involved partners

University of Bergen, NORCE Norwegian Research Centre, Stockholm University, Highsoft, NRK, Schibsted, TV 2, Vizrt

Objectives

The work package will develop methods and technologies for interaction between media content and users, both humans and computerised, and for providing personalised, adapted media experiences to all users regardless of their technical aptitude or personal needs.

Background

Tomorrow's media experiences will combine sensor technology (instrumentation), AI, and personal devices (interactivity) to increase engagement and collaboration. Enablers such as haptics, AR/VR, conversational AI, tangible interfaces, wearable sensors, and eyes-free interactions have made clear progress. Hence, media experiences will become more individualised and will target the preferences and circumstances of each user (adaptation) by making use of a variety of device categories offering alternative capabilities.

Research into adaptation includes responsive user interfaces, adaptive streaming, content adaptation, and multi-device adaptation. Adaptation is also needed for collaborative and social use. Finally, media experiences must be inclusive and available for all (accessibility). Research into accessibility includes screen readers and AI-based techniques for the generation of adapted content such as audio tracks for the visually impaired, video interpreters for the deaf, and individualised narration.

New Knowledge

The WP will focus on making media experiences more accessible to all users by exploiting personal devices to perform personalised adaptations. Adaptations can be based on physical requirements like visual or auditory impairments, age-related adaptations like age-appropriate visualisations, the technical knowledge levels of the users, the availability of sensors or specialised hardware, etc. The personal devices will also be used in social settings, e.g., using a phone to make personal adaptations even if multiple people are watching something on a shared TV.

Njål Borch
Senior Researcher,
WP Leader,
NORCE Norwegian
Research Centre

Petter Ole Jakobsen
Industry WP co-Leader,
Vizrt

19

WP5
Norwegian Language Technologies

Involved partners
University of Bergen, University of Oslo, Amedia, IBM, Schibsted, TV 2

Objectives
To develop language technologies for the Norwegian language. Datasets and advanced models for Norwegian (Bokmål/Nynorsk) that support the automated understanding as well as the automated production of media texts in this language will be developed and made available using state-of-the-art approaches in machine learning and AI.

Background
WP5 adopts theoretical approaches and methodologies primarily based on linguistic data science, including neural learning. Based on language data in the media from our user partners and the data and tools of our research partners, large corpora will be annotated. The labelled examples in these corpora will be used for training and evaluating supervised models that demonstrate advanced approaches in areas such as robust deep language analysis, adaptive language generation, event identification and extraction, and opinion analysis. The partners will cooperate to explore the use of such models for innovative purposes.

New Knowledge
The WP will focus on a range of linguistic tasks in the media domain and will apply novel machine learning algorithms to advance language technologies for the Norwegian language. Our commercial partners will provide us with the necessary language data, and annotated data and models for written Norwegian will be developed and made available.

Lilja Øvrelid
Professor, WP Leader,
University of Oslo

Emiliano Guevara
Industry WP co-Leader,
Amedia

Our team

Centre Management

- **Christoph Trattner** — Professor, Centre Director, UiB
- **Ellen Ingeborg Hætta** — Administrative Leader, UiB

WP1

- **Brita Ytre-Arne** — Professor, WP1 Leader, UiB
- **Hallvard Moe** — Professor, WP1 co-Leader, UiB
- **Kristian Tolonen** — WP1 Industry co-Leader, NRK
- **Erik Knudsen** — Researcher, UiB
- **Ana Milojevic** — affiliated PostDoc (funded by MSCA IF), UiB

WP2

- **Mehdi Elahi** — Assoc. Professor, WP2 Leader, UiB
- **Marija Slavkovik** — Assoc. Professor, WP2 co-Leader, UiB
- **Lars Skjærven** — WP2 Industry co-Leader, TV 2
- **Helle Sjøvaag** — Professor, UiS
- **Krisztian Balog** — Professor, UiS

WP3

- **Andreas L. Opdahl** — Professor, WP3 Leader, UiB
- **Bjørnar Tessem** — Professor, WP3 co-Leader, UiB
- **Are Tverberg** — WP3 Industry co-Leader, TV2
- **Duc-Tien Dang-Nguyen** — Assoc. Professor, Task Leader, UiB

WP4

- **Vinay Setty** — Assoc. Professor, Task Leader, UiS
- **Njål Borch** — Senior Researcher, WP4 Leader, NORCE
- **Morten Fjeld** — Professor, WP4 co-Leader, UiB
- **Petter Ole Jakobsen** — WP4 Industry co-Leader, Vizrt
- **Frode Guribye** — Professor, UiB
- **Helwig Hauser** — Professor, Task Leader, UiB
- **Ingar Arntzen** — Senior Researcher, NORCE

WP5

- **Lilja Øvrelid** — Professor, WP5 Leader, UiO
- **Koenraad de Smedt** — Professor, WP5 co-Leader, UiB
- **Emiliano Guevara** — WP5 Industry co-Leader, Amedia
- **Erik Velldal** — Assoc. Professor, UiO
- **Samia Touileb** — Researcher, UiO / UiB

Steering Board

- **Christian Birkeland** — Chair of the Steering Board, TV 2
- **Jan Erik Askildsen** — Dean of the Faculty of Social Sciences, UiB
- **Nabil Belbachir** — NORCE
- **Turid Borgen** — UiS
- **Laila Dahlen** — Schibsted
- **Petter Ole Jakobsen** — Vizrt
- **Frøy Gudbrandsen** — Bergens Tidende
- **Torstein Harildstad** — Fonn Group
- **Grethe Hjertland** — Highsoft
- **Helge Høibraaten** — Vimond
- **Hans-Henrik Merckoll** — IBM
- **Pål Nedregotten** — Amedia
- **Stephan Oepen** — UiO
- **Heidrun Reisæter** — NRK
- **Lise Våland Sund** — NFR, observer
- **Pinar Heggernes** — UiB, observer

Executive Board

- **Arne Klein** — TV2
- **Jade Josefine Nordahl** — NRK
- **Pål Ruud** — Schibsted
- **Eivind Fiskerud** — BT

Ethics Committee

- **Representative to be appointed** — UiB
- **Lilja Øvrelid** — UiO
- **Sinan Kayhan Ara** — Massachusetts Institute of Technology
- **Deborah Estrin** — Cornell Tech University
- **Luciano Floridi** — University of Oxford

Advisory Commitee

- **David Carroll** — The New School's Parsons School of Design
- **John Ellis** — Royal Holloway University of London
- **Hans Hoffmann** — The European Broadcasting Union – EBU

WP Advisory Group

- **Alexandre Rouxel** — The European Broadcasting Union – EBU
- **Irene Costera Meijer** — Professor II, WP1 Advisor, UiB / Vrije Universiteit Amsterdam
- **Dietmar Jannach** — Professor II, WP2 Advisor, UiB / The University of Klagenfurt
- **Enrico Motta** — Professor II, WP3 Advisor, UiB / Open University
- **Oskar Juhlin** — Professor II, WP4 Advisor, UiB / University of Stockholm

Accounts

Costs per project partner (in NOK 1,000)	2020
UNIVERSITETET I BERGEN	1,237
NORCE NORWEGIAN RESEARCH CENTRE AS	163
UNIVERSITETET I OSLO	42
UNIVERSITETET I STAVANGER	-
TV 2 AS	276
INTERNATIONAL BUSINESS MACHINES AS	117
SCHIBSTED ASA	101
BERGENS TIDENDE AS	72
NORSK RIKSKRINGKASTING AS	33
AMEDIA AS	-
FONN GROUP AS	-
HIGHSOFT AS	-
VIMOND MEDIA SOLUTIONS AS	-
VIZRT NORWAY AS	-
TOTAL	**2,041**

Funding sources (in NOK 1,000)	2020
Own contribution (Host)	898
Public funding	42
Private funding	619
The Research Council of Norway	481
TOTAL	**2,041**

Media Futures .