

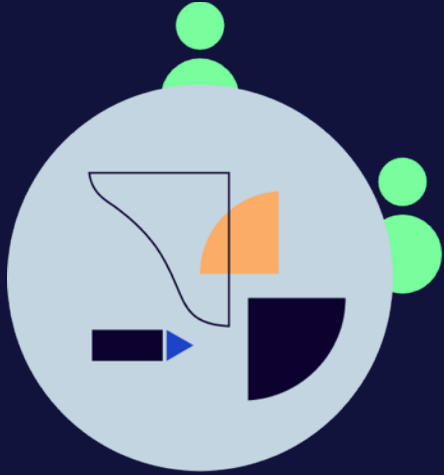
Bærekraftig digitalisering - Bærekraftsanalyse på 1-2-3

Workshop 24. oktober
John Krogstie
Simen Sommerfeldt



Struktur på ettermiddagen

- 30 min : Intro til problematikken rundt bærekraftig digitalisering
- 30 min: Presentasjon av SUSAF
- 60 min : 1. gjennomføring av workshop med bruk av SUSAF – SUSAD
- 30 pause
- 60 min: 2 gjennomføring av workshop med bruk av SUSAF
- 30 min: Læringspunkter



Simen Sommerfeldt - @sisomm



Bachelor of Engineering, University of Surrey

Tre barn

Role: CTO@Bouvet

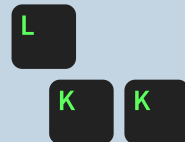
En av grunnleggerne av «Lær Kidsa Koding»

Var med på å etablere GoForIT

Stedfortreder i personvernemnda



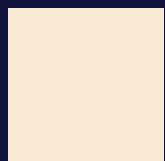
GOFORIT



Lær Kidsa Koding



Dette er Bouvet



Vi er et norsk konsulentselskap,
med 19 kontorer i Norge og
Sverige med over 2000 ansatte



Stor fokus på delingskultur,
troverdighet og jordnærhet



Vi leverer tjenester innen
kommunikasjon, rådgivning og
teknologi

Visjon

Vi går foran og bygger fremtidens samfunn



Fokusområder fra vesentlighetsanalyse



Bærekraft er i en kritisk fase

- Vi rister av oss naivitet...
- Og spør «hva kan vi gjøre»
- Samtidig som virksomhetene forstår at det koster..
- ...for det handler om økosystemet
- Og dere kan hjelpe til!



”

*Every line of code
represents a moral and
ethical implication*

Grady Booch

IBM Research, ACM Fellow, Co-inventor of UML



Frihetene i EMK 8

Friheter: Privatliv, kommunikasjonsvern, personvern, ytringsfrihet, religionsfrihet, bevegelsesfrihet, bestemmelsesfrihet, retten til å organisere seg, retten til ikke å bli diskriminert

... Og så har vi Rettighetene i GDPR



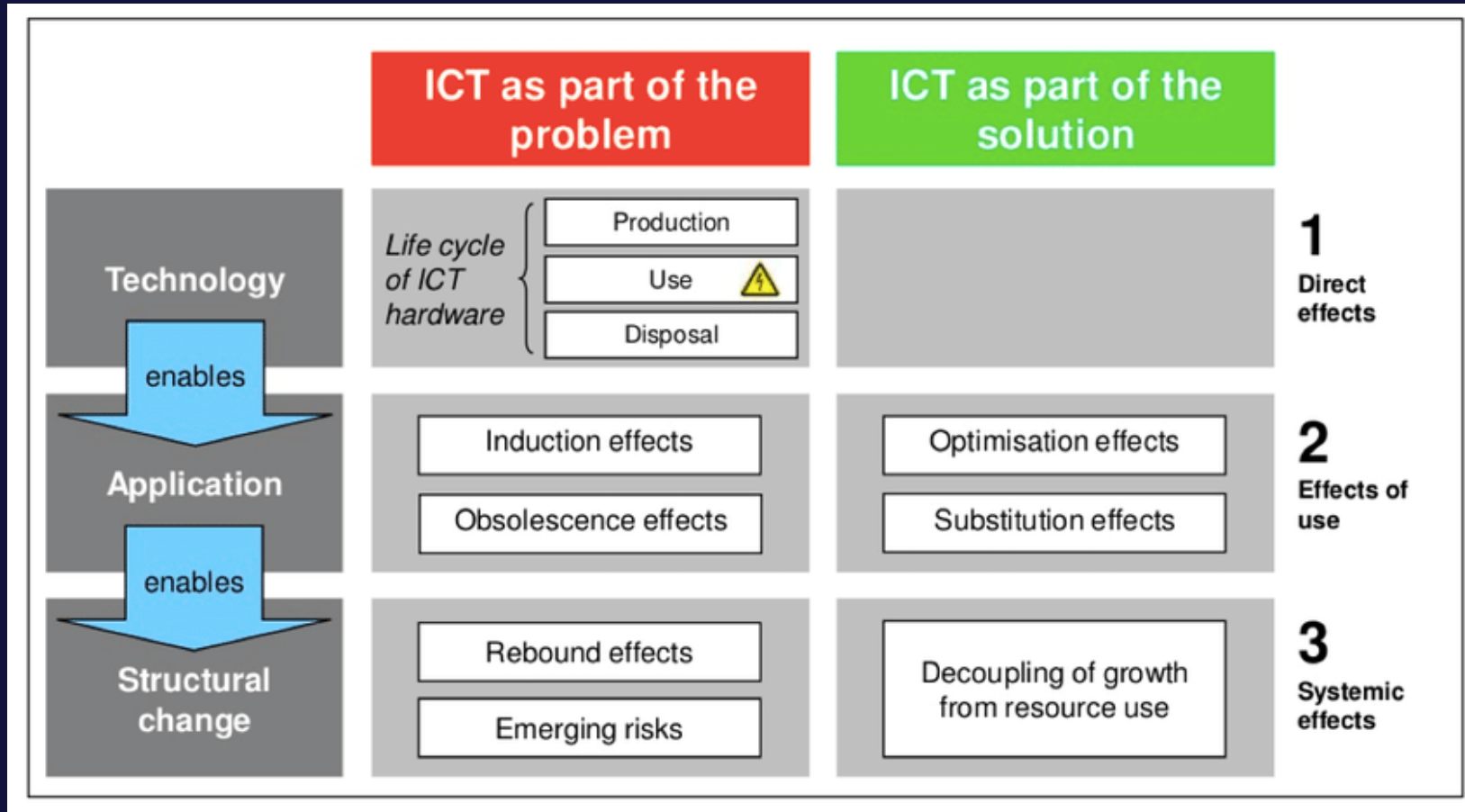
#nrknyheter

Må laste ned app for å slippe inn i Qatar

De kan bruke den til masseinnhenting av informasjon fra én million mennesker.

<https://tv.nrk.no/se?v=NNFA19101422&t=67s>

IT-systemer som problem og løsning



Det så ut som en fin idé!

DESIGN OF AIRBNB - ENVISIONED BENEFITS



MARKETPLACE TO
RENT YOUR HOUSE



MORE AVAILABILITY
OF CHEAPER,
SHORT-TERM RENTAL
OPTIONS



LOCAL
ACCOMMODATION

Oi da

THINGS GONE WRONG - WE DIDN'T SEE THIS COMING

Economic and social impacts.



NEW YORK:
HOMEOWNERS CAN
EARN 55% MORE
THAN THE MEDIAN
LONG-TERM RENTAL

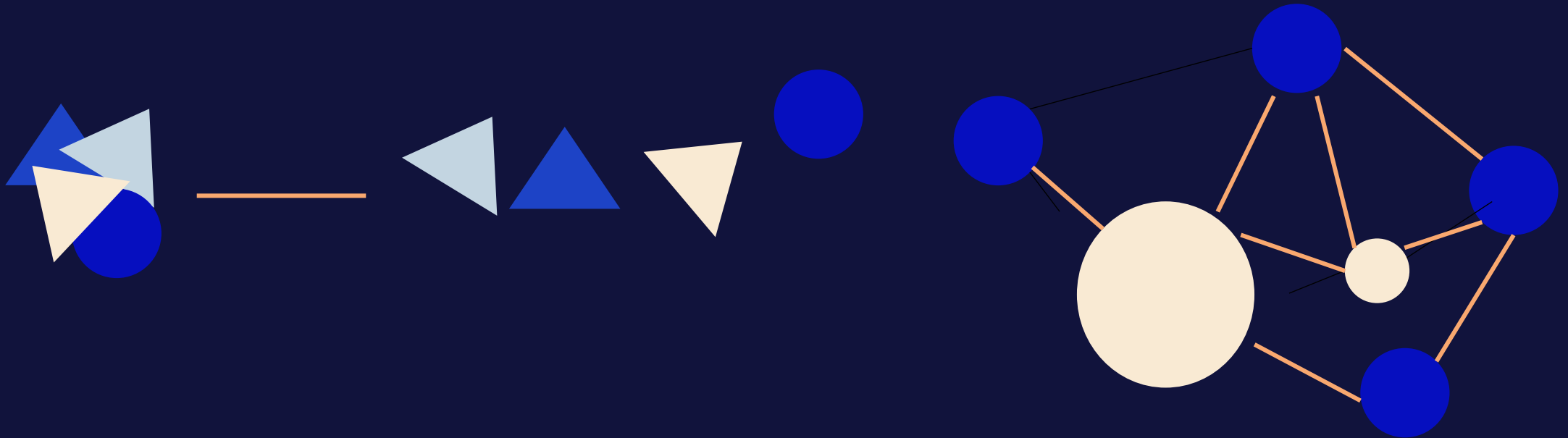
ESTIMATED: AIRBNB
REMOVED 7,000 -
13,000 UNITS OF
HOUSING IN NY
→ INCREASE OF 1.4%
IN THE MEDIAN
LONG-TERM RENT

72% OF POPULATION IN
NEIGHBOURHOODS AT
HIGHEST RISK OF
AIRBNB-INDUCED
GENTRIFICATION ARE
NON-WHITE
→ INCREASING RACE
SEPARATION

D.Wachsmuth and A. Weisler. Airbnb and the rent gap: Gentrification through the sharing economy.
Environment and Planning A: Economy and Space, 50(6):1147-1170, 2018.

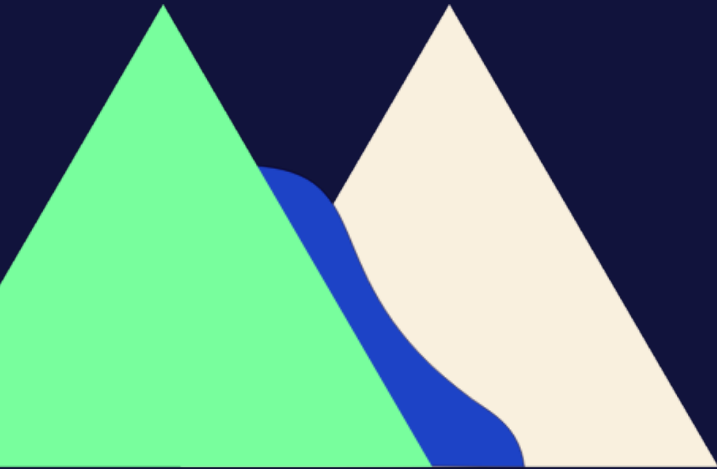
Vi kan ha bærekraftige prosjekter hvis...

- Virksomheten har **trippel bunnlinje** i DNA'et sitt
- Vi bruker **rammeverk** og **metoder** som understøtter bærekraft
- Prosjektdeltagerne og stakeholders har rett **kompetanse/vokabular**, og gjør de riktige tingene.



Trippel Bunnlinje

Hva er bærekraft?



United Nations



Report of the World Commission on Environment and Development

Our Common Future



United Nations
1987

UN Documents: Gathering a Body of Global Agreements has been compiled by the *NGO Committee on Education of the Conference of NGOs* from United Nations web sites with the invaluable help of information & communications technology.

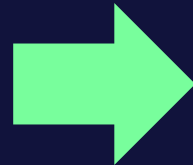
Brundtland- rapporten fra 1987

«Utvikling som
imøtekommer dagens
behov uten å ødelegge
mulighetene for at
kommende generasjoner
skal få dekket sine
behov»

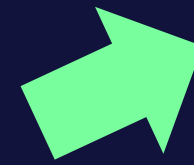
Et slags bærekraft - slektstre



1987



2005



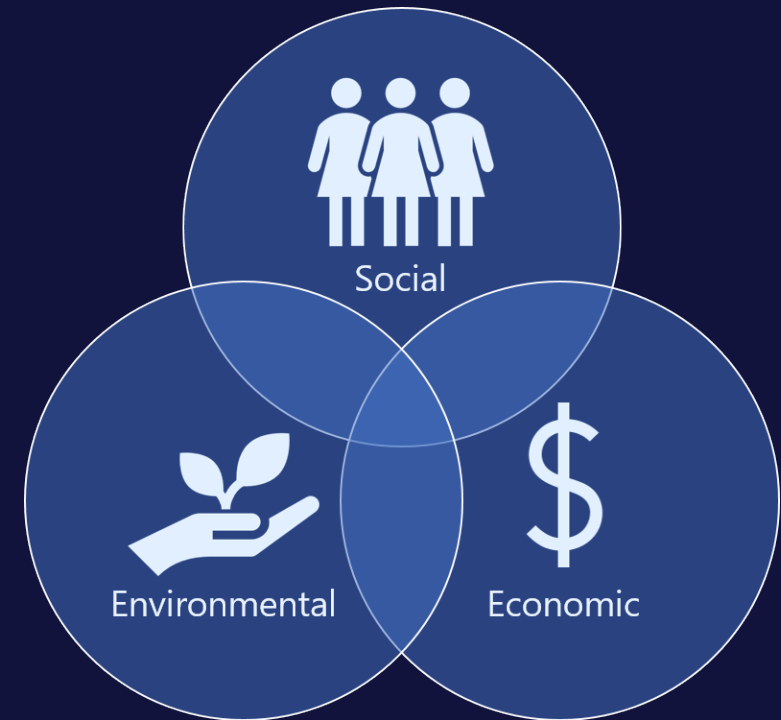
2019

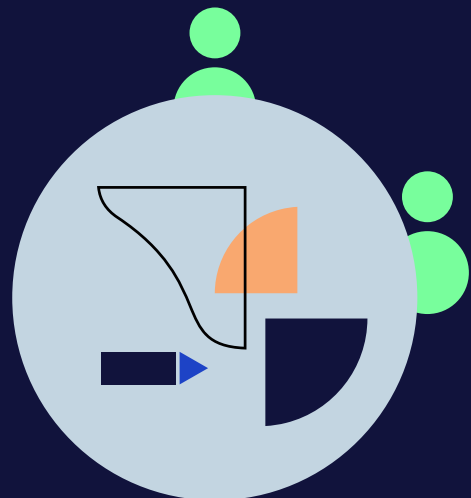


2015

Trippel Bunnlinje

...at det en bedrift foretar seg skal gi fordeler for både **bedriften**, **forbrukere** og **miljø** gjennom å fremme sosiale og miljømessige resultater **på lik linje** med økonomiske, for å kunne oppnå **langsiktig suksess**





METODER OG RAMMEVERK

Blah
Blah

Blah

YOUTH DRIVING
4CLIMATE AMBITION



Vi hindres av mangel på
felles strategiske
rammeverk





(c) Aardman Animations Limited

Akademia redder dagen

FOCUS: THE FUTURE OF SOFTWARE ENGINEERING

Requirements: The Key to Sustainability

Charafek Becker, University of Toronto

Suzanna Chitryan, University of Leicester

Letizia Dubois, State University of Rio de Janeiro

Shiva M. Easterbrook, University of Toronto

Rajeev Rasmussen, California State University Long Beach

Nahuel Seyff, University of Applied Sciences

Andri AHN Northwestern Switzerland

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Software's critical role in society demands a paradigm shift in the software engineering mind-set. This shift is driven by requirements engineering. **SE**



SOFTWARE SYSTEMS are a major driver of social and economic activity. Software engineering (SE) tends to focus on the technical characteristics of systems with clear boundaries and identifiable parts and components. However, software systems are embedded in socio-economic contexts. Software systems are essential to

societies that the resulting socio-technical systems boundaries and interactions are often hard to identify. For example, communication, travel, banking, and procurement systems influence the socioeconomic and natural environments through far-reaching effects on how we live, work, and what we buy. The engineering process rarely makes these effects explicit. The lack of visibility makes assessing a software system's long-term and cumulative impacts difficult. Treating for sustainability is a major challenge that can potentially change SE's role in society. What does it mean to establish sustainability as a major concern in SE? As software engineers, we're responsible for our software's long-term consequences. Inquiries of the primary purpose of the system we're designing. Requirements are the key leverage point for practitioners who want to develop sustainable software systems. Here, we present two examples that illustrate the change needed in SE and show how considering sustainability explicitly will affect requirements activities.

© 2014 ACM 978-1-4558-7642-3/14/0001...\$15.00

Software Engineering for Sustainability: Find the Leverage Points!

Software Engineering helps deliver software systems that can enable humanity to reach new levels of prosperity. That requires us building complex, interdependent and globally distributed systems can also be leveraged for sustainability challenges. Humanity faces a number of global, interdependent, and complex challenges that present a risk to societies, including climate change, large scale secondary migration, and poverty [18]. As software professionals, we can contribute to sustainability through the software systems that we engineer, and it is our social responsibility to do so [21]. In the sustainability problems are complex system problems (see [20] for Sustainability). How can we understand the complex dynamics that arise in the interaction within multifaceted social, economic, or ecological systems? One approach to identifying successful sustainability interventions is to consider leverage points - locations within a system where a small change in one aspect can result in significant system-wide changes [16]. This article suggests leverage points (LP) can help software engineers to address sustainability challenges by offering insights on possible transformation mechanisms and/or ways to that alternatives. While LP will not tell us exactly how to act on sustainability challenges, they provide an analysis tool to help practitioners to identify elements that can bring about effective change at different levels, for a software system and the wider system it resides in. As sustainability is a crosscutting (orthogonal) concern, LPs are beneficial as they enable intervention on different levels. We use the example of the UK public transportation system [23] to illustrate how leverage points can contribute to software engineering for sustainability.

SUMMARY Sustainability. The Oxford English Dictionary [13] defines sustainability as the capacity to endure. The Brundtland commission defined sustainable development as "meeting the needs of the present without compromising the ability of future generations to meet their needs" [1]. However, to understand the broader sustainability issues, we must ask which system is sustain, for whom, over which time frame, and at what cost [14]. This involves five interrelated dimensions [2]:

- **The individual dimension** covers individual freedom and agency, human dignity, and fulfillment. It includes individuals' ability to thrive, exercise their rights, and develop freely.
- **The social dimension** covers relationships between individuals and groups. It covers the structures of mutual trust and communication in a social system and the balance between conflicting interests.
- **The economic dimension** covers financial aspects and business value. It includes capital growth and liquidity, investment questions, and financial operations.
- **The technical dimension** covers the ability to maintain and evolve artificial systems (such as software) over time. It refers to maintenance and evolution, resilience, and the ease of system transitions.
- **The environmental dimension** covers the use and stewardship of natural resources, ranging from immediate waste production and energy consumption to the balance of local ecosystems and climate change scenarios.

Sustainability Quantification in Requirements Informing Design

Shela Oyediji Department of Software Engineering Loughborough University Technology Loughborough, Leicestershire shela.oyediji@lboro.ac.uk	Ahmed Sefiah Department of Software Engineering Loughborough University Technology Loughborough, Leicestershire ahmed.sefiah@lboro.ac.uk	Bright Penmanmiller Department of Computer Engineering and Computer Science California State University Long Beach Long Beach, California, USA bright.penmanmiller@csulb.edu
---	---	---

Abstract—Sustainability has been defined with different perspectives and from diverse dimensions, making it an ambiguous concept to quantify, measure and compare into software development lifecycle. Although we have a lot of knowledge about how to make sustainable systems, little research has reported how to quantify sustainability. This case for definition and derivation of sustainability from software engineering and other fields to be used into requirements. Effective measures that quantify sustainability and their dependencies are defined. A sustainability by design approach? What are the measures and measurement work of sustainability? The long-term impact goal is to answer such questions and similar ones. In this position paper, we present our investigations and part of the need for the theoretical ground of sustainability quantification in software development and measurement. The goal is to have research and identification activities on sustainability as a quality attribute and sustainability by design.

Keywords—Software Sustainability, Sustainability Measurement, Software Measurement, Software Development, Sustainability Metrics, Software Design

1. INTRODUCTION

In a broad sense, sustainability is "the capacity to endure" [1]. In software engineering, sustainability has been introduced from different dimensions with diverse perspectives and definitions. Sustainability can be differentiated into several dimensions including environmental, human, social, and economic. According to Becker et al. [2] sustainability dimensions are interdependent and cumulative - first, second and third order effects from each dimension will build into each other. Sustainability combination as a non-functional requirement like security, usability, reliability can help reduce software system first order impacts which will also aid reduction of second and third-order impacts of software systems. In doing so, developers have the potential to considerably improve software system sustainability from the requirement engineering stage onwards [2]. This also requires measurement of sustainability how well the development process produces sustainable software [2].

The fundamental question is how to quantify sustainability not only the software product, systems and services but also for the entire digital ecosystem caused by



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FNs bærekraftsmål er bra men..

«...of the 169 targets beneath the 17 draft goals, **just 29% are** well defined and based on the latest scientific evidence, while **54% need more work** and **17% are weak or non-essential** »

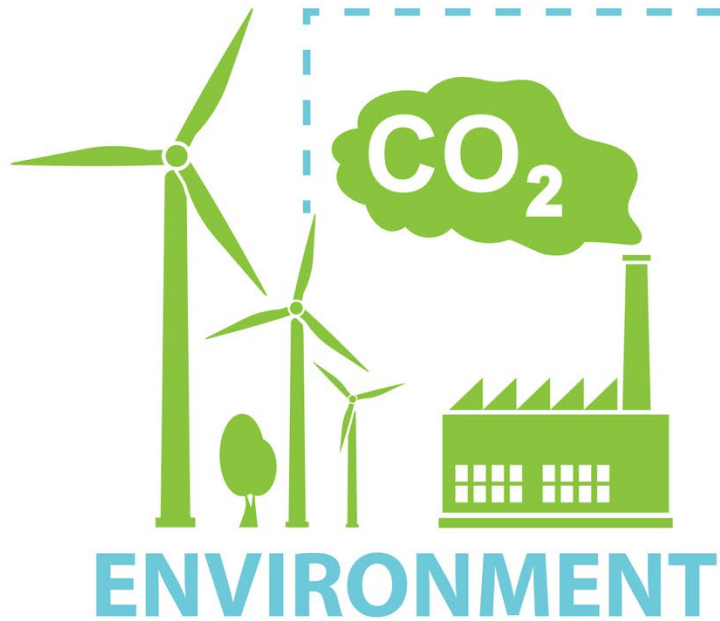




GoForIT fokuserer på ESG fordi..

- De fleste **strategiske rammeverkene** i akademia er basert på ESG
- FNs bærekraftsmål (SDG) **ikke er kvantifiserbare**, og derfor uegnet til bruk i kravhåndtering
- **Kognitiv belastning**: SDG er for tallrike og innviklet å sette seg inn i som introduksjon til bærekraft
- Å velge SDG'er kan virke **ekskluderende** på andre
- EU-taksonomien kan komme til å **utkonkurrere** SDG
- NB! SDG'er er gode **indikatorer**, og **kommuniserer bra** om bærekraft

ESG



Det handler ikke bare om miljøet

Innenfor digitalisering betyr dette fokus på sikkerhet, personvern, arbeidsmiljø og universell utforming – samtidig som vi ivaretar finansielle og lovmessige krav.

Vesentlighetsanalyse

- Vi må forstå virksomhetens **bærekraft -påvirkning**
- ...og forstå **kravene til oss** – fra eiere og samfunnet
- Så må vi se på hvilke tiltak som gir **størst effekt** , og som er forenlige med driften. Må vi endre oss i vesentlig grad?
- Ut av dette får vi **ambisjoner** , som vi må teste på interessentene
- Og til slutt må dette **omsettes i handling!**



Vesentlighetsanalyse

Virksomhetens påvirkning på verden

Verdens påvirkning på Virksomheten

Standarder og sektor påvirkning

Verdikjedeanalyse

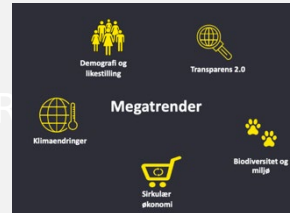
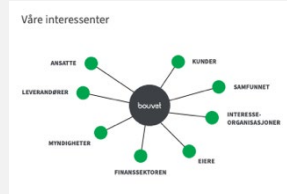
Interesenter og megatrender

Risiko og muligheter

Ambisjon og mål



RELEVANTE LEVERANDØRER	SIKKRESPERSONEN	RELEVANTE LEVERANDØRER	SIKKRESPERSONEN
<ul style="list-style-type: none"> • • • 	<ul style="list-style-type: none"> • • • 	<ul style="list-style-type: none"> • • • 	<ul style="list-style-type: none"> • • •



Beslutningsalternativ / mulighet	Risiko	Mulighet
•	•	•

Ambisjoner

Strategisk mål	Indikator	Verdier	Utsatt	Utsatt	Utsatt
•	•	•	•	•	•

Environment

This business is part of the economy, which is created by our society, which in turn is ultimately, utterly and immediately dependent on the environment. These are the vital context for any business – all risks and all opportunities – including yours.

This business is also part of a value constellation of other businesses, organizations, communities, individuals, animals, plants and the environment. When answering the questions posed by the canvas for your business, consider how your answers need to reflect these vital contexts and the other eco-system actors in your value constellation.

Society

Economy

BIOPHYSICAL STOCKS

What tangible materials are moved, flow, and / or transformed during the Activities that achieve this business's Goals?
Guidance: All materials remain biophysical stocks somewhere on our single shared planet irrespective of this business's Activities.



ECOSYSTEM SERVICES

Eco-system services are processes powered by the sun that use Biophysical Stocks to create flows of benefits humans need: clean water, fresh air, vibrant soil, plant and animal growth etc.
Which flows of these benefits are required by, harmed or improved by this business's Activities?

Example: See World Business Council for Sustainable Development (WBCSD)'s Corporate Eco-System Service Review v2.0.



COSTS

How does this business choose to measure the Costs incurred by its business model (Environmentally, Socially, Economically)?

RESOURCES

What tangible and intangible resource required in order to execute this business Activities and so achieve its Goals?



ACTIVITIES

What value adding work, organized in business processes, is required to achieve this business's Goals?



The Business Model Canvas

Designed for:

Designed by:

Date:

Version:

<h4>Key Partners</h4> <p>Who are our Key Partners? Which one of our key suppliers? Our Distribution Channels? Which Key Resources are we acquiring from partners? Which Key Activities do partners perform?</p> <p>EXAMPLES FOR NETWORKS Distribution and marketing Relocation of the site and contracting Acquisition of particular resources and activities</p>	<h4>Key Activities</h4> <p>What Key Activities do our Value Propositions require? Which one of our key suppliers? Our Distribution Channels? Customer Relationships? Revenue streams?</p> <p>EXAMPLES Production Product design Manufacturing</p>	<h4>Value Propositions</h4> <p>What value do we deliver to the customer? Which one of our customer's problems are we helping to solve? What bundles of products and services are we offering to each Customer Segment? Which customer needs are we satisfying?</p> <p>EXAMPLES Relocation Access Customization "Tailor the job to you" Design Efficiency Risk Cost Reduction Risk Reduction Accessibility Convenience/Usability</p>	<h4>Customer Relationships</h4> <p>What type of relationship does each of our Customer Segments expect us to establish and maintain with them? Which ones have we established? How are they integrated with the rest of our business model? How costly are they?</p> <p>EXAMPLES Personal Assistants Exclusive Personal Assistance Self-Service Automated Services Communities Co-creation</p>	<h4>Customer Segments</h4> <p>For whom are we creating value? Who are our most important customers? How do we reach them? How do we acquire them? How do we retain them? How do we sell to them?</p> <p>EXAMPLES Individuals Segments Channels Markets</p>
<h4>Key Resources</h4> <p>What Key Resources do our Value Propositions require? Our Distribution Channels? Customer Relationships? Revenue Streams?</p> <p>EXAMPLES FOR NETWORKS Physical Human Financial</p>	<h4>Channels</h4> <p>Through which Channels do our Customer Segments want to be reached? How are we reaching them now? How are our Channels integrated? Which ones work best? Which ones are most cost-efficient? How are we integrating them with customer routines?</p> <p>CHANNEL TYPES 1. Awareness 2. Evaluation 3. Trial/Adoption 4. Repeat 5. Referral 6. After-Sales</p>	<h4>Cost Structure</h4> <p>What are the most important costs inherent in our business model? Which Key Resources are most expensive? Which Key Activities are most expensive?</p> <p>IS YOUR BUSINESS ONE Cost driven (focused on value chain, premium value proposition) Fixed Cost driven (fixed on value chain, premium value proposition)</p> <p>FIXED COST DRIVEN Fixed Costs (salaries, rents, utilities) Costs of scale Economies of scope</p>	<h4>Revenue Streams</h4> <p>For what value are our customers really willing to pay? For what do they currently pay? How are they currently paying? How would they prefer to pay? How much does each Revenue Stream contribute to overall revenues?</p> <p>FIXED PRICES Usage fee Subscription Fee Licensing Advertising</p> <p>PRICE PRICES Product feature dependent Customer segment dependent Usage dependent</p> <p>HYBRID PRICES Flat Price Negotiation dependent Self-Service dependent Real-time dependent</p>	

ECOSYSTEM ACTORS

Who and what may have an interest in fact that this business exists?
Examples: Humans, NGOs, Government, etc. Other life (usually represented by IGO) etc.



NEEDS

What fundamental Needs of the System Actors is this business trying to satisfy or may hinder?
Guidance: For inspiration on possible needs, see Maslow's Hierarchy of Needs or Maslow's Fundamental Human Needs (preferred).



GOALS

What are the Goals of this business that its Stakeholders have agreed?
What is this business's definition of success: environmentally, socially and economically?



BENEFITS

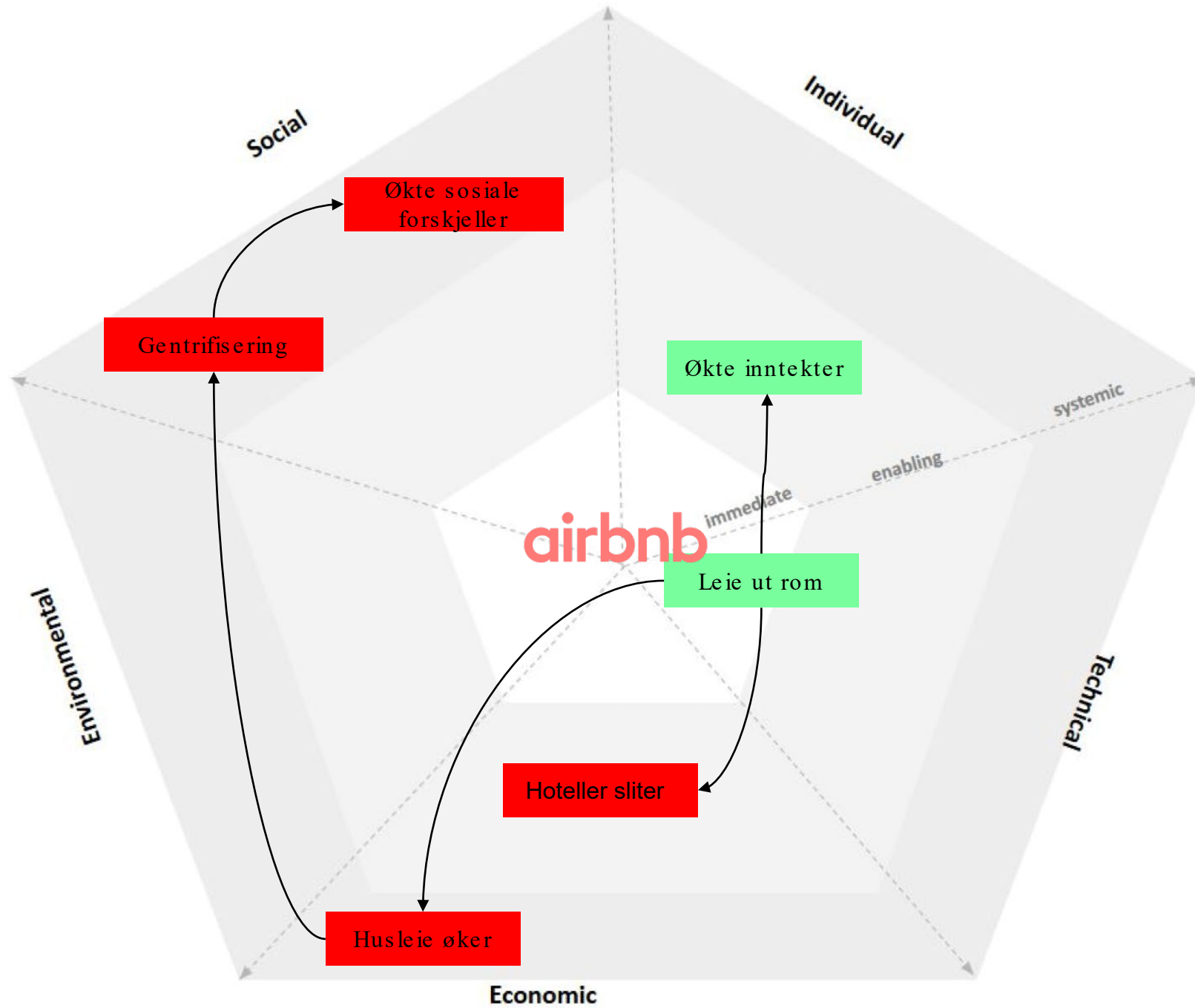
How does this business choose to measure the Benefits that result from its business model (Environmentally, Socially, Economically)?



OUTCOMES

What outcomes demonstrate whether this business has achieved its Goals, achieving its stakeholders' definition of success over time?
How does this business measure the benefits and costs to determine whether or not these outcomes are achieved (in applicable environmental, social and monetary units)?

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Et drømmescenario

Virksomheten har en **bærekraftig fremtidsvisjon**, backet opp med en god vesentlighetsanalyse. Vi har en strategi basert på **trippel bunnlinje**, og de ansatte har rett kompetanse og vokabular



Vi bruker metoder som **Flourishing Business Canvas** og **SUSAF**, og skaper en rød tråd i virksomheten, med konkrete mål for arkitekturen i virksomheten og prosjektene



... og vi kan danne en forbindelse til virksomhetens eventuelle valgte **bærekraft** - indikatorer



Yngvar Ugland,
Forbrukerteknolog hos DNB



Bærekraft



Generativ AI



Tilgang på kompetanse



goforIT



goforIT



KnowBe4



ATEA



ITERA



IKT Norge



accenture



sopra steria



Loopfront



knowit

OSLOMET

NITO



Redpill Linpro



WEB Lånekassen



finans FORBUNDET

Den norske dataforening

bouvet

Witted

SpareBank 1

otte

twoday

NIKT 2019: IKT-Norge og Bouvet
utfordret IT-utdanningene til å
prioritere **etikk , kritisk tenking** og
bærekraft

How should IT education address
sustainability and climate change



GoForIT



Februar 2020.. Møte med
IKT-Norge, UiA, NTNU og Bouvet



GOFORIT

Systemiske utfordringer

- Vi har i dag manko på 40.000 «IT folk» frem mot 2030 – **og de bør kunne bærekraft**
- Akademia famler med **bærekraft-innholdet** – også i etterutdanninger
- Arbeidslivet famler med å **finne riktig kompetanse**
- De som jobber med innkjøp **vet ikke hva de skal etterspørre**
- Og vi er **forpliktet** til å nå parisavtalens mål.



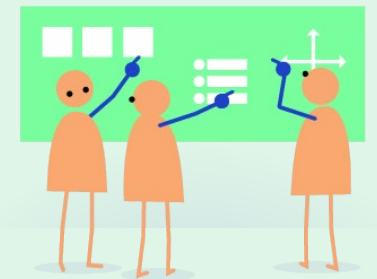


	Fase 1	Fase 2	Ettervert
Samfunnet			
Publisert			
Marknads			
Arbeidssituasjon			
GoForIT			

Fra HKDir s in konferanse «DigiNorden» sept. 2022

Innhold og aktiviteter i **GoForIT**

- En arena for mobilisering og samhandling rundt **bærekraft**
- Sparring rundt ambisjoner i **studieprogrammer**, forskning og undervisningsopplegg
- Egen gruppe som driver med **Politisk påvirkning**
- Oversettelse av og sparring rundt **CDR**
- **Kompetanseverktøykasse** for bærekraft
- Deler kompetanse/erfaringer om bærekraft i **arbeidslivet**
- «børs» for **gjesteforelesninger**
- **Forskernettverk** med forskerfrokoster
- To fagnettverk: Sirkulærøkonomi og karbonfangst/lagring.





accenture > bouvet
sopra > steria
knowit



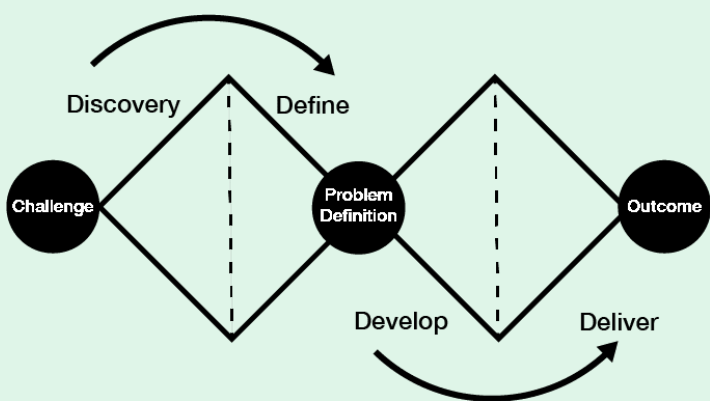
...og få **travle ledere** til å bli begeistret, legge det inn i planene for avdelingen, og mene noe med det

A man and a woman are shown from the chest up against a plain, light-colored wall. The man, on the left, has dark hair and a beard, wearing a white t-shirt. He has a wide-eyed, surprised expression with his mouth slightly open. The woman, on the right, has brown hair tied back with a yellow headband, also wearing a white t-shirt. She has a similar surprised expression, with her hands raised in a gesture of surprise or confusion. The overall mood is one of unexpected discovery or realization.

... Imøtekomme de
mentale barrierene..

Dybdeintervjuer ga innsikt

- Bærekraftansvarlige
- Studieprogramdesignere



Verktøykassen for bærekraft



Personlig oppfølging



Kommunikasjon

Utdanning og
etterutdanning



Offentlig og private anskaffelser



Tjenesteutvikling

Rolledefinisjoner



GoForIT

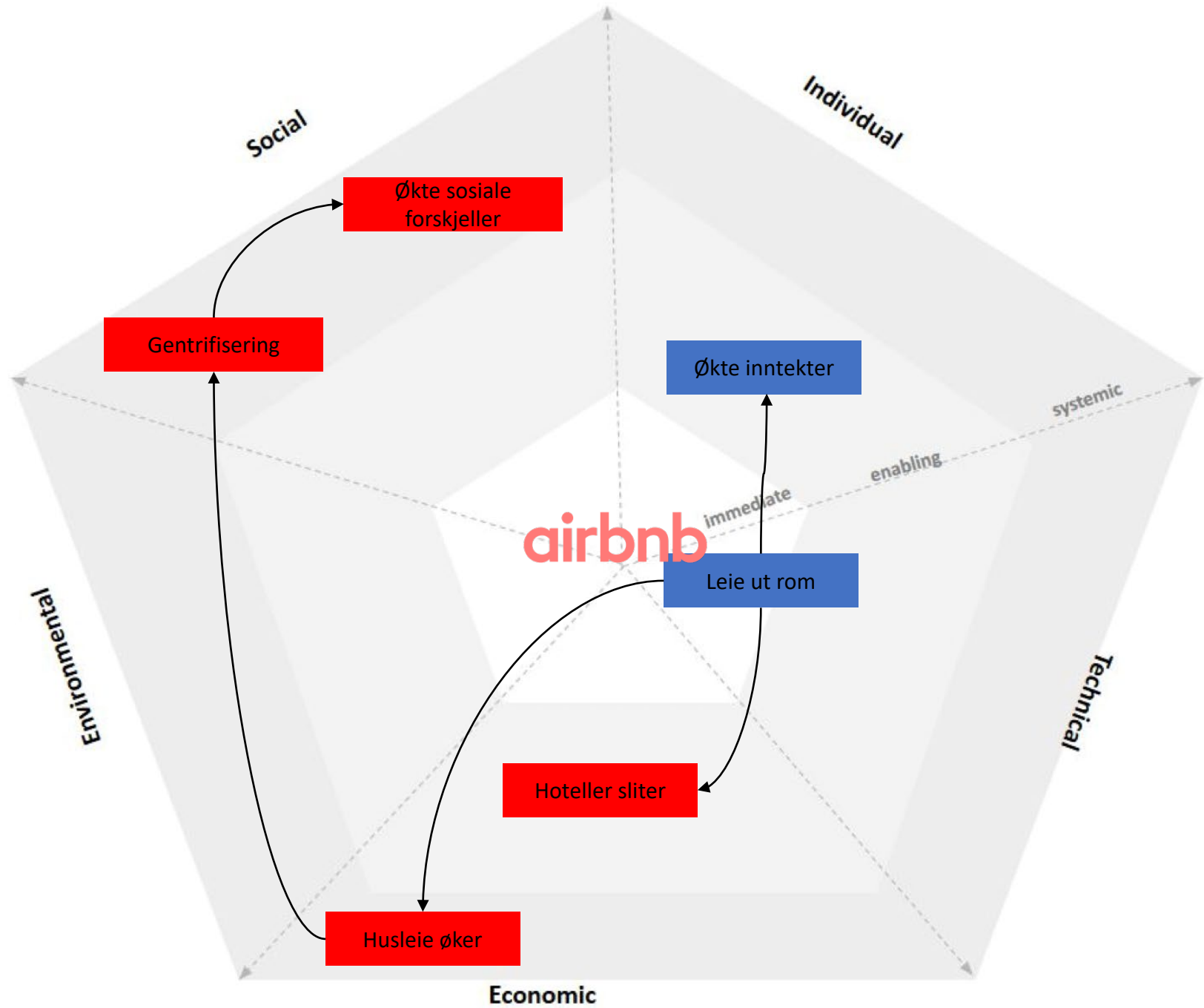


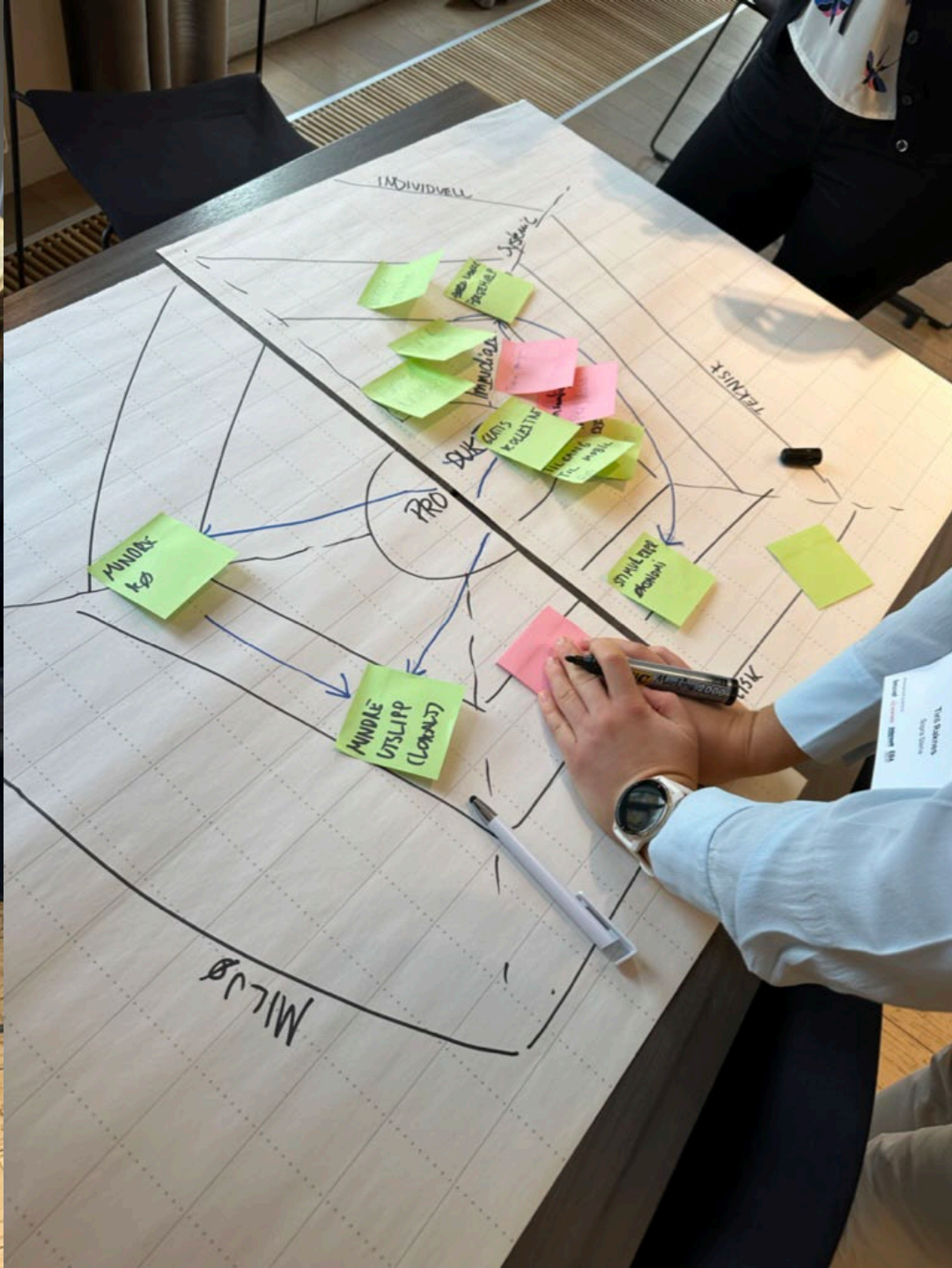
SusAF

The Sustainability Awareness Framework



Workbook





A group of six people, three men and three women, are standing in a modern office lounge. They are dressed in business-casual attire. The setting includes wooden floors, recessed ceiling lights, and large windows in the background. Other people are visible in the background, suggesting a social or professional gathering.

Fra lanseringen av CDR



GoForIT


Fase 1


Fase 2

Etterhvert




Samfunnet



Det går ikke fort nok


Opplever bransjen som
endringsagenter for bærekraft



Politikere



Hva det gir
og krever


Endre
rammebetingelser



Akademia



Oppdatere
Undervisningsopplegg


Forbereder studenter på
Å jobbe bærekraftig




Arbeidslivet


Endre arbeidsform



Jobber bærekraftig









Hva **betyr**
bærekraft for oss


Leveranser


Oppdatere


Kommunisere
og hjelpe


Kan legges ned

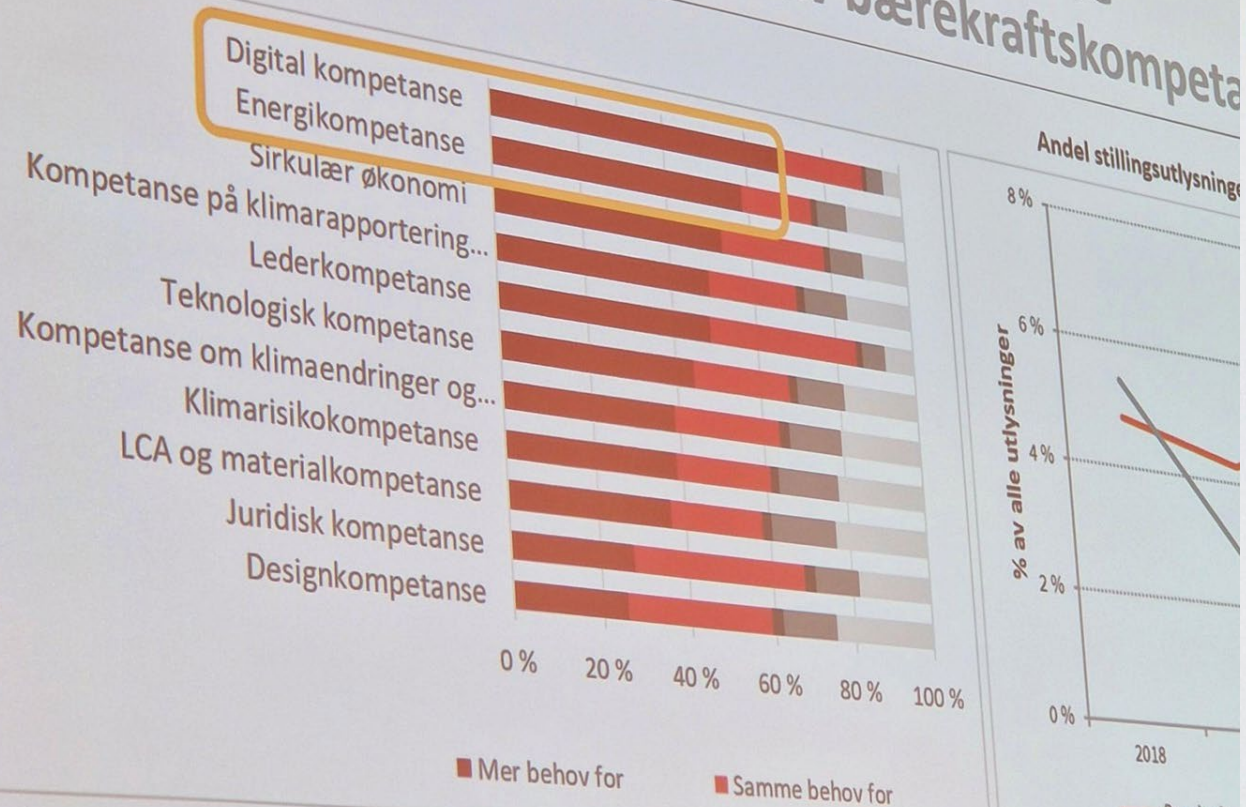
 produkt  Kommunikasjon  Arbeid  Risiko  Verdi

Innspill til Høyres ekspertgruppe



- Studieplasser
- Kompetanse hos politikere
- Etikk
- Satsing på energi som næring
- Energiforbruk

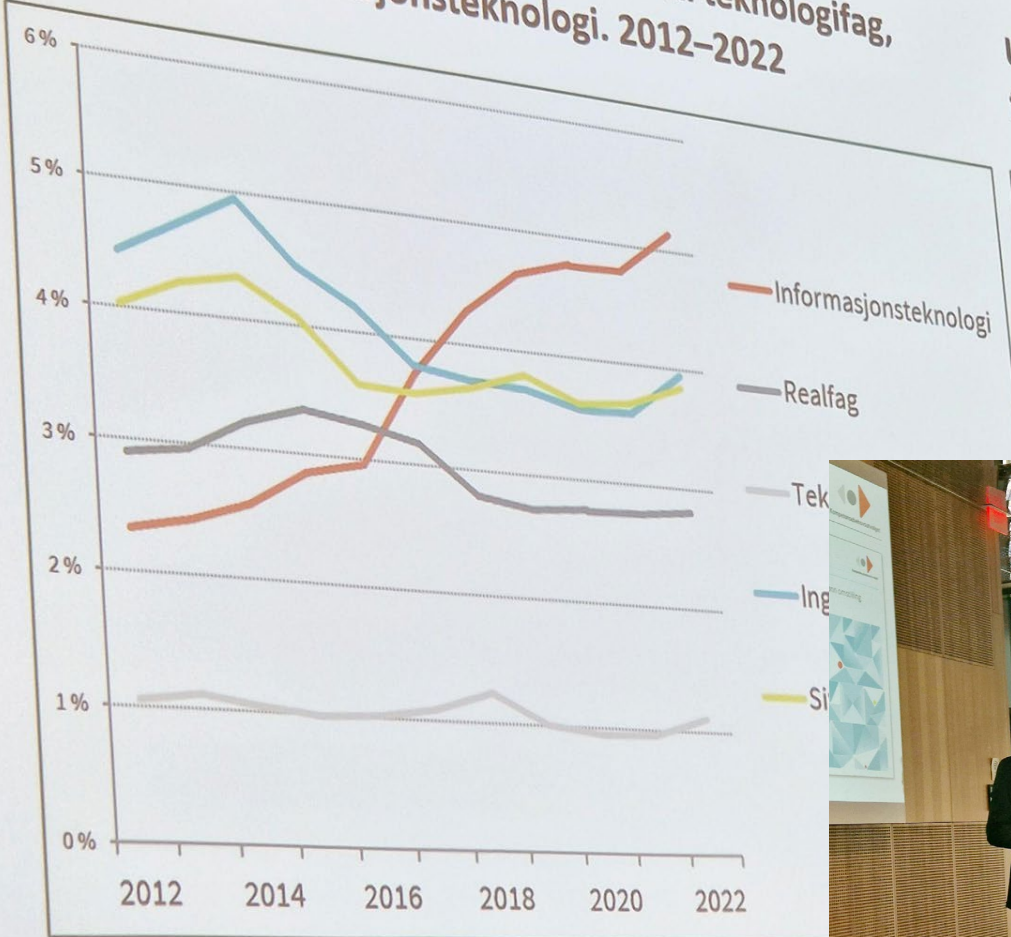
Særlig behov for IKT- og energikompetanse – men også en stor bredde av bærekraftskompetanse



Kilde: NIFU-rapport 2023:5, utarbeidet for KBU

Holder søkerne og høyere utdanning

Utvikling i andelen førstevalgssøkere til teknologifag, realfag og informasjonsteknologi. 2012–2022



Kilde: Tall levert på forespørsel av Samordna opptak



Leif Skiftenes Flak, John Krogstie og Mali Hole Skogen
Leif Skiftenes Flak, professor ved Universitetet i Agder, John Krogstie, professor ved NTNU, og Mali Hole Skogen, direktør for bærekraft og nye teknologier i IKT-Norge

Innlegg

Vi mangler fagfolk – trenger flere roboter

Norsk a
flere m

Maps IKT-Norge Nyheter Debatt

Khrono 10 år

IT-FAG

Næringslivet skriker etter IKT-kompetanse: 101 færre studieplasser

Antall studieplasser i IT-fag går ned i 2023, mens søkertallene viser en liten økning. — Satsingen er syltynn, sier IKT-Norge.



ARTIKKEL ©

SINTEF inn i GoForIT: Vil ha flere IKT-talenter som kan bærekraft



DIGITALISERING OG OFFENTLIG IT

På tide å sette digitalt samfunnsansvar på agendaen

EU og FN understreker viktigheten av å forstå sammenhenger mellom digitalisering og bærekraft. De kan åpenbart være både positive og negative. Tiden er overmoden for en større debatt om konsekvenser av digitalisering knyttet til sosiale, økonomiske og klimamessige forhold.



De fire kronikkforfatterne samlet. Pia Jærsdal, avdelingsleder i Bouvet, Leif Skiftenes Flak, professor ved Universitetet i Agder, Ida Mæuche, prosjektleder i Bouvet og Mali Hole Skogen, direktør for teknologi og bærekraft i IKT-Norge. Foto: Bouvet



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