



CHALLENGE  
BASED  
INNOVATION  
ATTRACT @ DF  
TUULI UTRIAINEN  
27.9.2016

# IdeaSquare

“Experiment at CERN bringing together **people from multiple backgrounds** to see, if the cycle time for societal applications from the fundamental research could be made shorter.”

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LHC=  
Large  
Human  
Collider

# Technology based innovation

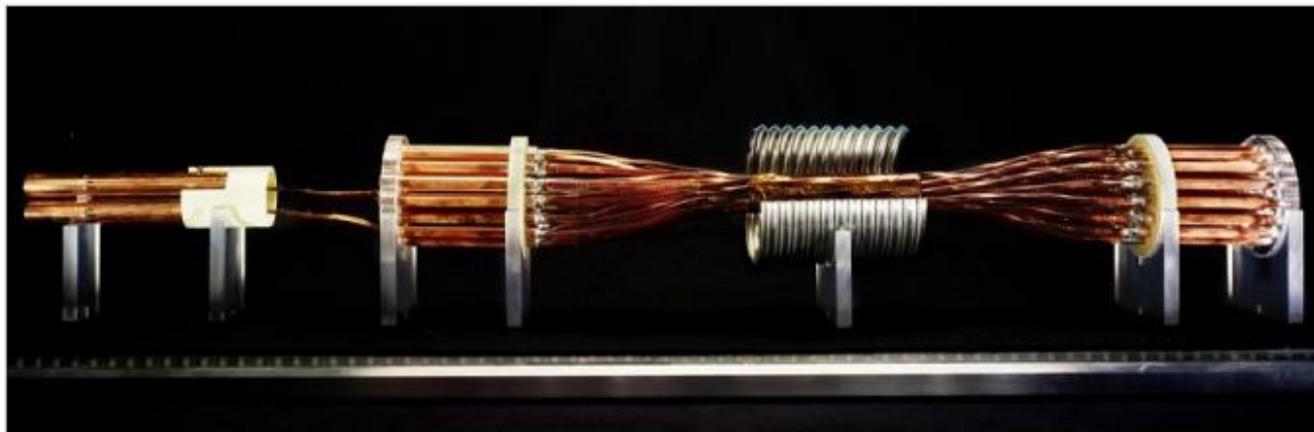
e.g. NTNU screening weeks

# Knowledge Transfer

 Search

[Home](#) [Intellectual Property Dissemination](#) [Medical Applications](#) [Spin-off](#) [Ideasquare](#) [Our team](#) [Contact us](#)

## Technology Portfolio



### Information for external partners

[Knowledge Transfer Opportunities](#)  
[Technology Portfolio](#)  
[CERN Easy Access IP](#)  
[CERN Open Hardware Licence](#)  
[Contact us](#)

All CERN technologies listed below are available for licensing and/or research collaborations with industry or institutes.

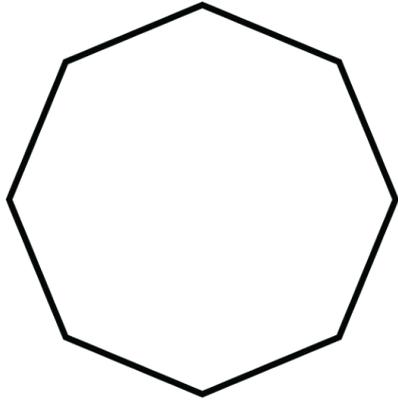
<http://goo.gl/eW69l4>

No **solution** can be better than the **problem** that it is supposed to solve.

... all about the interplay

Start from the need?

# Start from the need?



**Challenge  
Based  
Innovation**

# Multidisciplinary team

Solving power - different points of view

## NGOs

Problems worth solving – driving the solution if successful

## CERN

Technology feasibility support - inspiration



World Health  
Organization

WORLD  
ECONOMIC  
FORUM



United Nations

unicef 

The UNICEF logo, which consists of a stylized figure of a mother holding a child, set against a globe and surrounded by a laurel wreath.

## NGOs

Problems worth solving – driving the solution if successful



WFP  
World Food  
Programme

wfp.org



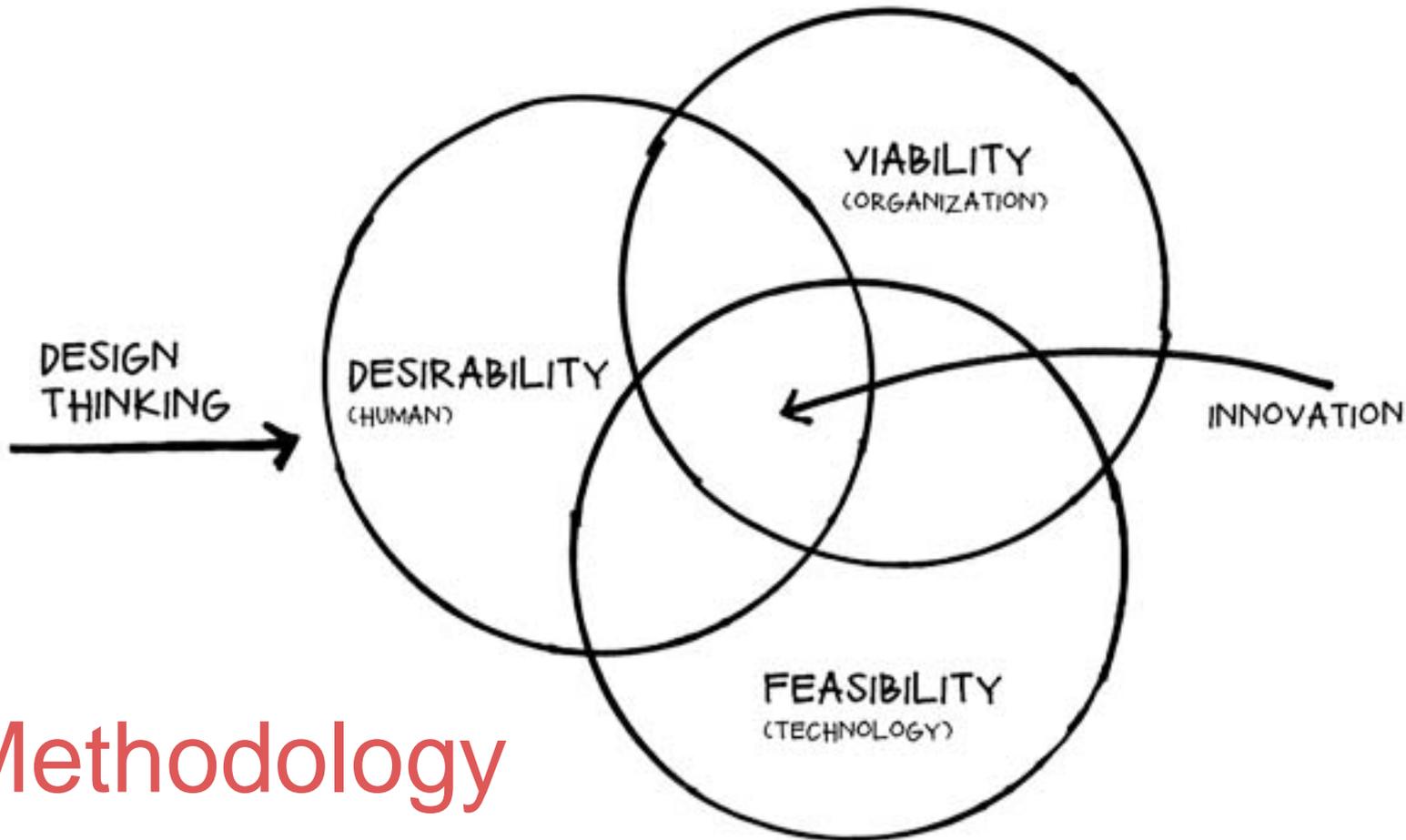
International  
Telecommunication  
Union



UNHCR  
The UN Refugee Agency



International  
Labour  
Organization



# Methodology

3-6 Months, Global teams, Kick off and  
Gala at CERN, Human centered design

**Aalto University Finland - Engineering, Art & Design, **Business** based**

**NTUA Greece - **Architecture** based**

**UNIMORE Reggio Emilia - **Business Engineering** based**

**ESADE + IED + UPC Barcelona - **Business, Engineering and Design** based**

**Swinburne Australia - **Product Design** based**

**NTNU Norway - **Product Development** based**

A hand is shown holding a small, glowing purple cylindrical object. The object has a bright blue light source inside, creating a lens flare effect. The background is dark, with a soft red glow emanating from the bottom left. The overall scene suggests a futuristic or technological context.

Needfinding → Solution generation → Proof of concept

# Projects sharing space is important



**EDUSAFE**

Education in advanced VR/AR Safety Systems  
for Maintenance in Extreme Environments



“What, CERN is  
helping autistic  
children...?”

- *Average  
Josephine*

# CERN missions:

Research: Seeking and finding answers to questions about the Universe

Technology: Advancing the frontiers of technology

Collaborating: Bringing nations together through science

Education: Training the scientists of tomorrow

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# Team Ampere:

Enhance the mobility of people who have lost it

# ENHANCING MOBILITY

## AMPERE TEAM



**Laura Aalto-Setälä**  
M.Sc.; MA student, Product  
and Spatial Design  
Aalto University



**Manel Baradad**  
Computer Engineering & Tele-  
communications Engineering  
UPC



**Iñigo Flores Ituarte**  
MSc. (tech.) Product Development  
Researcher and Doctoral Candidate  
Aalto University School of Enginee-  
ring



**Jordi Sanchez Forés**  
Product Design  
IED Barcelona



**Victor García**  
Telecommunications Engineering  
UPC



**Anssi Laurila**  
Master's student, Entrepreneurship  
& International Design Business  
Management  
Aalto University School of Business



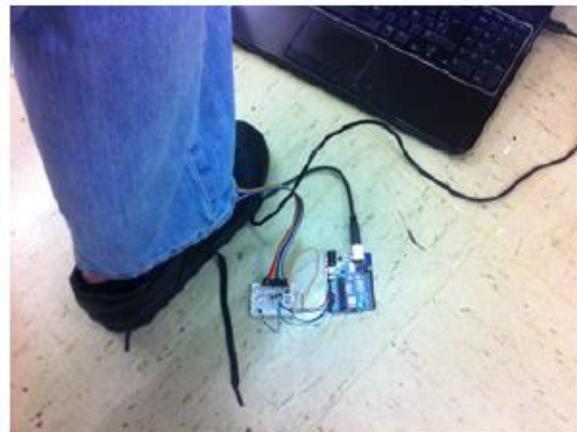
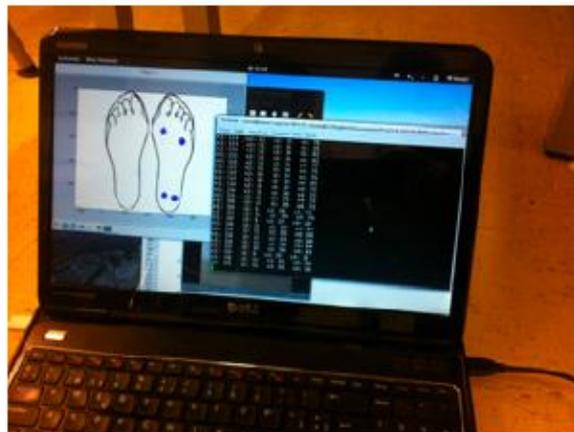
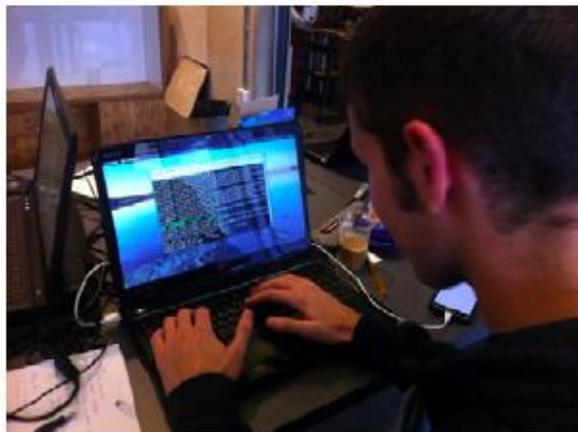
**Enna Rane**  
Master Student, Machine Design &  
Product Development  
Aalto University School of Enginee-  
ring



**Jaspinder Singh**  
MBA  
ESADE Business School  
Marine Engineer  
Mechanical Engineer  
Thapar University India

# FIRST PROTOTYPES

## INSOLE SENSORS



Coding and testing some sensors placed in a shoe insole in order to collect some data and analyze how the pressure in different points affects the falls.

# FIRST PROTOTYPES

## HIP AIRBAG



Testing some hip Airbags and some triggers to check the efficiency of the idea.



# THE BLACK HOLE CHALLENGE

## FALL DETECTION ELECTRO ESTIMULATION



The aim of the black hole challenge was to try some crazy ideas that can give an answer to our briefing. We decide to use electro stimulation in order to “control the muscles” to improve the balance of the body by moving the arms when it's need it.





So, how's it going?

# Media seems to like it...

Home > Tailor-made experience > Real World Challenges > Challenge-Based Innovation

## Challenge-Based Innovation

FEATURE OF THE WEEK

March 22, 2015 10:30 pm

### Cern social experiment yields thoughtful designs from students

Della Bradshaw

Share Author alerts Print Clip

Comments

#### Research at Large Hadron Collider benefits from student touch



When most people think about wearable technology, they are likely to think of the

#### EDITOR'S CHOICE



FT Rankings

The FT's prestigious global league tables for the top MBAs and other courses



MOOC Tracker

Find free online courses to sharpen your business skills with our



#### Students innovate products at Cern

Students are creating the tools of the future in courses held in cooperation with Cern, the European Organisation for Nuclear Research.

#### EDITOR'S CHOICE

##### MBA BY NUMBERS



FT statistician Laurent Ortmans spots trends in our rankings data

##### CAREER HOW-TO



Need advice or job after graduation? Our how-to guide



CBI students "at the heart of product development" in Cern.

A multidisciplinary group of Aalto students took part in an international product development course that was held in cooperation with Cern. The Challenge Based Innovation (CBI) pilot course that began last October culminated on 7 March with a gala, where the innovations produced during the course were introduced.

The course involved learning about product development by utilising technologies developed at Cern. The aim was to find new technical solutions for certain societal problems and to bring radiation detector technology closer to people's everyday life. Another key feature was to examine and adopt community learning methods. The starting point for task-setting and work was an open question that was iterated and defined into a problem that the students tried to solve.

TUTKIJAT MAAILMALLE

Osaamista Suomeen Apurahat Ajankohtaista



Nyt tammikuun alussa opiskelijat ovat suorittaneet jo kaksi kolmannesta kurssista – ensimmäiset vaiheet oli suunniteltu tiedonhakuun, käyttäjätutkimukseen ja näiden aikana kehitettyjen ideoiden nopeaan testaukseen. Kurssin kolmannessa vaiheessa kaikki kuusi opiskelijajoukkoa alkaneet kohdistaa ideoitaan todella avoimista tehtävänäannoista kohti tarkasti rajattuja ja rakennettavissa olevia konsepteja, jotka esitellään kurssin loppugaalassa.

# Universities seem to like it...

Strengthening ESADE's two focus areas: **innovation and entrepreneurship**

- CBI supports creating startup teams with technical capabilities and allows working on an opportunity related to a technology
  - new kinds of projects entering ESADE's accelerator program
  - E.g. Well2Go (CBI2015)
  - E.g. New project on safety bracelet for elderly developed by students who met in the CBI course (CBI2015)
- Attracting innovation-minded students: **CBI has been a reason to choose to study at ESADE**

**CBI: the unique learning setting for ESADE students**

**ESADE**  
Business School



- 1. Interdisciplinary collaboration**
- 2. Technology / science focus**
- 3. Experiential learning**
- 4. International context**

CERN seems to like  
it...



Knowledge Transfer



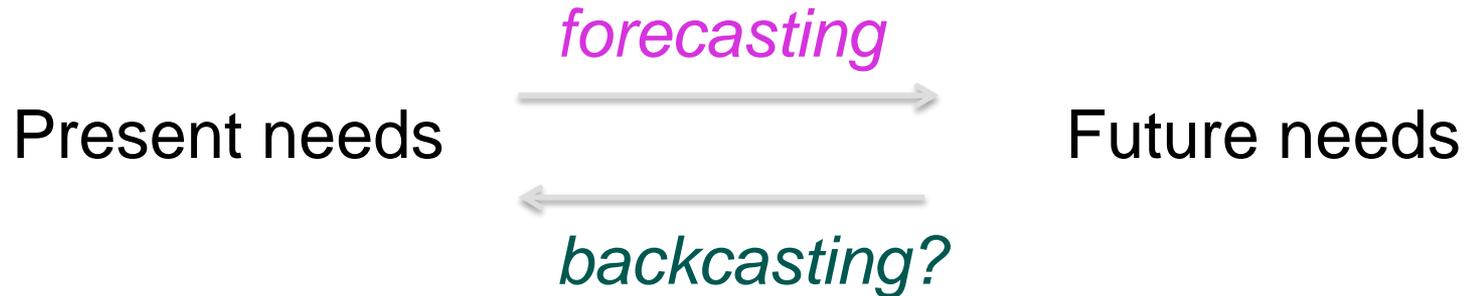
What have we learnt?

# Collaboration with NGO's is NOT TRIVIAL



*Better shelter,  
Fundació Finestrelles...  
CBI 2016*

# Applying DT methodology is NOT TRIVIAL



# Technology transfer is NOT TRIVIAL

Approach I Combine project teams with research groups.

Learning Acronym jungle doesn't make it easy to approach the technologies (designers were freaking out) – need a better interphase. Results depend on the phase of the research project.

# Technology transfer is NOT TRIVIAL

Approach II Taking a CERN researchers as mentor to look at the concepts the teams are creating and making links to relevant technologies and people

Learning Better, but the linking technologies highly depend on the mentors

# Technology transfer is NOT TRIVIAL

Approach III Taking a member of the KT group as a mentor to interphase with the teams

Learning Approach seems viable, as the KT group can offer an overview of multiple technologies

To improve How to best bring the technology in as first inspiration and then as an enabler?  
How to lower the threshold to engage people even when in the middle of process “this is not good enough to show... its just an idea...”? Emphasizing co-creation and mixing thinking styles?

# Research

Research at CERN looks at interaction between particles

Research at CBI looks at interaction between team members

ME310@Stanford

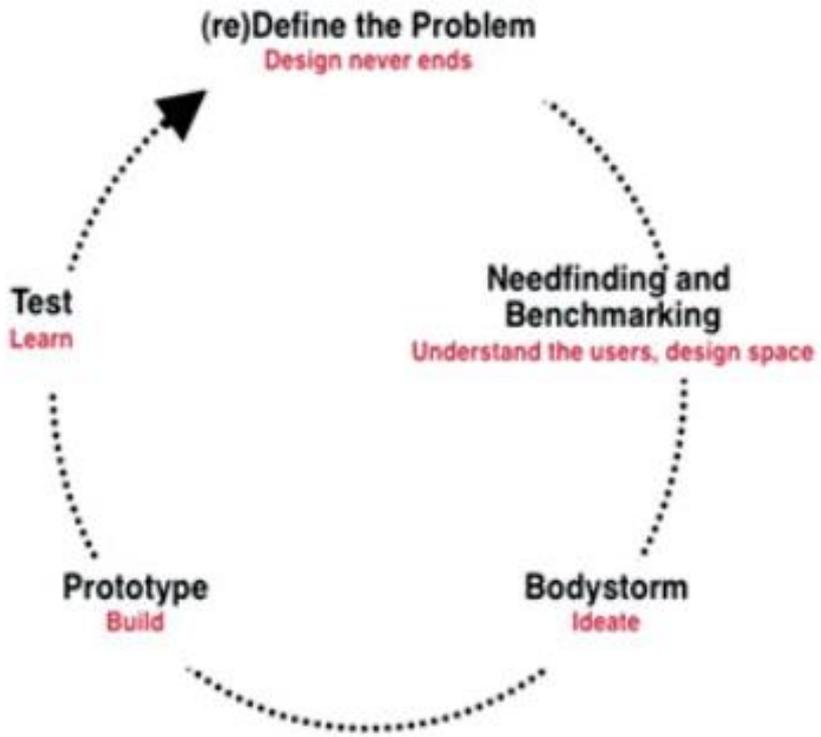
PDP@Aalto

IDBM@Aalto

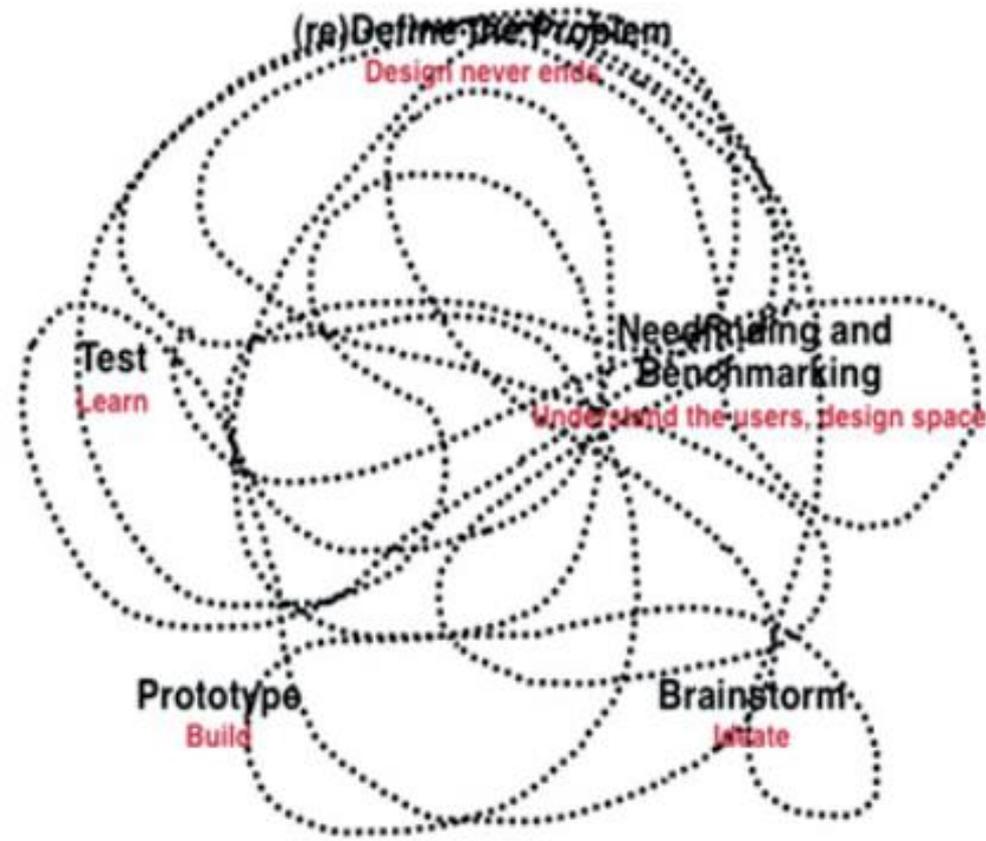
Center for Design Research at  
Stanford

Larry Leifer

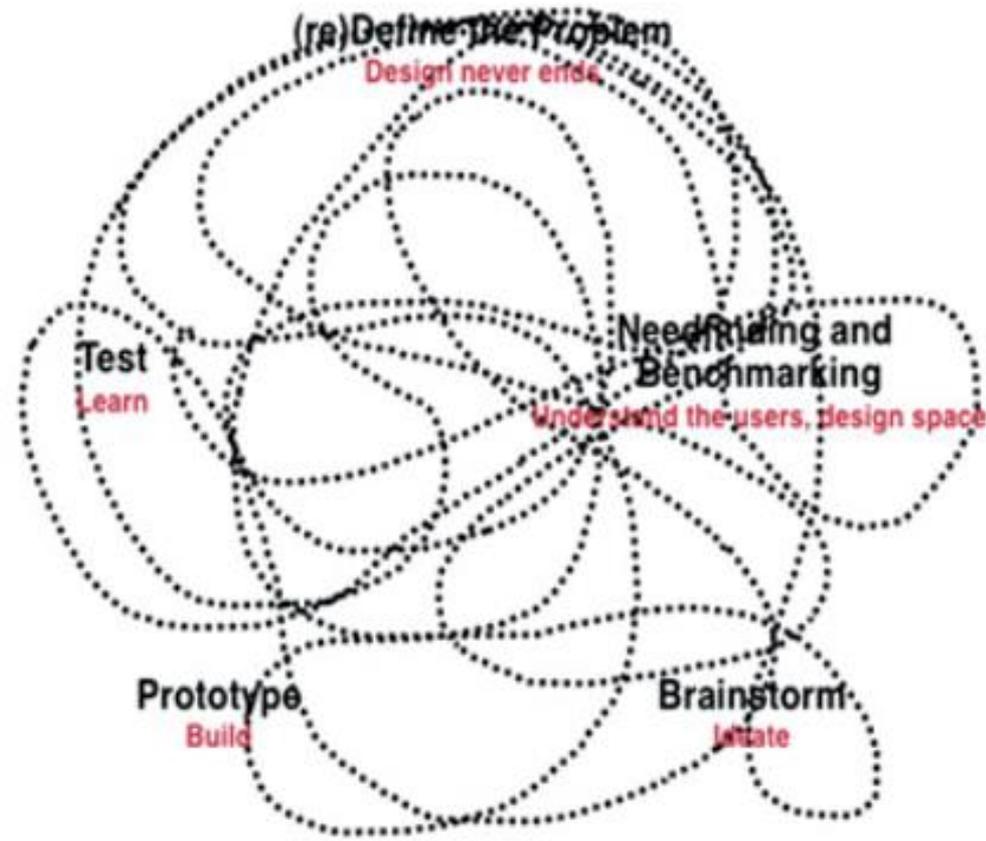
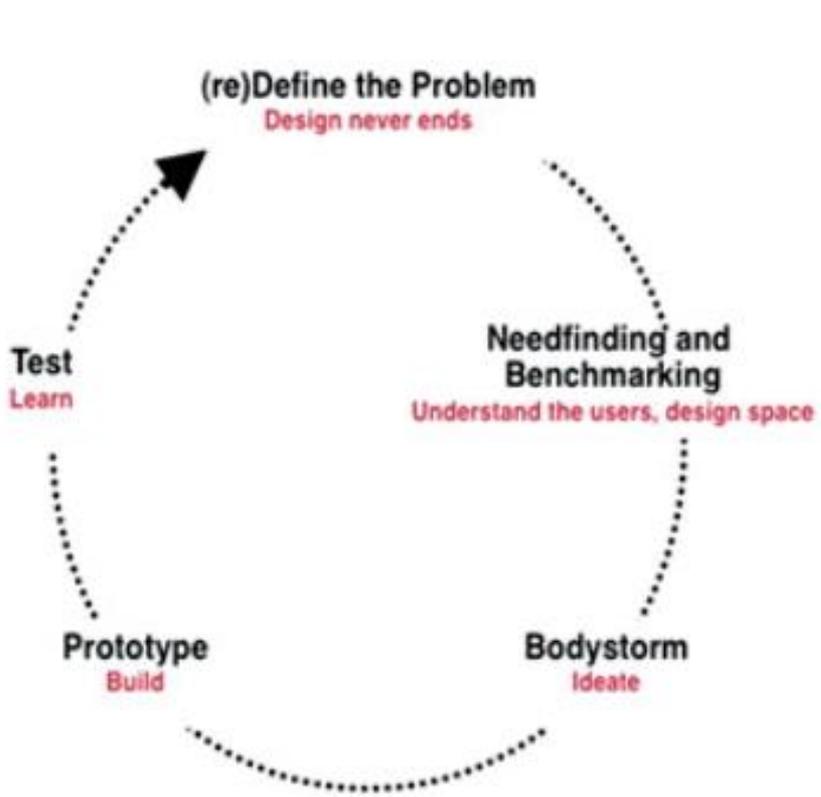




*Theory*



*Practice*



*Though design is not science, there are benefits in understanding better, what is going on.*

## Example from CBI II

What kind of difference does **testing** make?

How can we measure that?

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What kind of difference does **testing** make?

How can we measure that?



### **Egg drop challenge revised**

*Martin Steinert & Carlo Kriesi at NTNU*

A: Not allowed to test the design

B: Made to test the design

Measured height will tell numerical difference between testing and not testing.

+ confidence

## Example from CBI II

What kind of difference does **testing** make?  
How can we measure that?



### **Egg drop challenge revised** *Martin Steinert & Carlo Kriesi at NTNU*

A: Not allowed to test the design  
B: Made to test the design

Measured height will tell numerical  
difference between testing and not  
testing. **69cm / 175cm**

+ confidence **44%**

## **Another example from CBI**

How can we best support you in your work – where are the problems?

## Another example from CBI

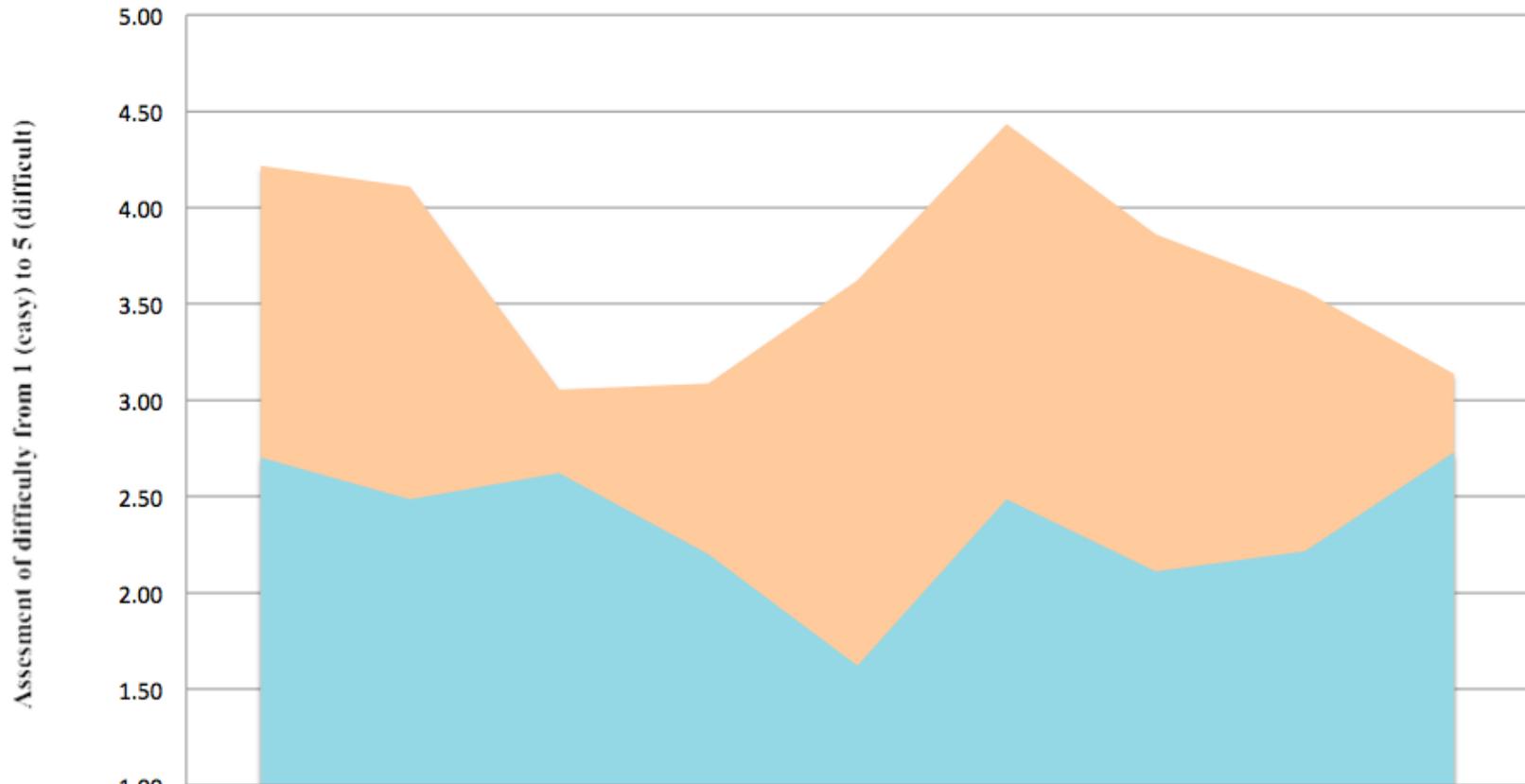
How can we best support you in your work – where are the problems?

Research already states that e.g. prototyping and decision making are challenging ... but which is more difficult and why?

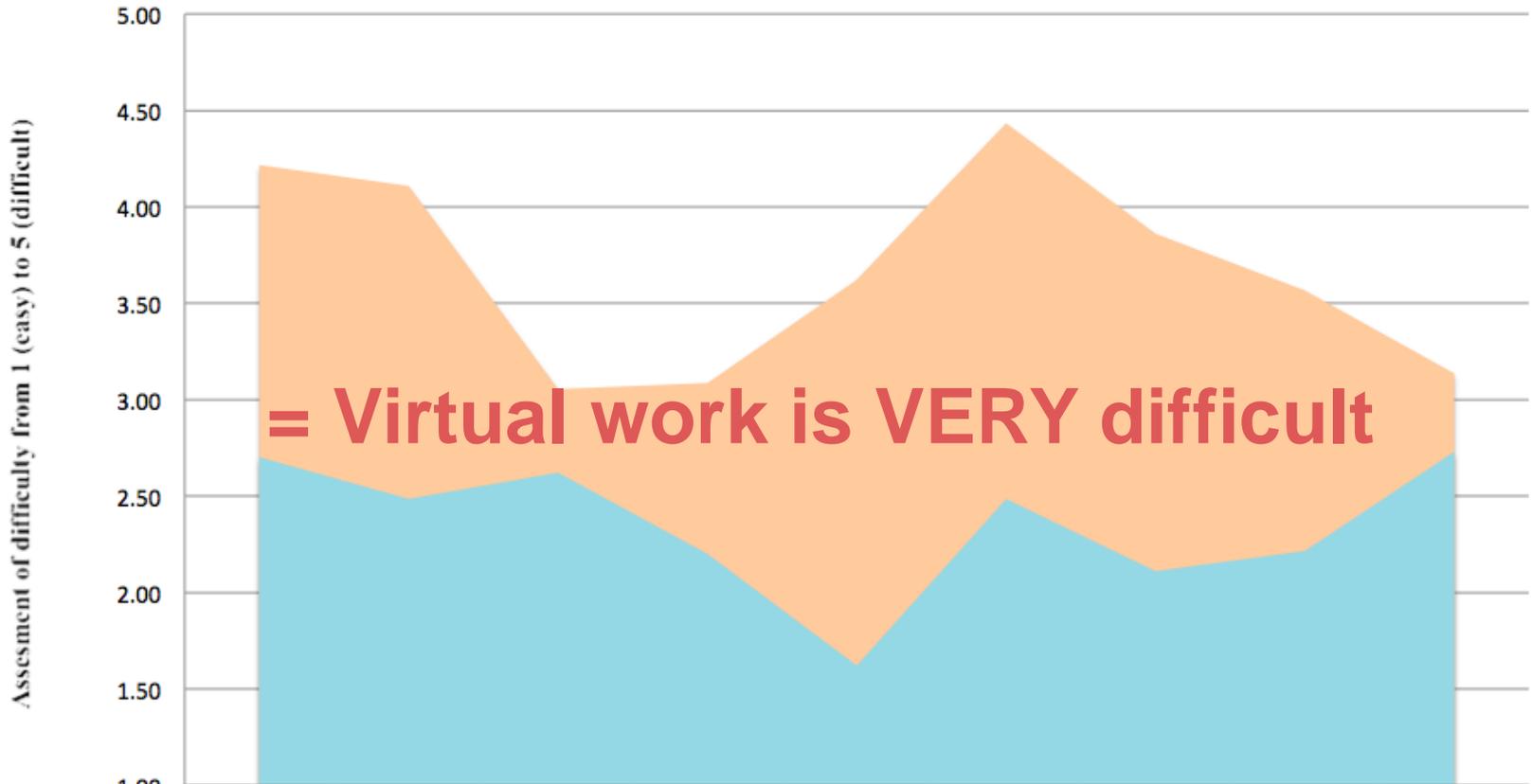


VS





Virtual activity	4.22	4.11	3.05	3.09	3.62	4.43	3.86	3.57	3.14
Co-located activity	2.70	2.49	2.62	2.20	1.62	2.49	2.11	2.22	2.73



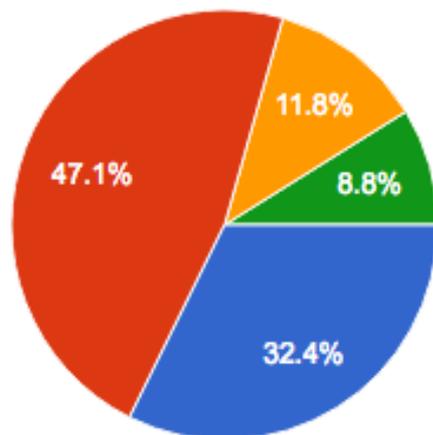
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## **Example from Innovation for Change & CBI**

What are the best starting points for a project?

Given that the goals of the project, would you have rather chosen...

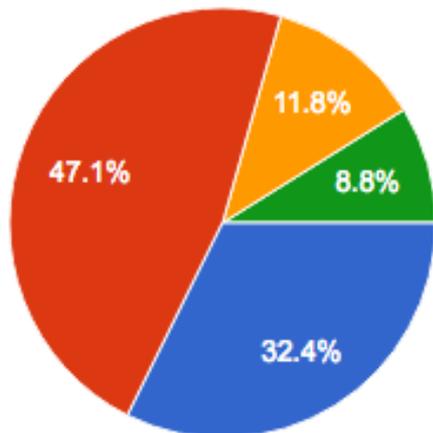
- your own challenge, ideated and put together in your team?
- the challenge framed by an organization as happened now? (need pull)
- challenge formed starting from the technologies by CERN KT/ Polito TT groups? (tech push)
- Other



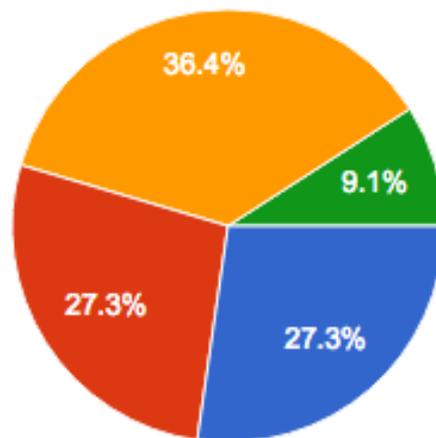
beginning

# Given that the goals of the project, would you have rather chosen...

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beginning



after

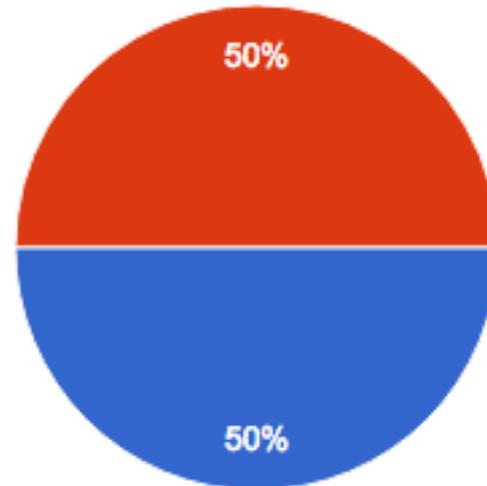
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What does knowledge transfer think?

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What does knowledge transfer think?