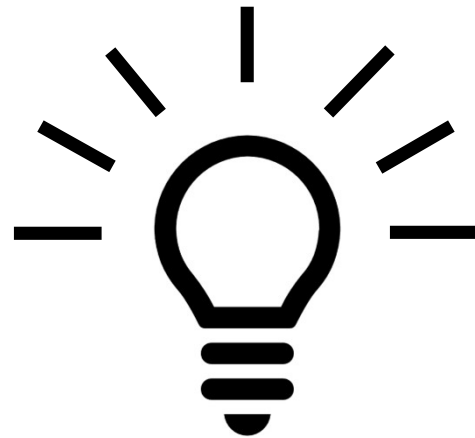


Introduction to innovation

VISTA PhD Days 5-6 February 2024

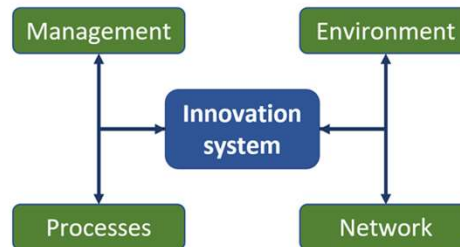
Kjell Olav Skjølsvik, Innovation manager



Workshop session 1, 12.45 – 14.30: What do we mean with innovation?

Control structures,
hierarchy of
mechanisms and
authorities.

Creation of solutions,
new knowledge and
relationships



Elements affecting or
being affected by the
system, input/output and
relationships to other
systems

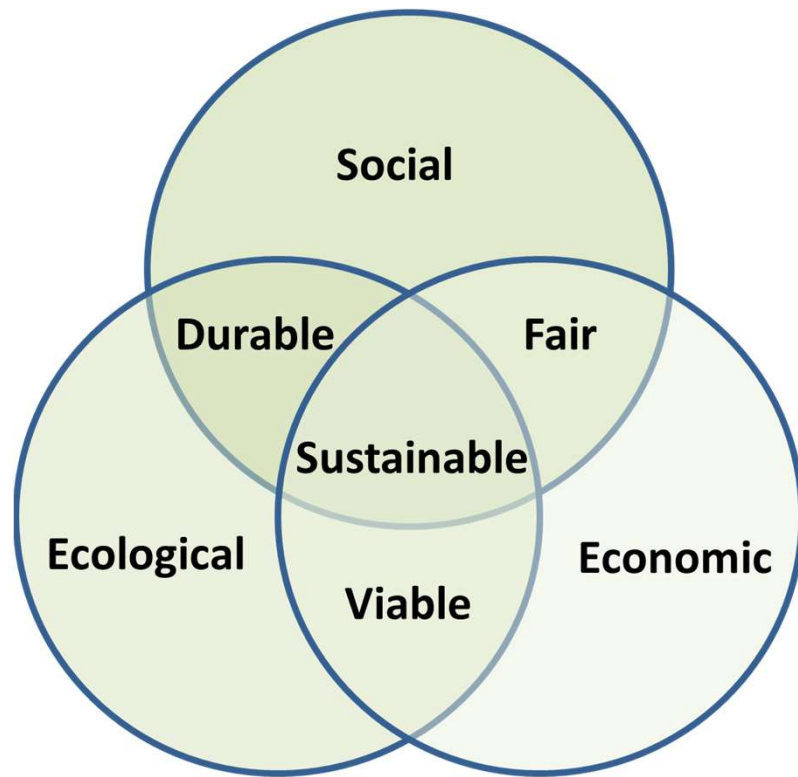
Physical appearance of
the network in action

Emerging properties
- Innovations (ISO)
- Innovation capability (ISO)
- Impact
- Competence

- Introduction to the topic (~ 20-30 min)
- Work in groups (~ 45 min)
- Summary in plenary (~ 30 min)

Why the focus on innovation?

University 3.0 expected to contribute to change



Megatrend in change - UN sustainability goals

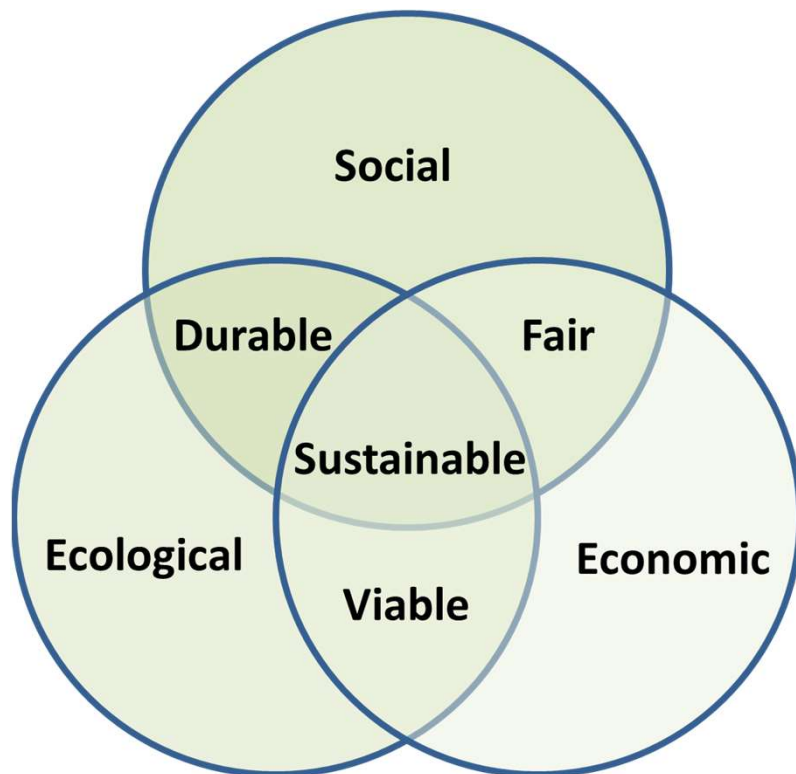
3.0 Entrepreneurial University – 20th century
3rd Mission – Innovation and knowledge hub
Executed by Education, research & knowledge transfer

2.0 Research University – 19th century (Germany)
2nd Mission – Discovery and advancement of new knowledge
Executed by Education & research

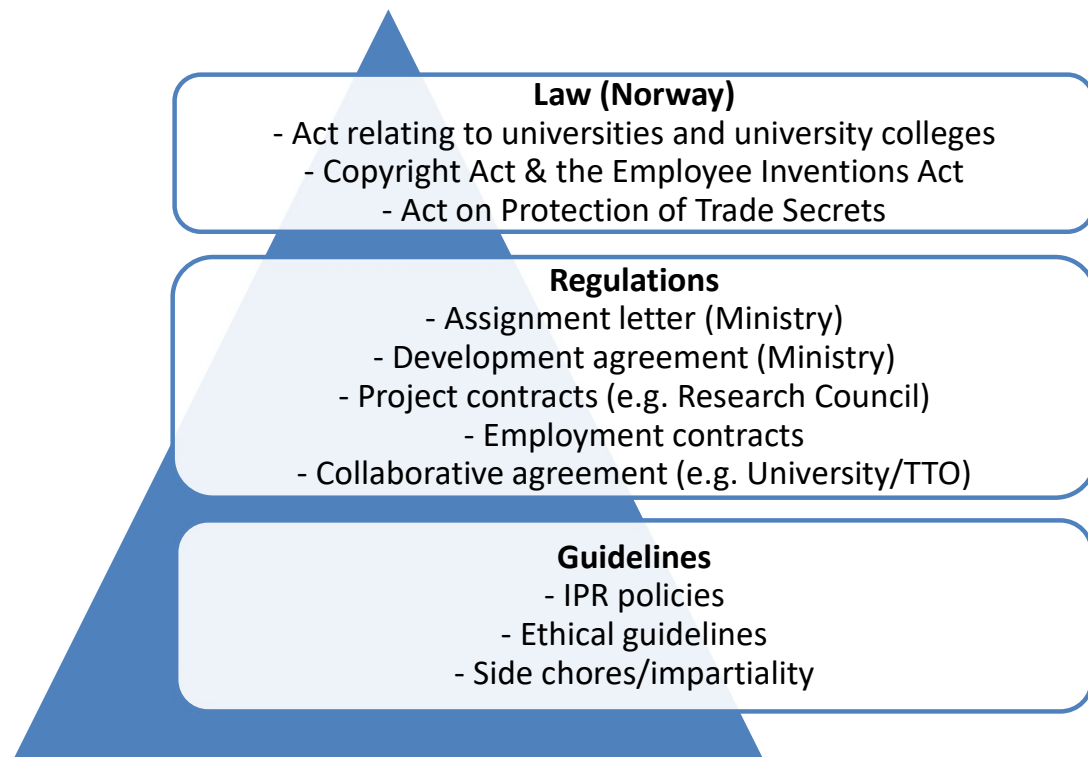
1.0 Medieval University – 11th century
1st Mission – Preservation and transmission of knowledge
Executed by education

Why the focus on innovation?

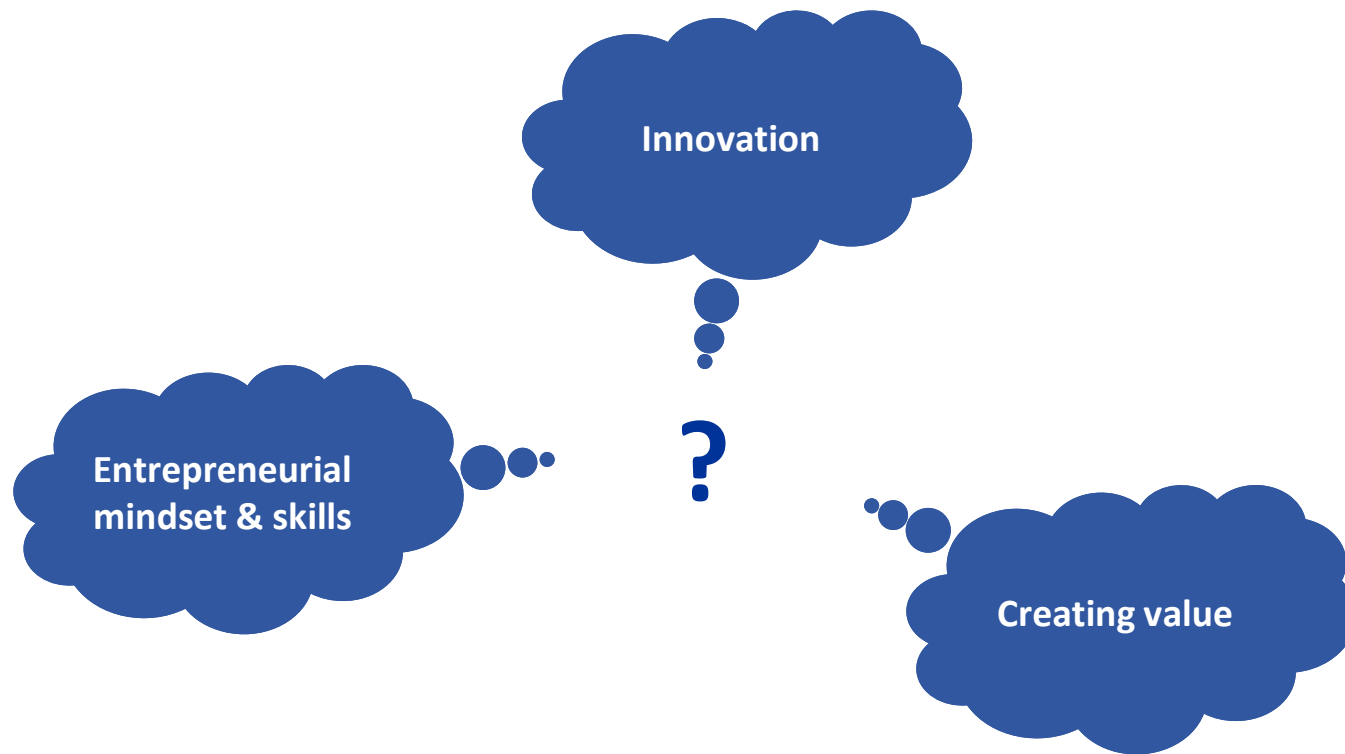
University 3.0 expected to contribute to change



Megatrend in change - UN sustainability goals



A regulatory pyramid for universities



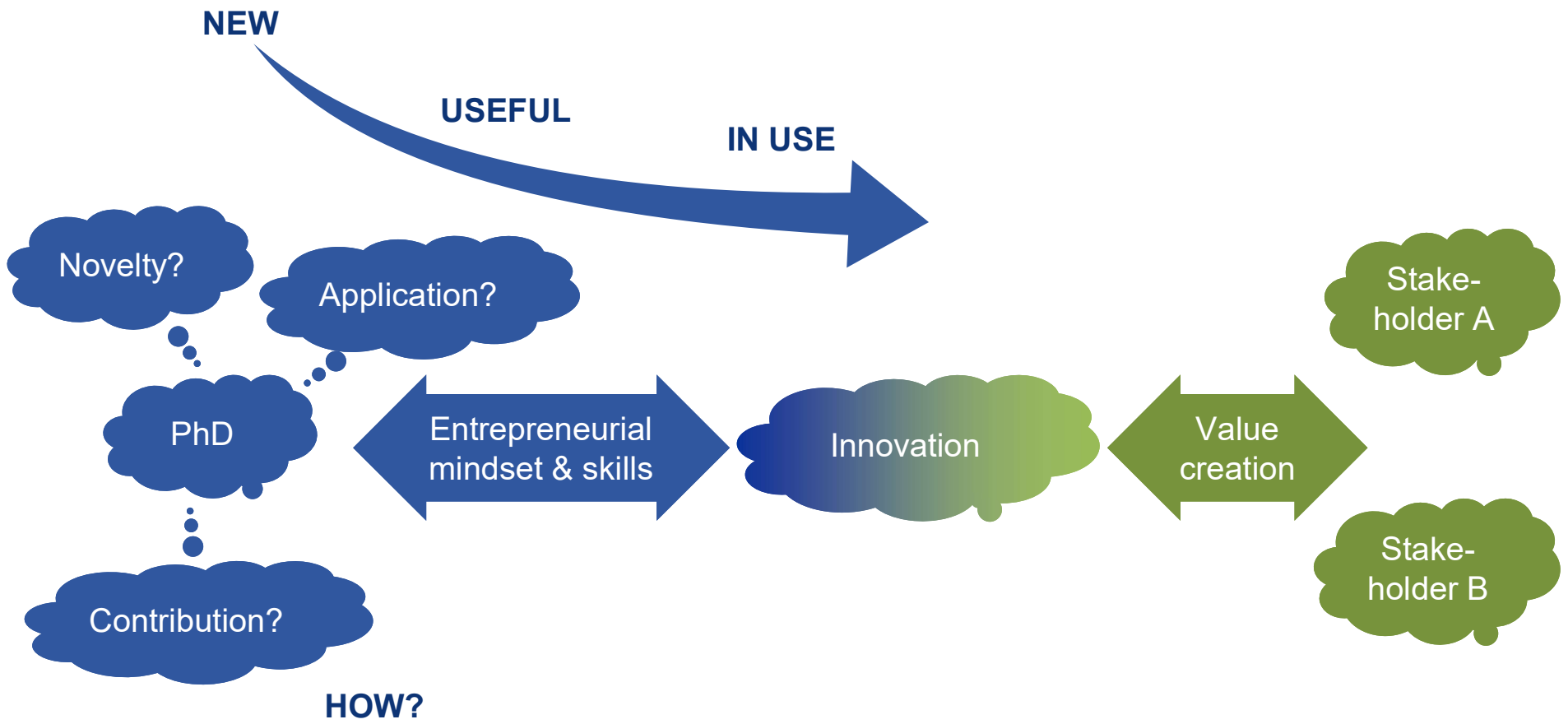
ISO 56000:2020 (3.7.6)

Value

gains from satisfying needs and expectations, in relation to the resources used.

- Example: Revenues, savings, productivity, sustainability, satisfaction, empowerment, engagement, experience, trust.
- Note 1: Value is relative to, and determined by the perception of, the organization and interested parties.
- Note 2: Value can be financial or non-financial.
- Note 3: Value can be created, realized, acquired, redistributed, shared, lost, or destroyed.
- Note 4: The value of an entity is generally determined in terms of the amount of other entities for which it can be exchanged.

PS: What is the difference between value and impact?

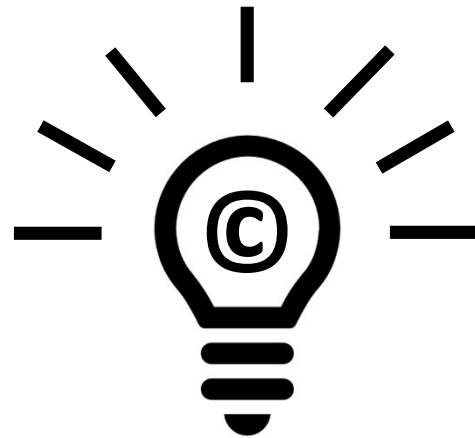


Source: Ø.Widding, SFU Engage

Intellectual property rights

VISTA PhD Days 5-6 February 2024

Kjell Olav Skjølsvik, Innovation manager

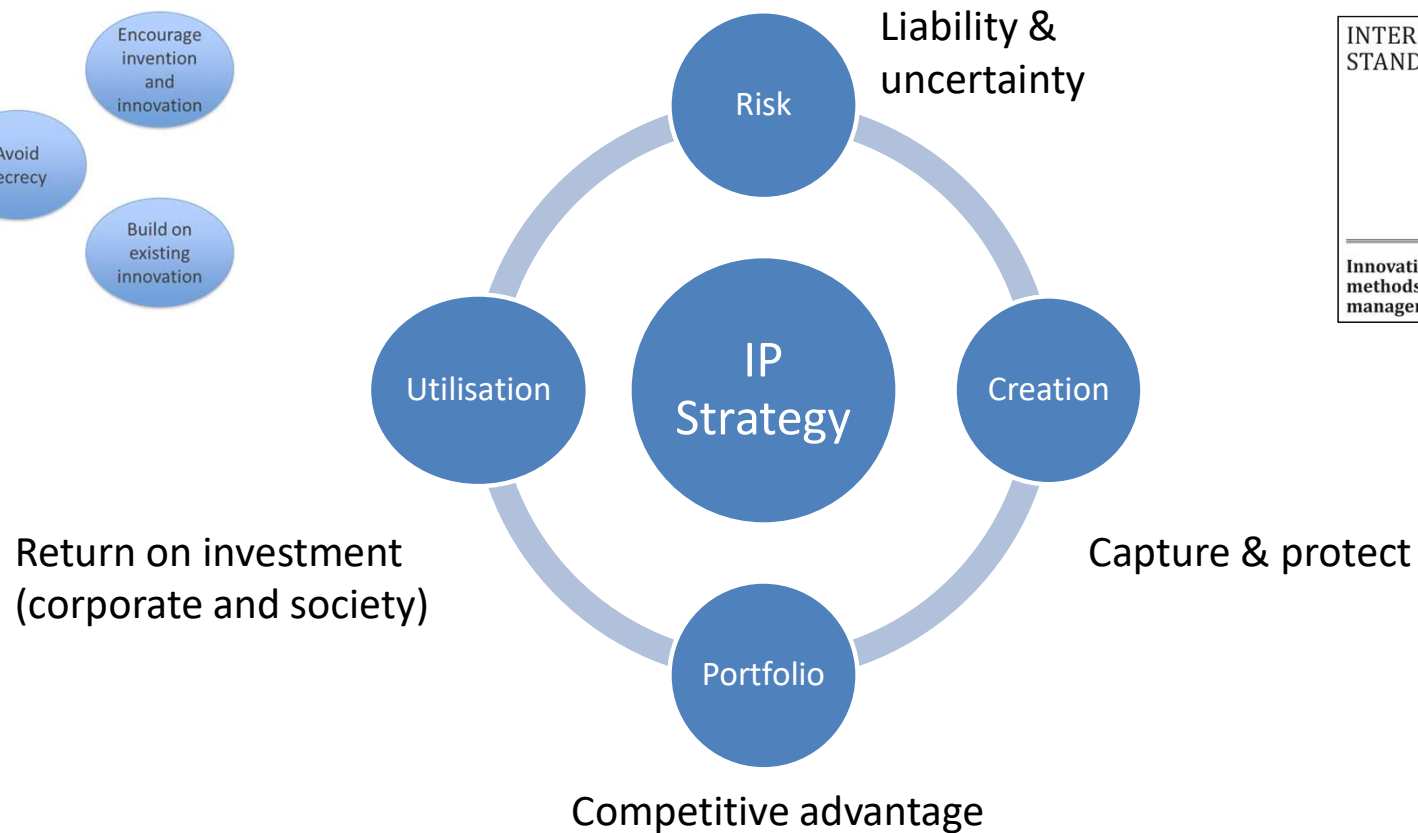


«Best practice»

Yesterday



Today



«the negative» relevance – property disputes

Norske Alva utvikler «verdens beste jernløse motor»: Idéhaver mener teknologien er stjålet

Har fått et av selskapets patenter opphevet. Alva avviser at konflikten er et problem.



AUGMENTI

Oppfinner gikk mot norske forsvarsgründere. Fikk opphevet patent som han selv står bak

– Illojalitet på et nivå som vi heldigvis sjeldent ser i Norge.



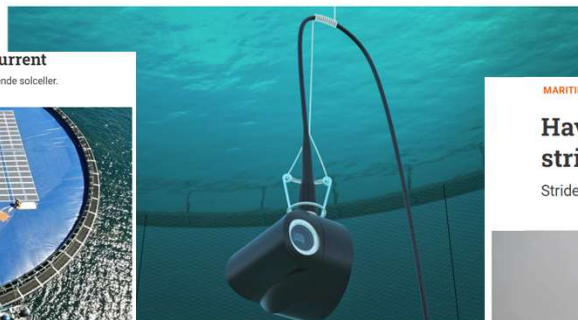
Solcellegründer saksøker konkurrent

Ocean Sun og Inseanergy strides om rettighetene til flytende solceller.



Mener tidligere ansatte stjal tekniske tegninger og forretningshemmeligheter

Havbruksleverandørene Fluctus og Steinsvik møtes i retten.



DEVICO - AZIVELL

Gründer og selskapet hans må betale fem millioner for ulovlig bruk av eks-arbeidsgiverens hemmeligheter

Kuttet utviklingstiden for konkurrerende produkt i nytt selskap.



Dansica Kjøkken. Partner ville taet ut erfaringstiden som legger bak dette er ulovlig brukt av et ikke-ansatt gründer. 10. Mars 2021 - 05:11

ROALD MARADAL - INNDRITT 10. MARS 2021 - 05:11

ANDRITZ HYDRO - RAINPOWER

Konkurrenten ba om razzia hos norsk vannkraftselskap. Nå møtes de i retten

Mener Rainpower har brukt teknologi uten lisens.



MARITIM

Eierne av nedsenkbar merd saksøker hverandre – vil slippe å samarbeide

I konseptet Havlijen skal selskapet Nekst senke oppdrettsmerder under vann for å unngå lakselus og alger. Selskapet krever å få slippe å samarbeide med en av medeierne. Medeieren krever enerett til teknologien.



MARITIM

Havbruksleverandører i kunstig intelligens-strid: – Kan få store konsekvenser

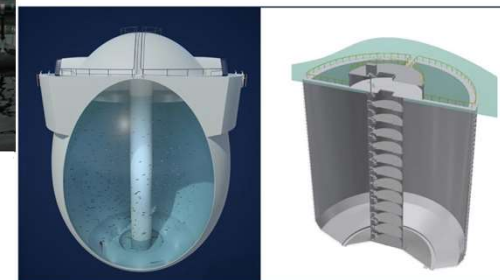
Striden kan i verste fall føre til mindre innovasjon, mener en av partene.



STRID MELLOM MARAD OG HAUGE AQUA

Krever patent ugyldig: – Som å påpeke at en bil har bremses

Alle punktene i Marads patent finnes fra før eller er selvfølgeligheter, mener Hauge Aqua.



What is IP and IPR? - ISO56000 definitions

Intellectual property (IP)
Results of intellectual activities that is eligible for protection by law

Typical properties (intellectual assets)

- Inventions
- Methods
- Software/source code
- Database
- Design
- Teaching material
- Publications



Intellectual Property Rights (IPR)
Legal rights associated with intellectual property

- Copyright legislation
- Patent legislation

NB: National rights



- Patent – Registration on own initiative
- Copyright – Default rights
- Design – Registration on own initiative
- Trademark – Registration on own initiative
- Registration:  Norwegian Industrial Property Office

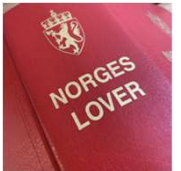
Key R&D contract terms related to IP & IPR

- **Background** Existing intellectual assets made available for use in the project: notification of type of asset and conditions for use in project and after end of project (appendix to contract or notification during execution)
Be aware: Background not declared and used and built upon becomes new results (may lose ownership control) or pollute own results
- **Ownership** Normative rule: Results (IP) are owned by those who create the new intellectual assets. For academia: a premiss for participation if public financed
Be aware: shared ownership – require separate agreement (and no one likes or recommend shared ownership)
- **Access rights** Who has rights (by contract) to access to results for own internal or commercial use.
Be aware: largest complexity and R&D contract variations due to variations in conditions for access; a) area or field of use, b) royalty-free or based on fair and reasonable conditions, c) exclusive or non-exclusive

Ownership

Key Norwegian legislation:

- Norwegian Act relating to Inventions by employee; i.e. including PhD's/PDs (arbeidstakeroppfinnelsesloven). Relevant for patentable inventions. Employer has the right to obtain ownership of inventions by employees.
- The Norwegian copyright act (åndsverksloven). Relevant for other intellectual work (e.g. databases, instructions, software, teaching material). The creator of the intellectual asset is the originator with the copyright. Copyright to computer programs created by an employee during the performance of tasks covered by the employment relationship, or according to the employer's instructions, passes to the employer. The same applies to access to changes to the work and transfer of the right.

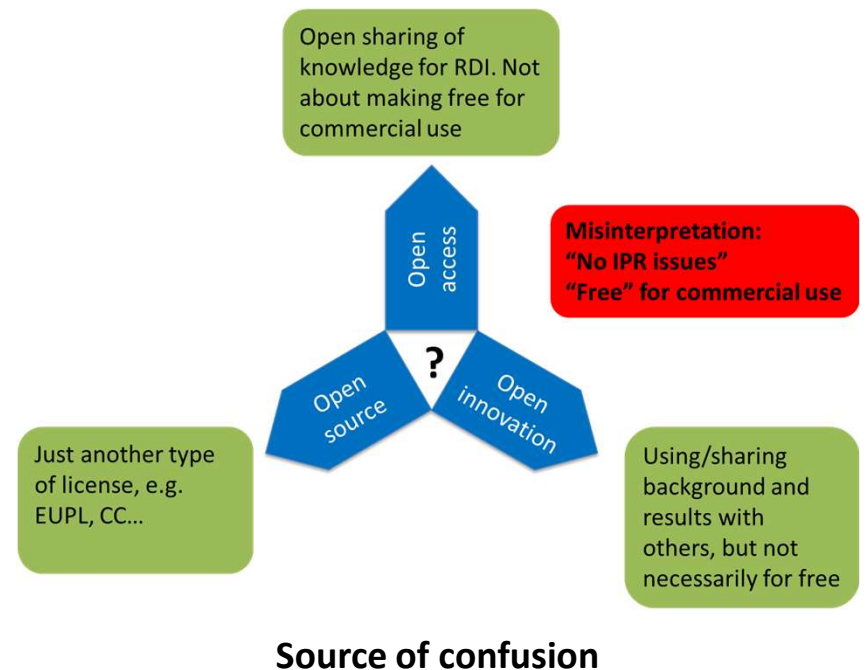


University IP Policies & Employer contracts

Access

Access to IP (right to use):

- Provided by owner on defined terms;
- Regulated by agreements/licences
Formal agreement with IP owner on access rights to IP in question, including terms and conditions for access
- May be equal for all (Open) or only for one or selected few (Commercial)



Dilemma

Publish



Protect

As open as possible, as closed as necessary

Who decides?

Want to learn more?



European IP Helpdesk

Stay ahead of the innovation game.

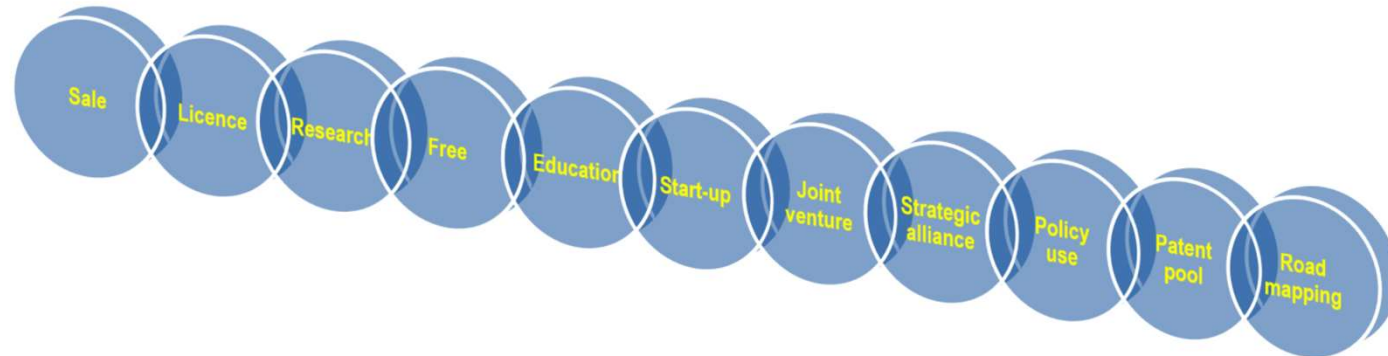
IP Management in ICT projects

Dr Eugene Sweeney, CEO, Iambic Innovation Ltd
Senior IP Advisor, European IP Helpdesk
es@iambicinnovation.com

Exploitation Strategies

Like physical property, **intellectual property is a valuable asset** which can be **traded** – bought, sold or leased, given away free, used in JV's, as collateral, etc...

But, **many more ways of extracting value...**



<https://register.gotowebinar.com/recording/4295711001092907351>

Start-up and technology transfer

VISTA PhD Days 5-6 February 2024

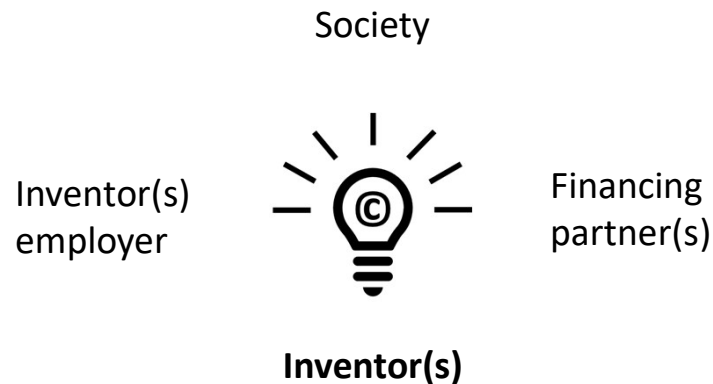
Kjell Olav Skjølsvik, Innovation manager



WHY? (Recap)

There is no innovation, hence no value creation until the usefull novelty is taken into use.

The core of university contribution is to provide others access to our intellectual properties for their use. Such access must be granted on fair and reasonable conditions for all involved stakeholders (knowledge transfer).





DIPAI is a start-up company based on research at NTNU Department of Ocean Operations and Civil Engineering. Deep learning algorithms have been developed and validated, providing new opportunities for reliable diagnostics and prognostics.



Features

Spin-off from NTNU in 2020, based on PhD research on application of machine learning in maritime maintenance planning.

Key features include Deep learning algorithms for monitoring of marine equipment and automatic detection of abnormalities

Value and impact

For a shipowner, the solution will contribute to reduced OPEX due to reduced consumption of spares and fuel optimisation.

The overall impact of adoption of the solution is reduced material flow and associated costs and reduced emissions from shipping

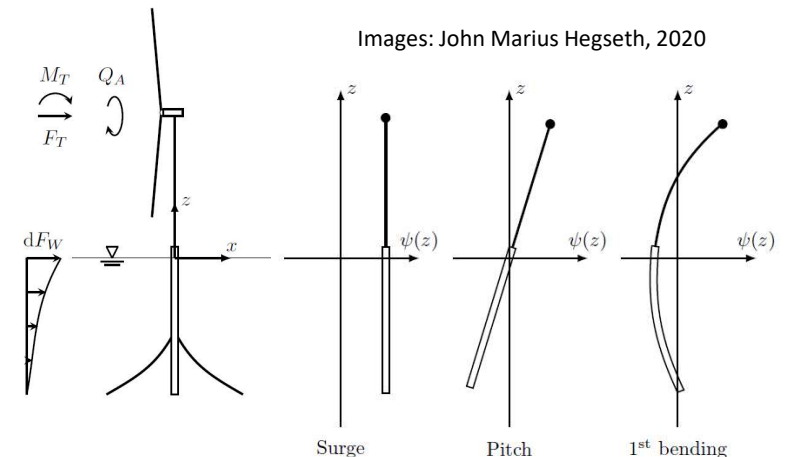
A linear, frequency-domain aero-hydro-servo-elastic model of a floating wind turbine has been developed at Department of Marine Technology .

Features

Commercial software license

The model is implemented as a set of python routines, adapted for integration with the OpenMDAO framework.

The model was developed during PhD work based on analytical expressions. Comparisons against a time-domain nonlinear aero-hydro-servo-elastic tool (SIMA) show good agreement for both fatigue and short-term extreme response estimates.



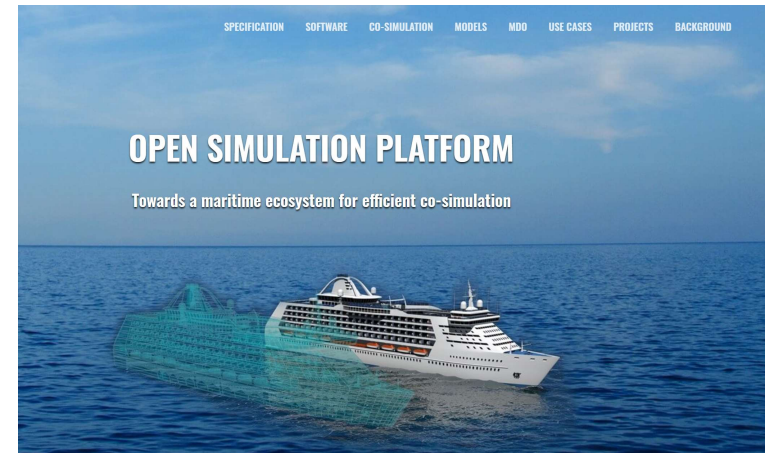
Value and impact

The method could be applied to rapid early-stage design of floating wind turbines, as it is highly computationally efficient and well-adapted to optimization and exploration of the design space.

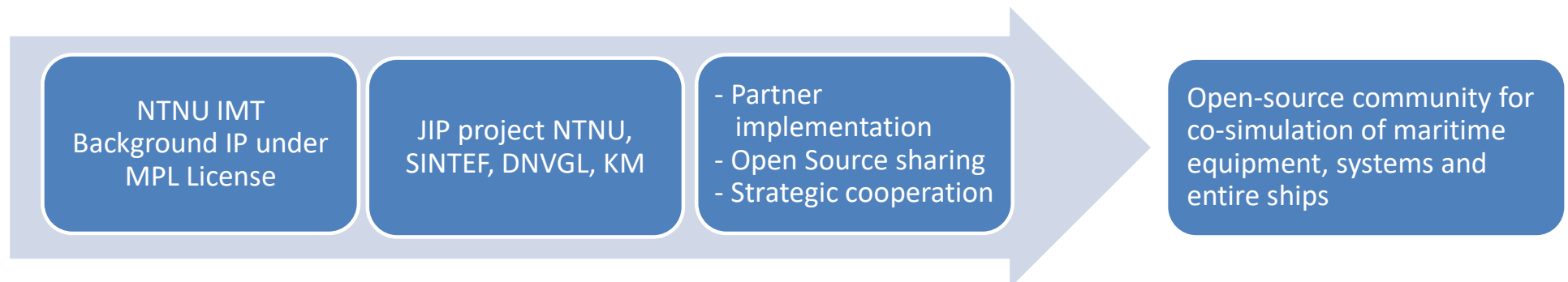
Innovation through open-source software development



NTNU IMT intellectual property (software MCSim/Marpowsim) offered as project background to JIP. Condition for use in implemented results based on MPL type license (open). New results utilised in IMT education & research.



Copyright © 2020 DNV GL AS, Kongsberg Maritime CM AS, SINTEF Ocean AS and NTNU



Options?

I have through my research identified a knowledge gap and developed a solution (HW/SW/Service) which I believe applied in business segment XX will represent value for key stakeholders.

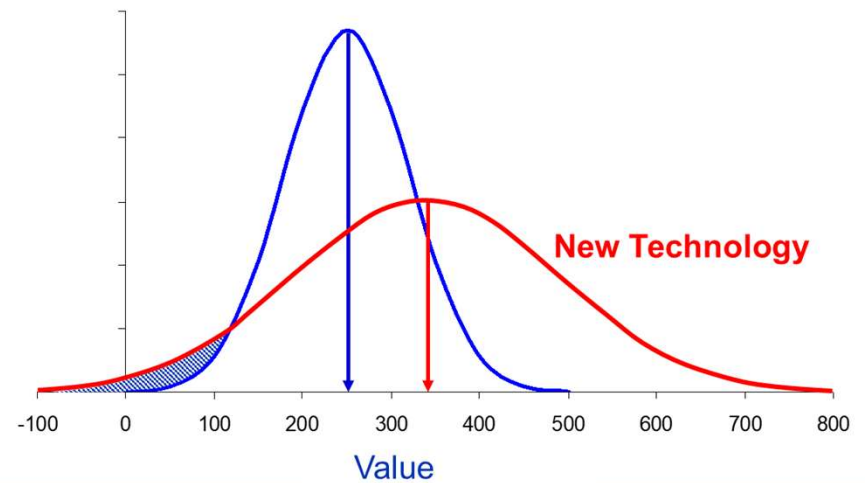
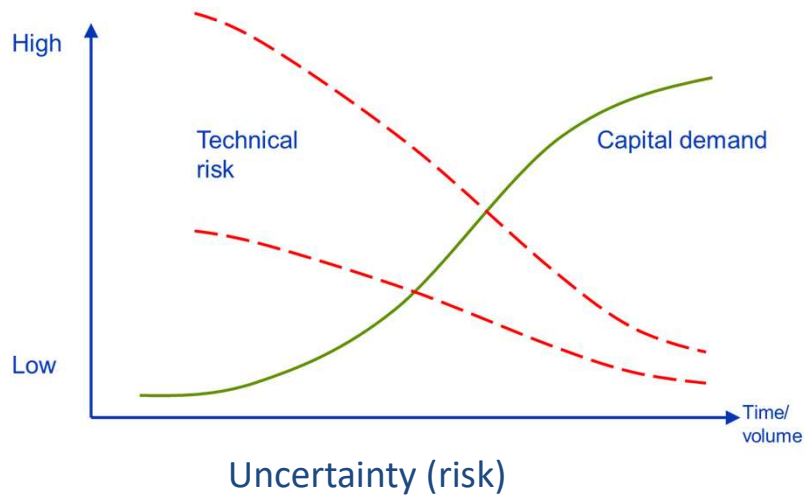
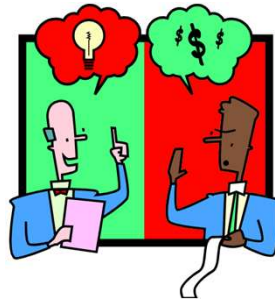
Now what?

How to utilise the research?

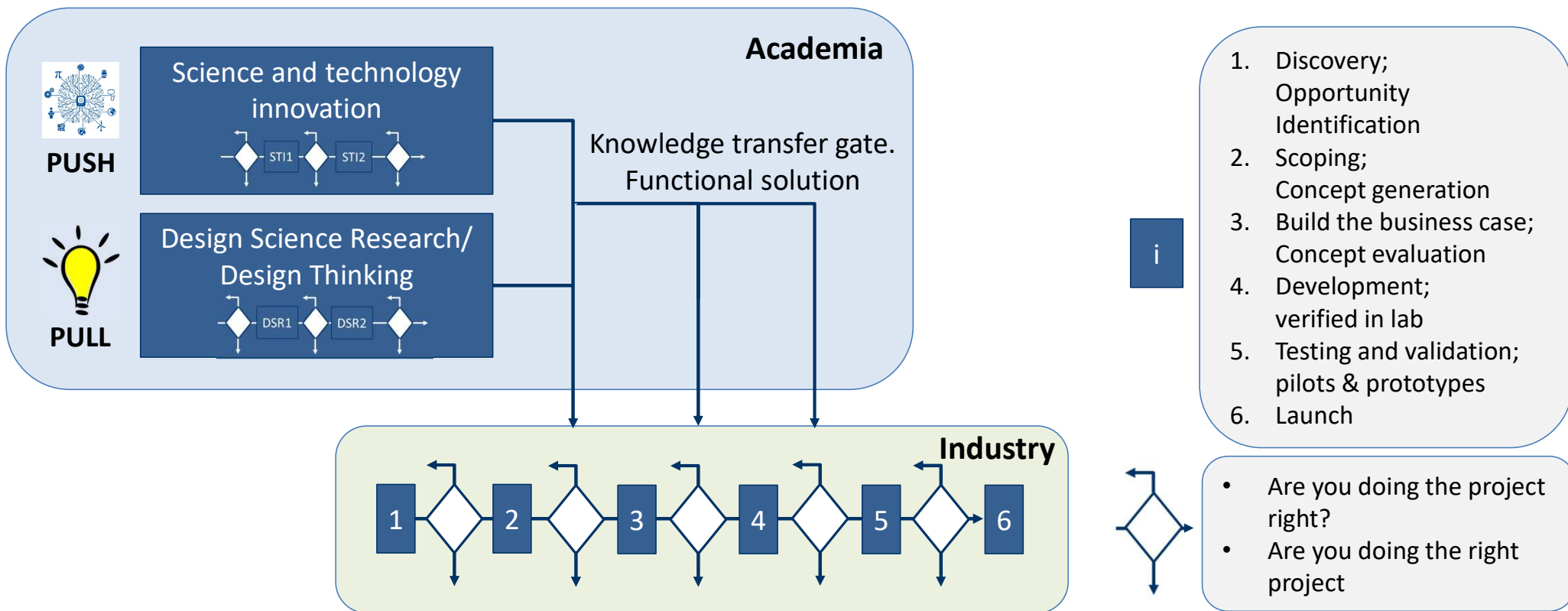


Valley of Death

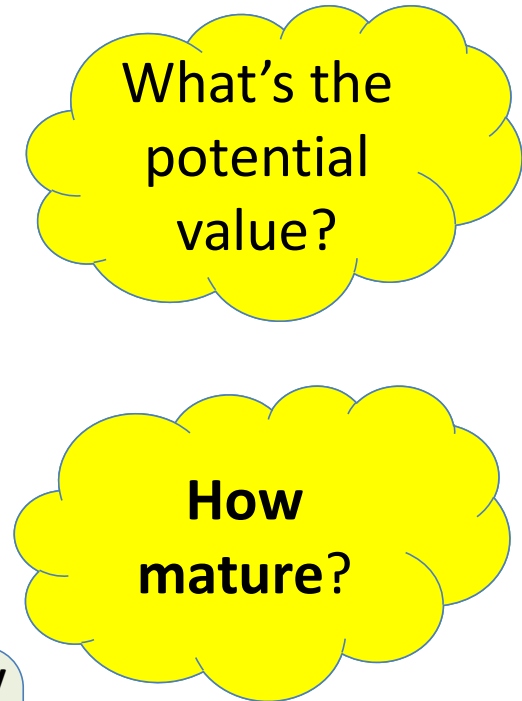
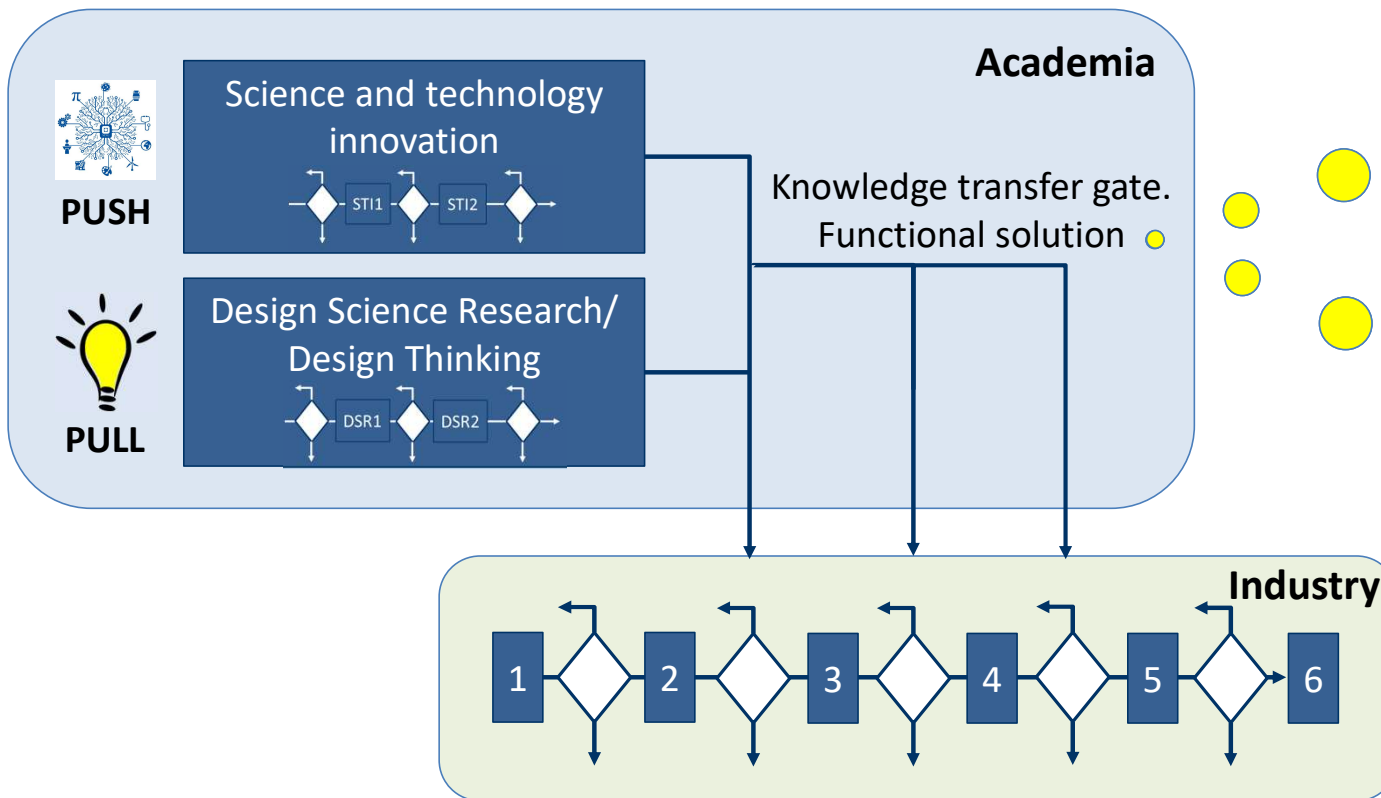
Barrier: The challenge of conviction



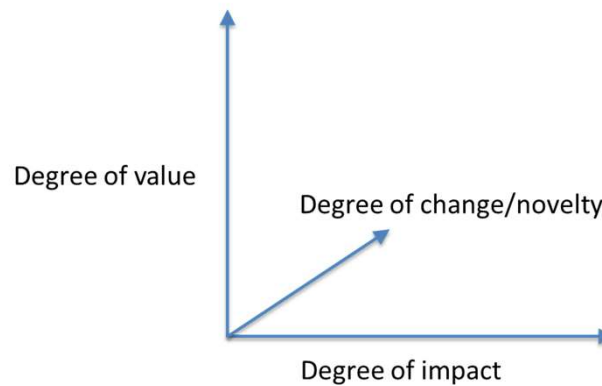
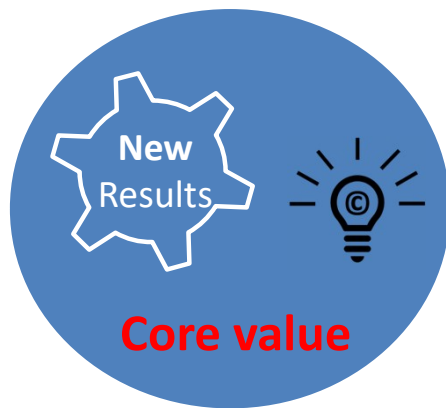
Communication challenge: from R to D



Communication challenge: from R to D



Value arguments



- Codified knowledge (IP)
- Validated solution (Maturity)

- Significance (incremental/enabling)

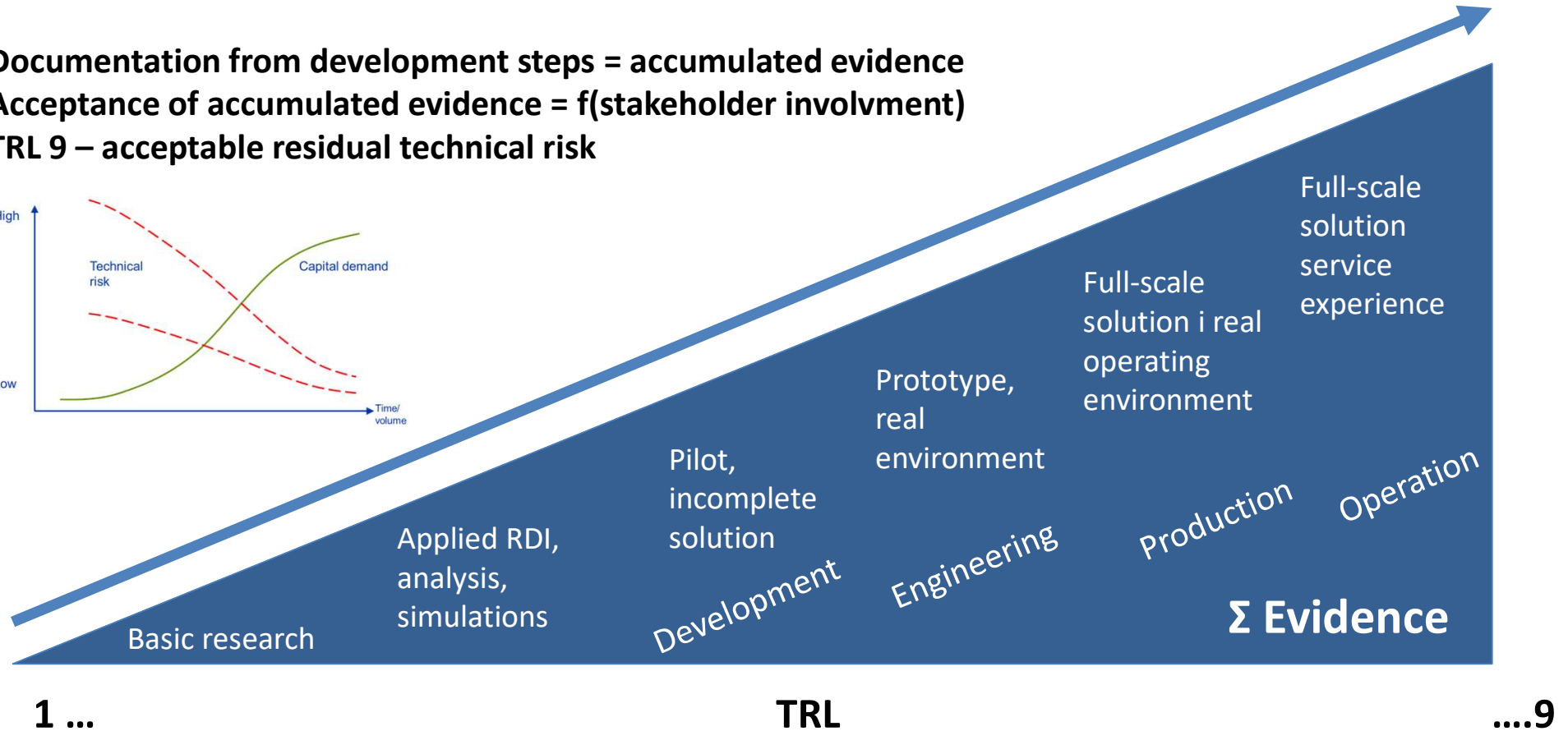
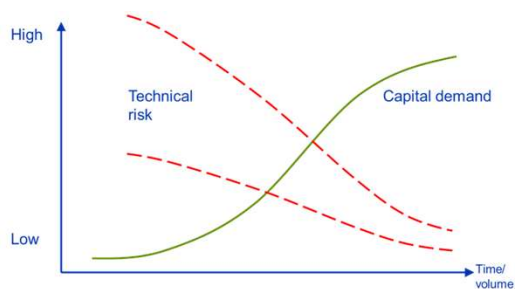
- Relevance; connecting with drivers for change

Maturity – The engineer's approach

Documentation from development steps = accumulated evidence

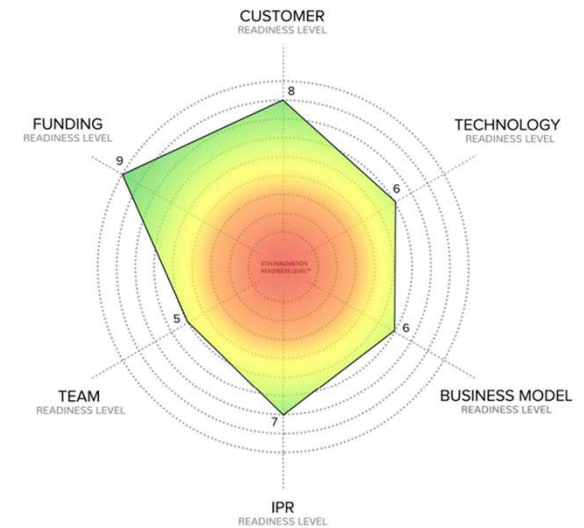
Acceptance of accumulated evidence = $f(\text{stakeholder involvement})$

TRL 9 – acceptable residual technical risk



Innovation readiness; from core value to business value (from D to D)

A research-based business idea will normally be immature on one or more perspectives. Prior to licencing or a start-up the innovation readiness normally require validation activities, and these activities may be organised as a project lead by the TTO



KTH Innovation readiness model
www.kthinnovationreadinesslevel.com



«The good helper» - Technology Transfer Offices

The universities Technology Transfer Offices (NTNU TTO/VIS) represents the key support mechanisms for commercialisation of research.

Channels for knowledge transfer:

- License university IP to defined third party
- License university IP to a start-up (spin-off)

License:

May be described as a «rental agreement»

Provides access to and rights to use a defined asset (IA)

The agreement may include terms related to exclusivity, area of use and geographical limitations. Standard elements are terms of payment, warranty and guaranties, duration and termination.

TTO competence areas:

- The process (commercialisation)
- Marked
 - Value chains and business models
- IP and IPR
 - Types of IP and IPR
 - Legislation and protection
 - Inventors agreement
- Licensing
 - Types
 - Contracts
- Establishing a new company (the process)
- Technology and market validation
- Project management
- Financing (public/private)
- Network (ecosystem)

Start-up: A challenging journey; need fuel, need crew



Valley of Death



Darwinian Sea

Reference: Philip E. Auerswald, Lewis M. Branscomb, 2003. Valleys of Death and Darwinian Seas: Financing the Invention to Innovation Transition in the United States: Journal of innovation 2003

Start-up: A challenging journey

Numerous sources for funding for the different stages of the journey.
 Due to the complexity NTNU/UiB have dedicated advisors on funding mechanisms

	Ideation - Discovery	Development	Demonstration	Deployment
TRL	1	2 - 4	5 - 8	9
Research Council of Norway	Skattefunn IPN, KSP, IPD, Researcher projects...		FORNY / STUD-ENT (PhD)	
EU Horizon Europe	Large portfolio of mechanisms			
Innovation Norway		Pre-seed funds	Start-up grants Innovation grant Innovation / risk loans	
Enova			Pilot/demonstration	
Private Equity		Pre-seed	Seed	Venture

The complexity matrix...require a team effort

Topic	Ideation - Discovery	Development	Demonstration	Deployment
TRL	1	2 - 4	5 - 8	9
Objective	Assess idea and select pathway to impact	Develop, verify and validate concept	Demonstrate solution	Growth and value realisation
Market	Define value proposal, assess impact potential	Market analysis	Product- and business plan. Marketing.	First generation implementation, define growth strategy
Technology	Assess novelty and realism	Define and develop solution	Test, demonstrate, document, improve.	Define next generation solution
Organisation	Onboarding and recruitment	Establish project organisation and partnerships, spin-off?	Business model and ownership	Expand organisation
Economy/risk	Assess business model and main risks	Cost and operating models, financing demand and perform initial risk assessments	Financial plans, economy system, administrative support	Manage liquidity Risk assessment
Financing	Identify need and source	Establish funding	Investors/ownership	Secure long-term financing for growth
IPR	Identify core IP	Define IP strategy, secure IP	Implement IPR strategy	Follow-up of IPR
Legal	Assess IP ownership	Define regulatory requirements	Permissions, approval, certification	Warranty and liabilities
Competence	Define required complementary competence	Develop competence network and roles	Project management, execution team, admin.	Complement and strengthen
Capability	Personnel resource status	Partnerships, board, recruitment	Ensure robust ownership	Production, marketing and sales
Information	Define what and who	Communication strategy	Update strategy	Marketing strategy

Summary – A brief introduction to your Innovation system

Law (Norway)

- Act relating to universities and university colleges
- Copyright Act & the Employee Inventions Act
- Act on Protection of Trade Secrets

Regulations

- Assignment letter (Ministry)
- Development agreement (Ministry)
- Project contracts (e.g. Research Council)
- Employment contracts
- Collaborative agreement (e.g. University/TTO)

Guidelines

- IPR policies
- Ethical guidelines
- Side chores/impartiality



Value & Impact

