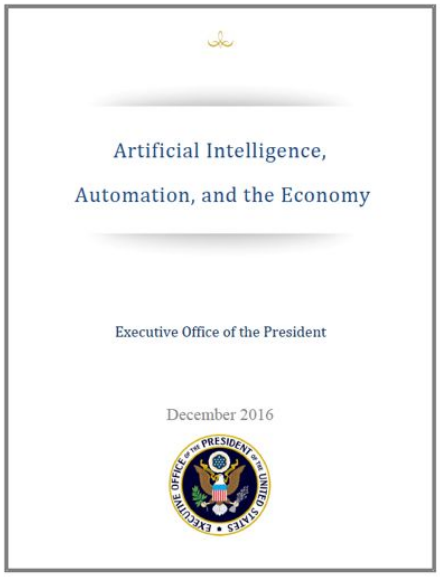
Digital Do It Yourself

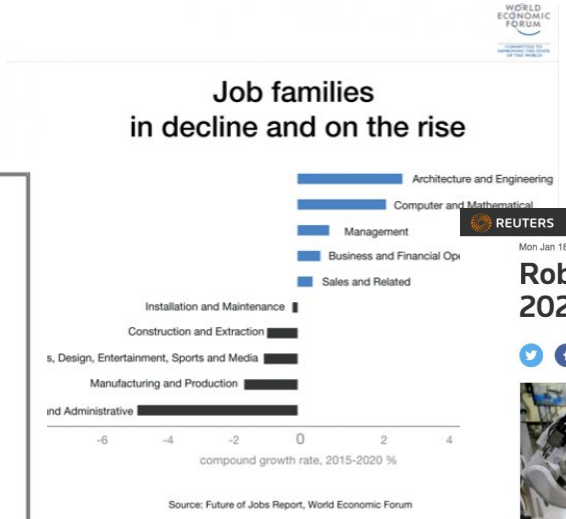
Final Conference, Milan, 22 June 2017

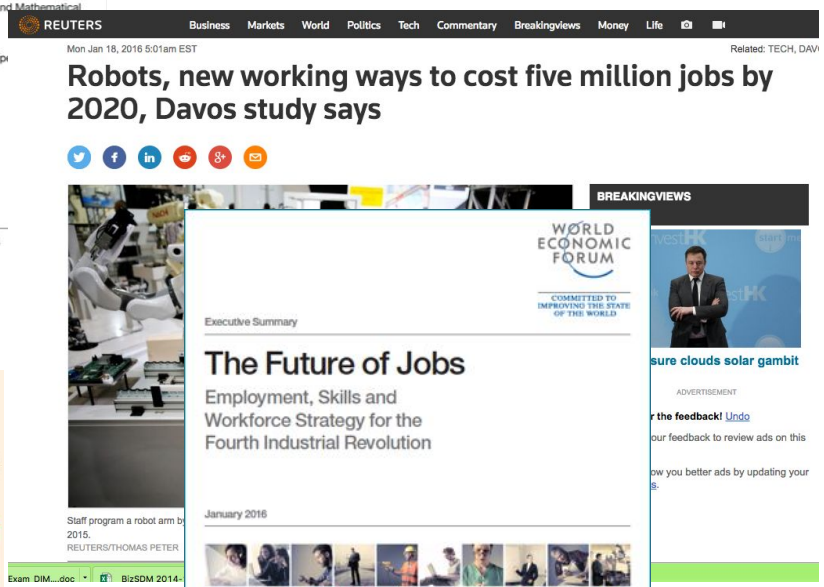
Digital DIY
Reshaping Work and Organizations

Aurelio Ravarini

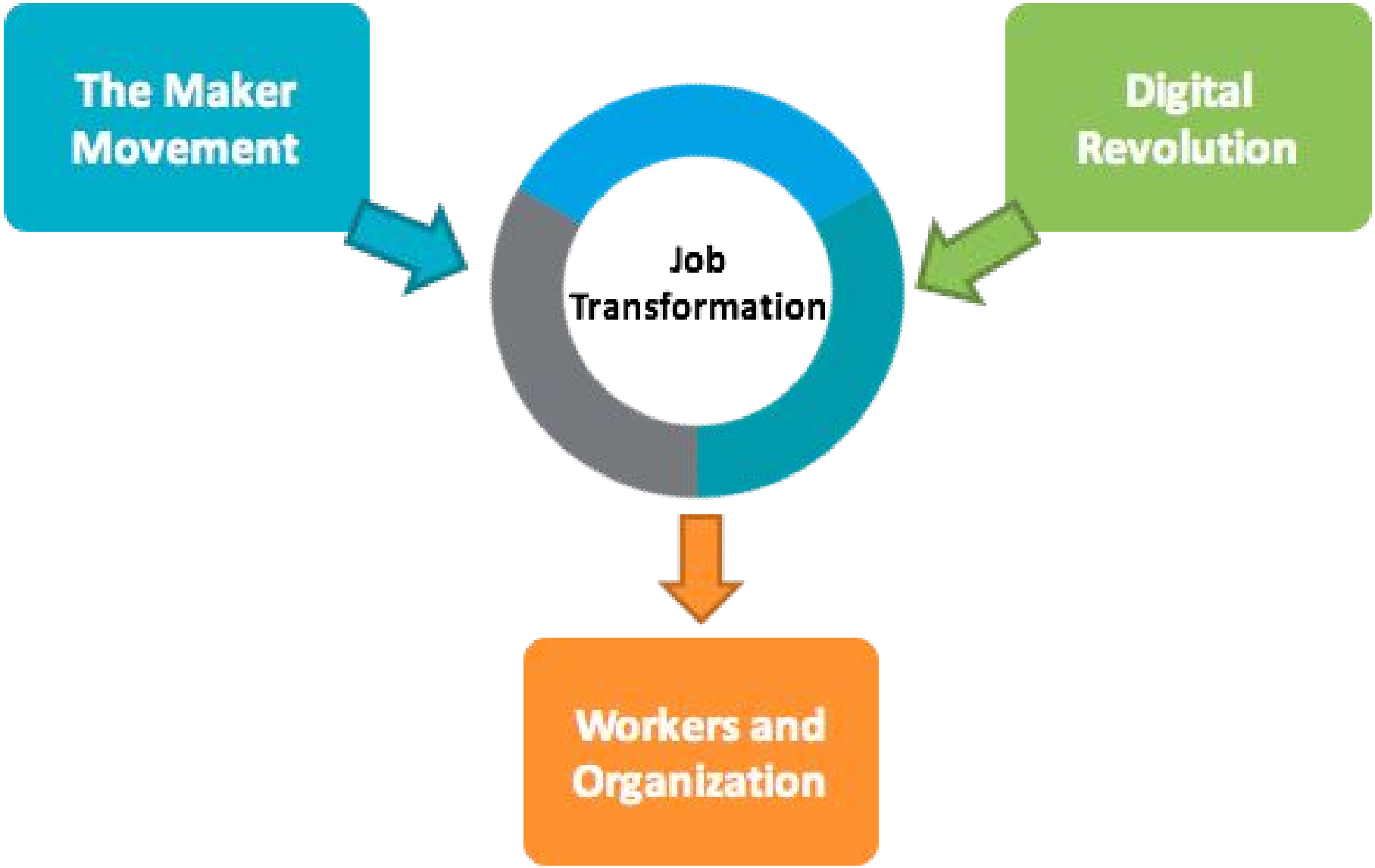
Digital Technology and Work: should we beware?







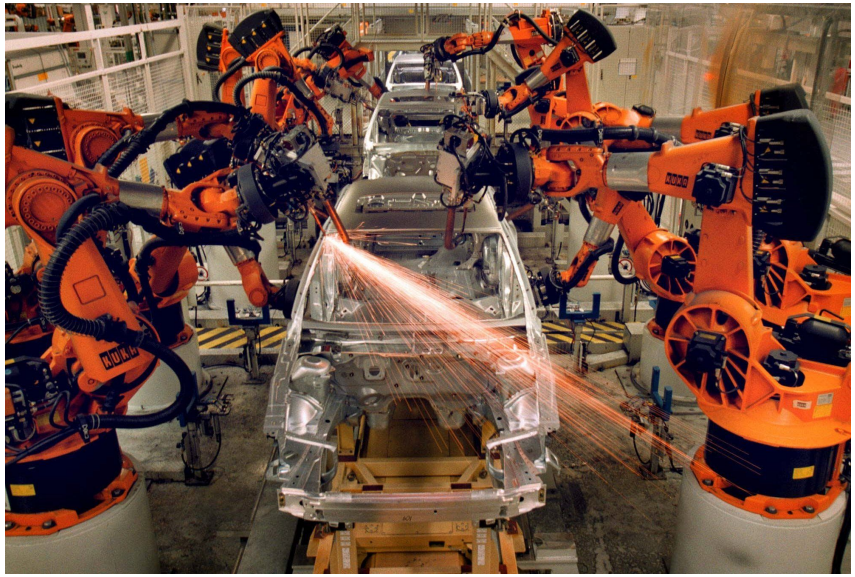
Focusing on **Work**



A paradigm shift for the role of technology

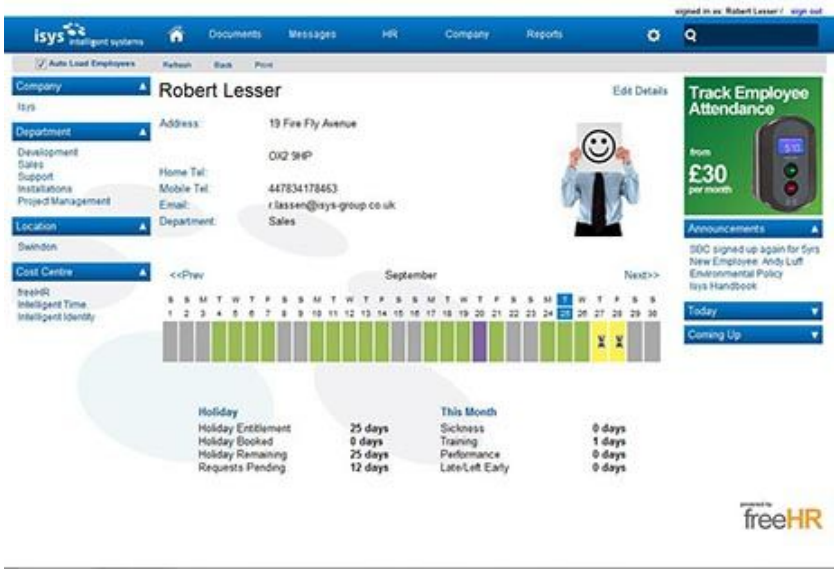
“Digital technology dependent” phenomena can be classified:

- **Automation**: substitution, i.e. independence on humans “**Do without people**”



A paradigm shift for the role of technology

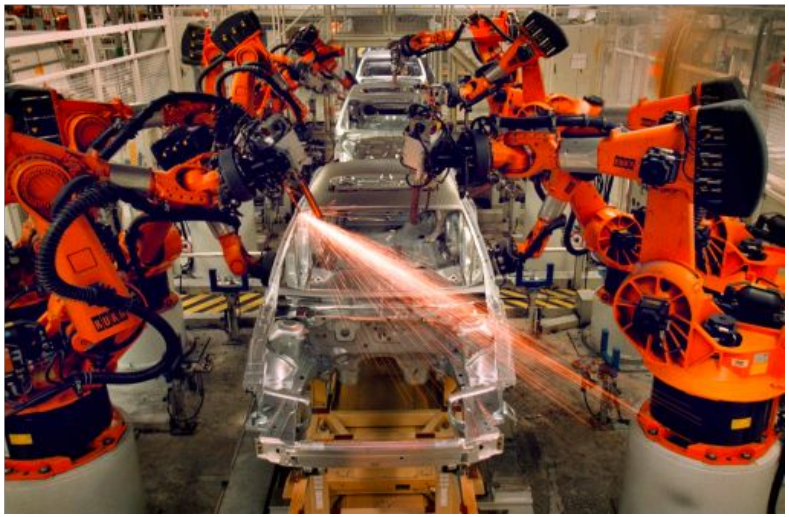
- **Automation**: substitution, i.e. independence on humans
  - “Do without people”
- **Self-service**: operational autonomy, i.e. independence on organizational entities for carrying out operative tasks
  “**Do without asking permission**”



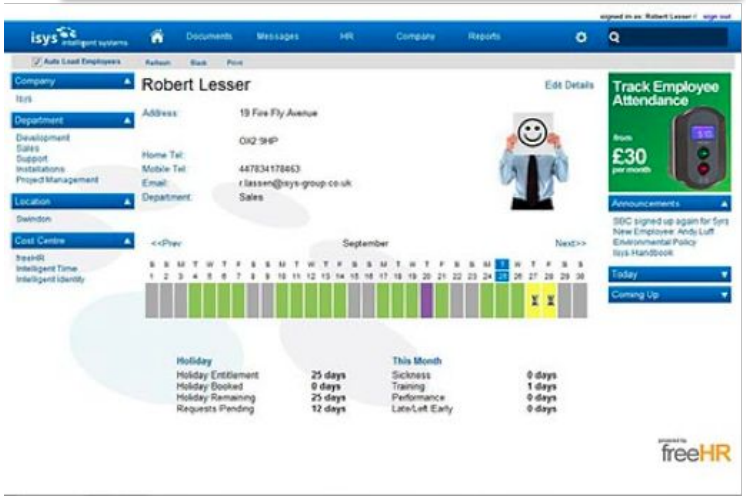
A paradigm shift for the role of technology

- **Automation**: substitution, i.e. independence on humans
- **Self-service**: operational autonomy, i.e. independence on organizational entities for carrying out operative tasks
- **Virtualization**: independence on physical proximity
  “**Do without touching**”

Technology - people = automation



Technology - burocracy = self service



Technology - offices = virtualization

DiDIY
DIGITAL
DO IT YOURSELF

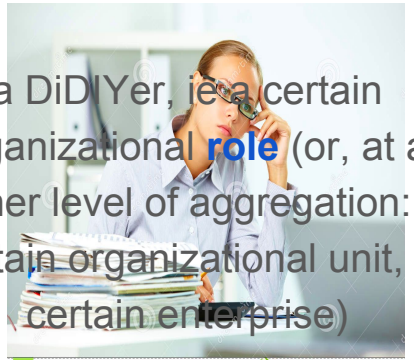
knowledge sharing

inter-dependence between individuals mediated by technology

integration of activities

augmented individuals!

Defining DiDIY from a work/organization perspective



a DiDIYer, ie a certain organizational **role** (or, at a higher level of aggregation: a certain organizational unit, a certain enterprise)

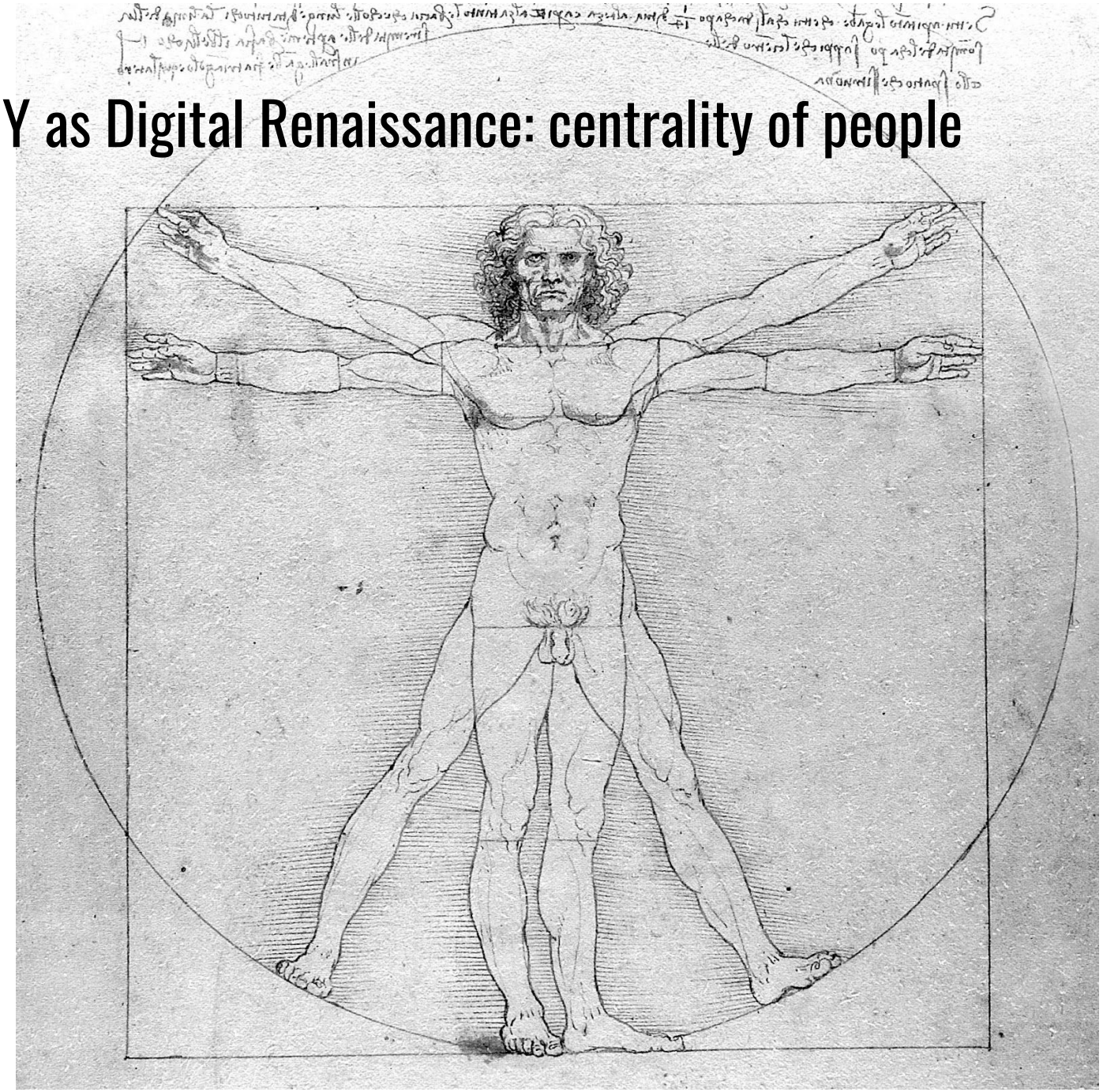
by exploiting certain digital **technologies**

carries out on her own certain **activities**, activities previously carried out by experts (or specialized companies)

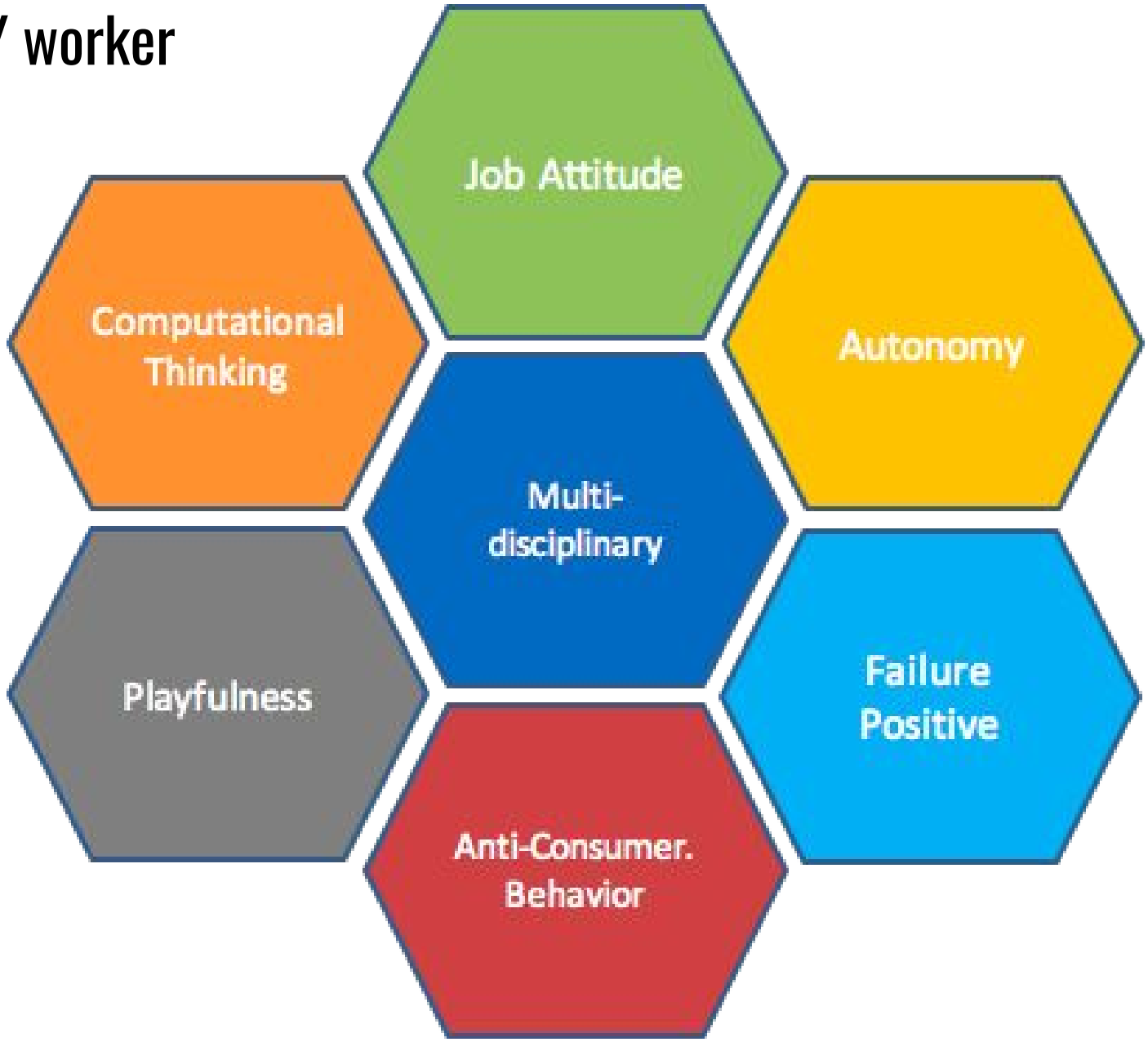
possibly exploiting the knowledge **sharing** within a certain community (of individuals, of organizational entities)

DiDIY workers: Transitioning towards a DiDIY organization

DiDIY as Digital Renaissance: centrality of people



DiDIY worker



DiDIY as Digital Renaissance: centrality of knowledge

DiDIY workplace

Driving the paradigm shift

DiDIY means (also) applying
a "Maker" attitude in existing,
formalized organizations

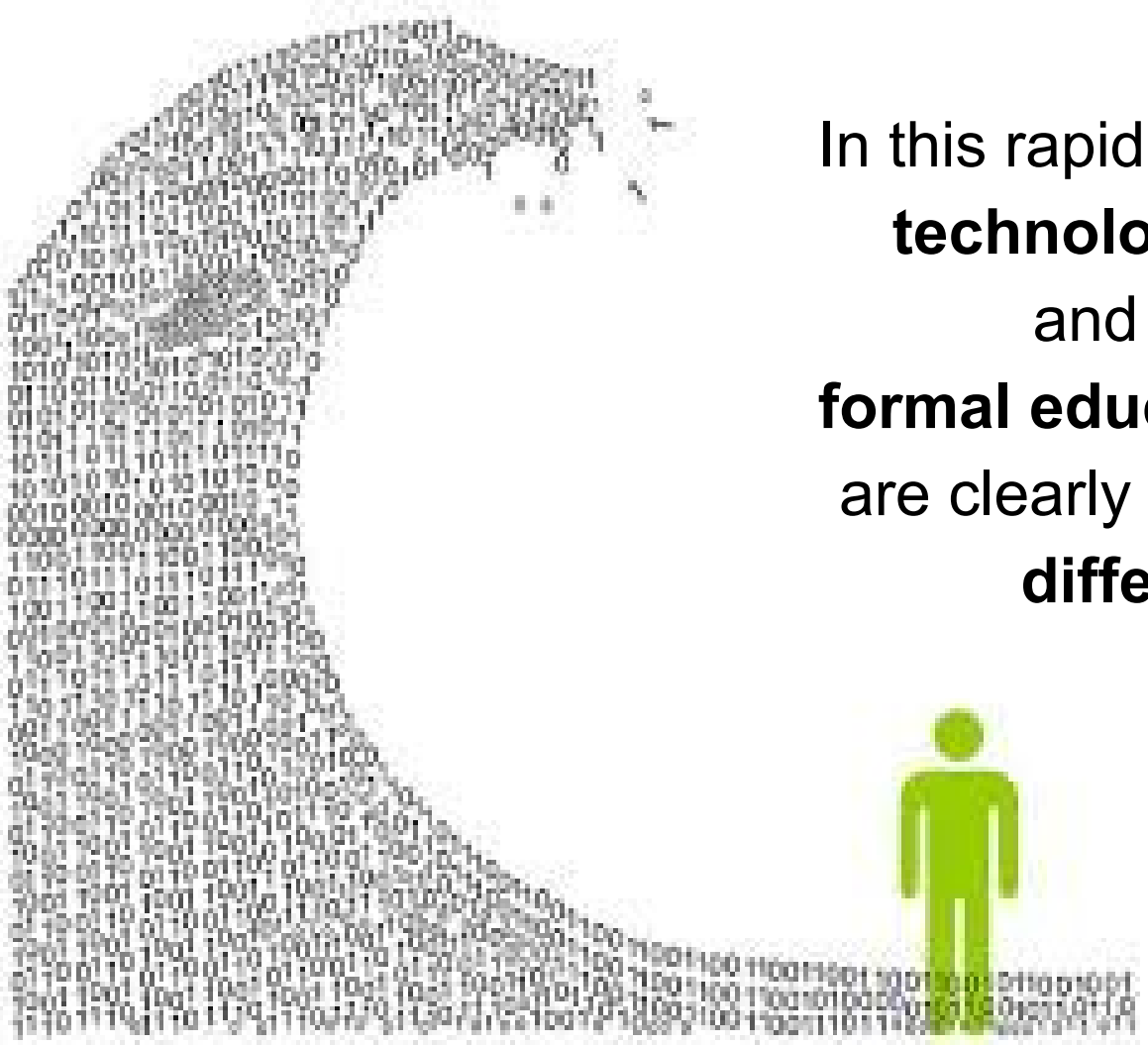
Digital technologies can be used also to
enable creativity in workers and
not only to improve **productivity** in the
machines

Driving the paradigm shift: the role of decision makers

Decision makers inside companies and policy makers should
overcome the Tayloristic view of the management
and provide rewards and incentives to proactive, cross-disciplinary, tech-enabled practices

DiDIY in Education and Research

Chiara Barattieri di San Pietro

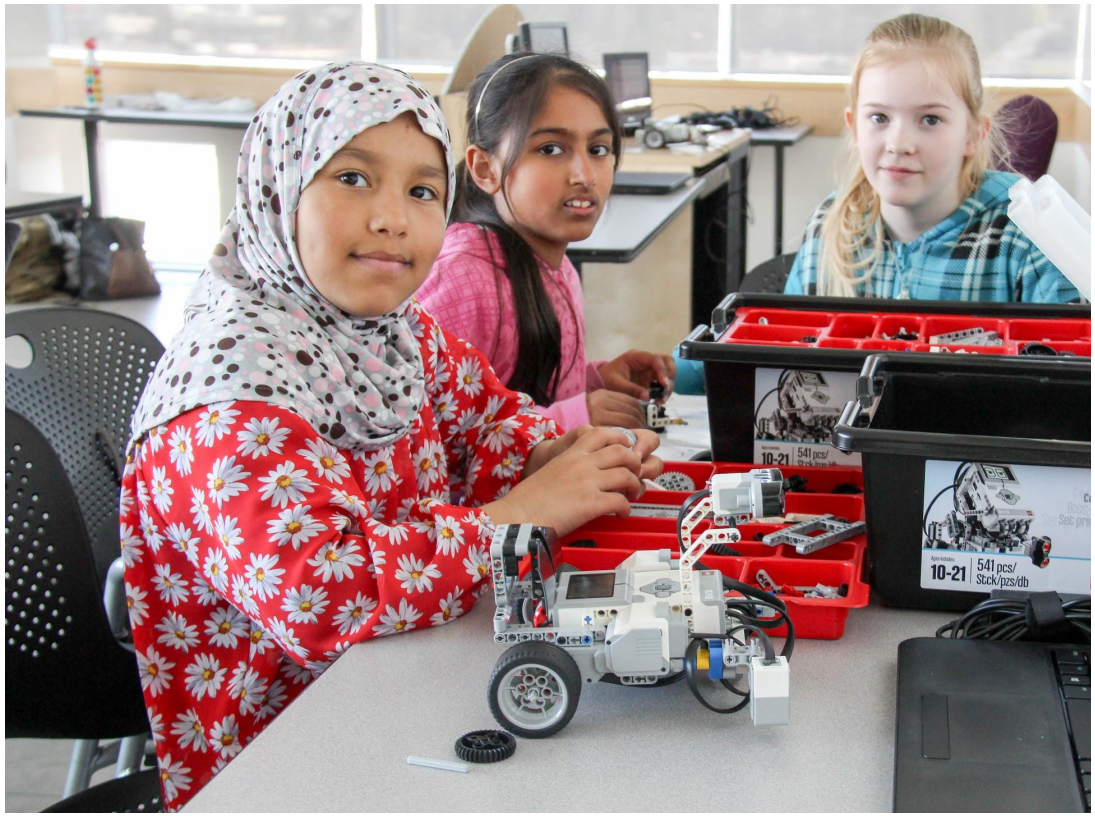


In this rapidly evolving society,
technological evolution
and the current
formal educational structure
are clearly moving forward at
different paces

Need to **shift**

from short-term, technology-oriented knowledge

to a **flexible**, long-term approach to “novelty”



Schools moving from content-delivering to acquisition of transversal skills

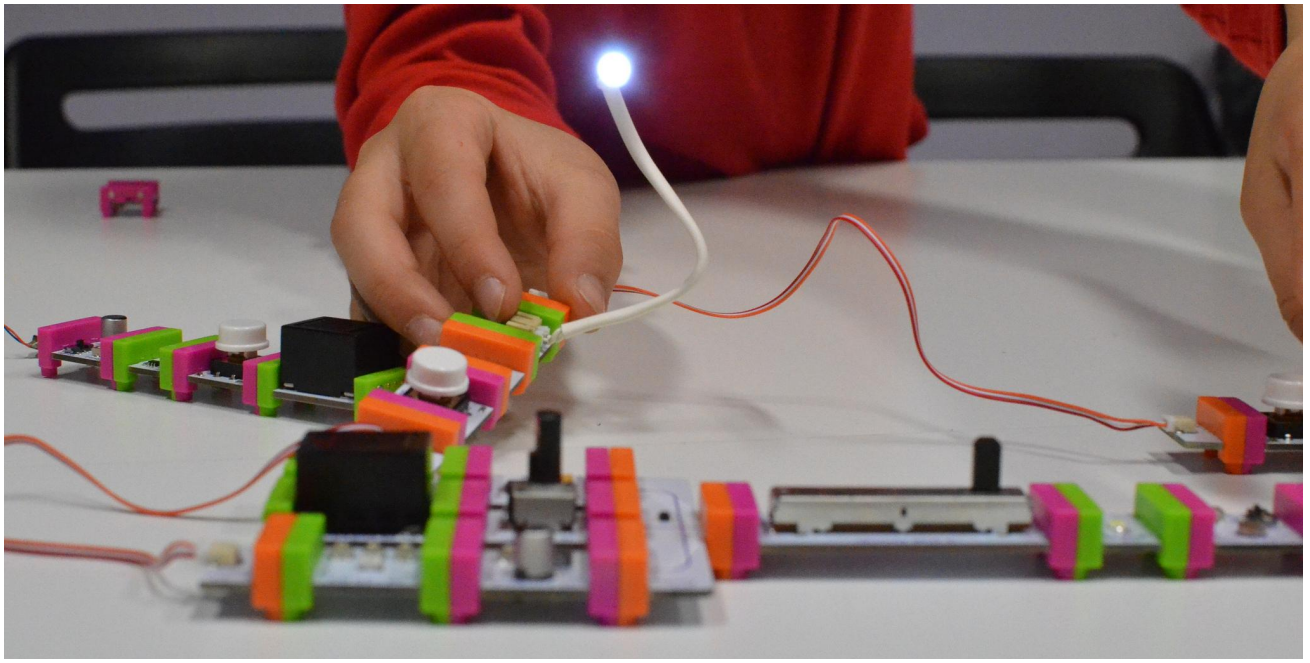
21st century skills:

creativity and innovation, critical thinking, problem solving, decision making, and an open attitude to life-long learning.

Changing the emphasis of existing curricula and assessment, encouraging schools to use **multiple types of assessment**.

"*When assessing students, it is always worth asking what type of skills will students need to lead a successful life*"

(OECD, 2015)



DiDIY enables an innovative learning

centered around the person and
closer to the need of the territory

make the school laboratory work **meaningful** to the student

reinforce **motivation**

Systems approach required to **build teacher capacity**
to build a skilled and **dedicated** teacher workforce, attracting and retaining **qualified** teachers and ensuring that they **continue to learn** throughout their careers

Prof. Walter Lewin, giving a lecture on physics

Learning time no longer limited to the school environment, but rather continues outside the school walls by engaging in social and digital activities on the **internet**

Digital learning most successful when combines **formal and informal learning**

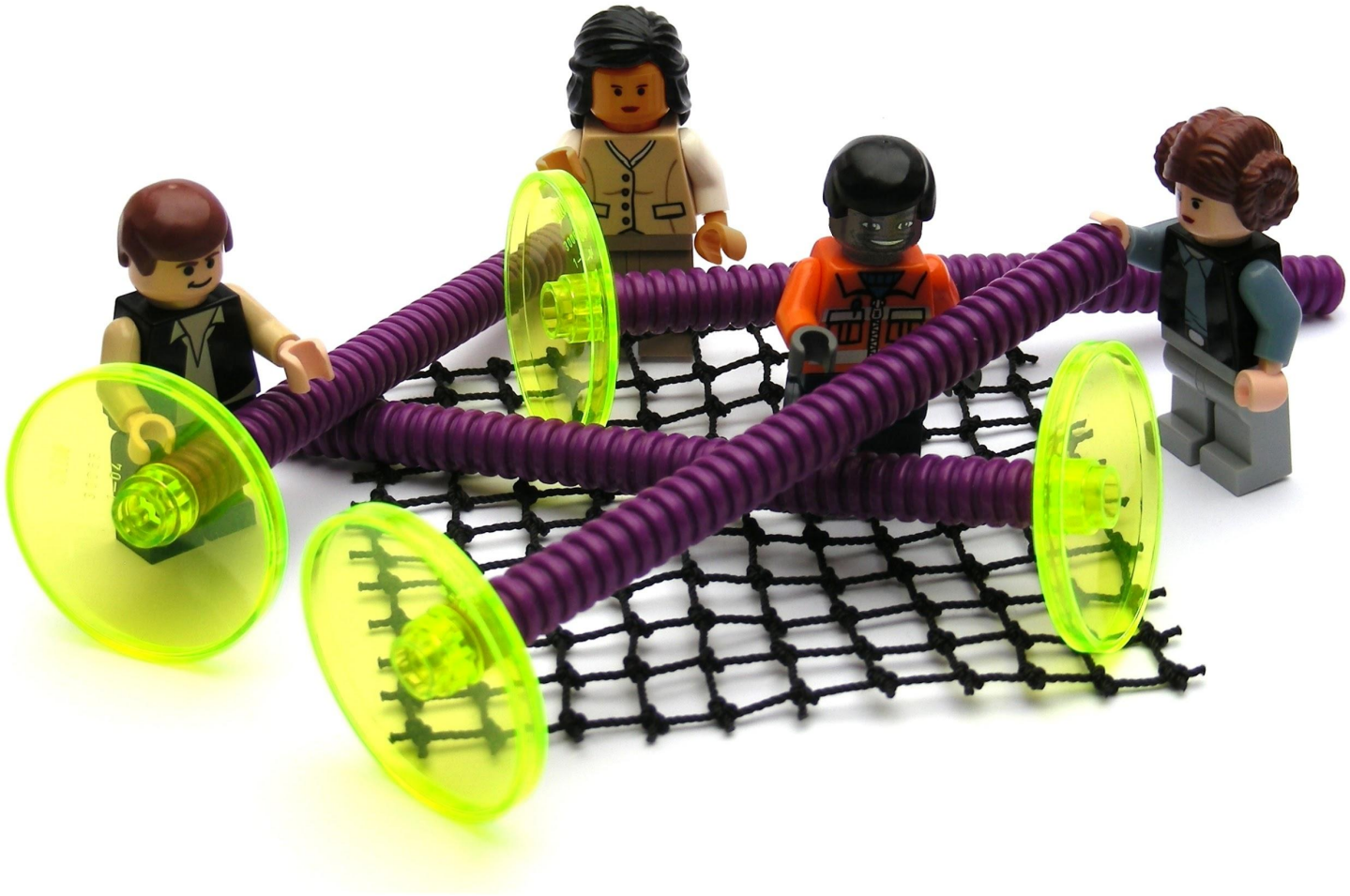
Also limited by the **lack of informed supervision**, which can lead to unfavorable outcomes if duly trained in the **ethical and moral aspects of new technologies**.

Learning science in school can lead to a
better informed future citizens
who will be able to **exploit the research results**,
understanding at the same time the **limitation**
and **ethical implications** of such information.

Digital DIY and creative society

David Gauntlett & Isabelle Risner

Digital DIY and Creative Society



Creative Society: Online video series

- Case studies helping us to identify outstanding practice and common themes
- Six videos available at http://www.didiy.eu/online-videos-didiy-case-studies

Creative Society: Makerlab Workshops

- In-depth investigation of why making matters to makers
- Carried out among 95 makers in 9 workshops
- At a variety of locations

Personal benefits

- Confidence
- Flow
- Problem-solving
- Creativity and fun

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- Confidence
- Flow
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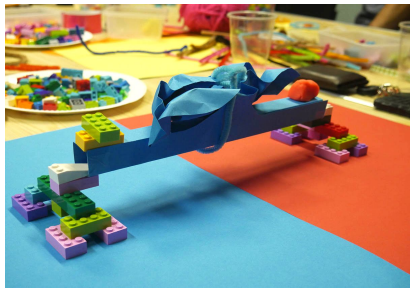
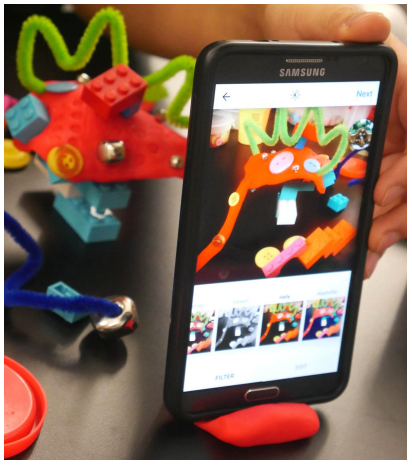
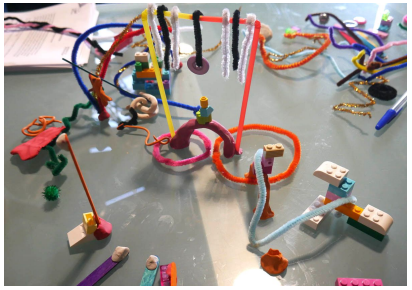
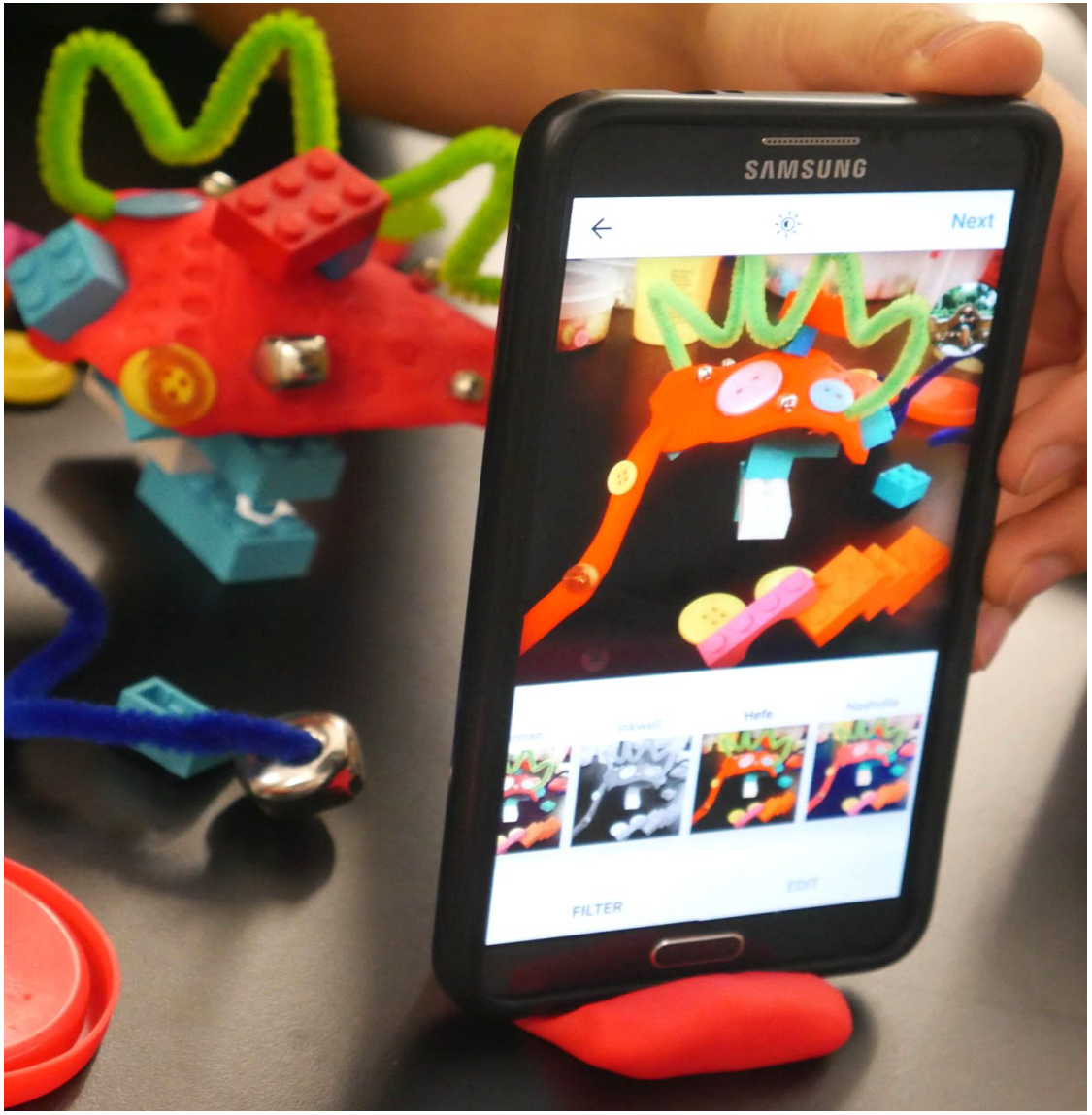
Collective benefits

- Data sharing
- Collaboration
- Connections
- Community





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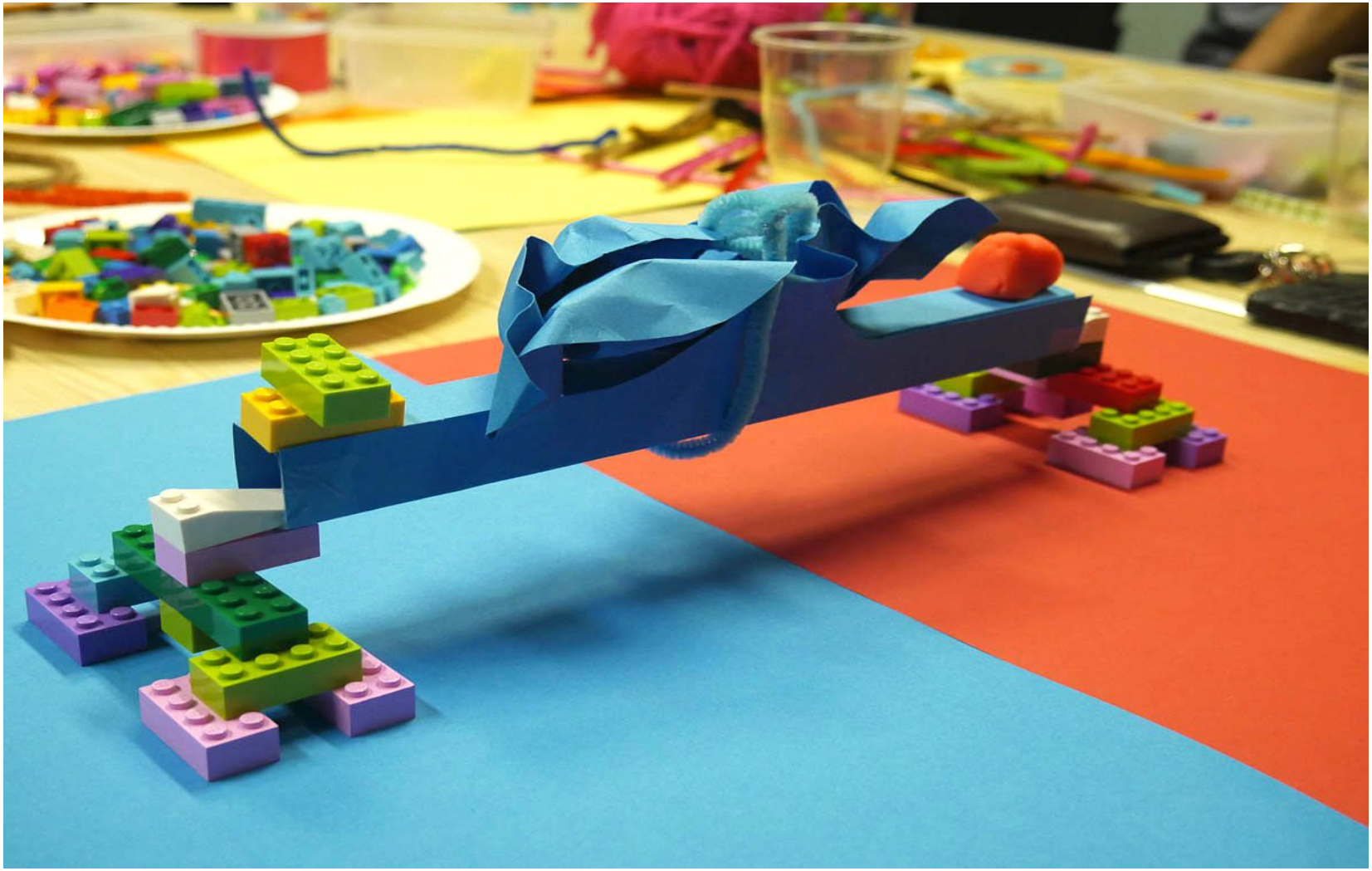

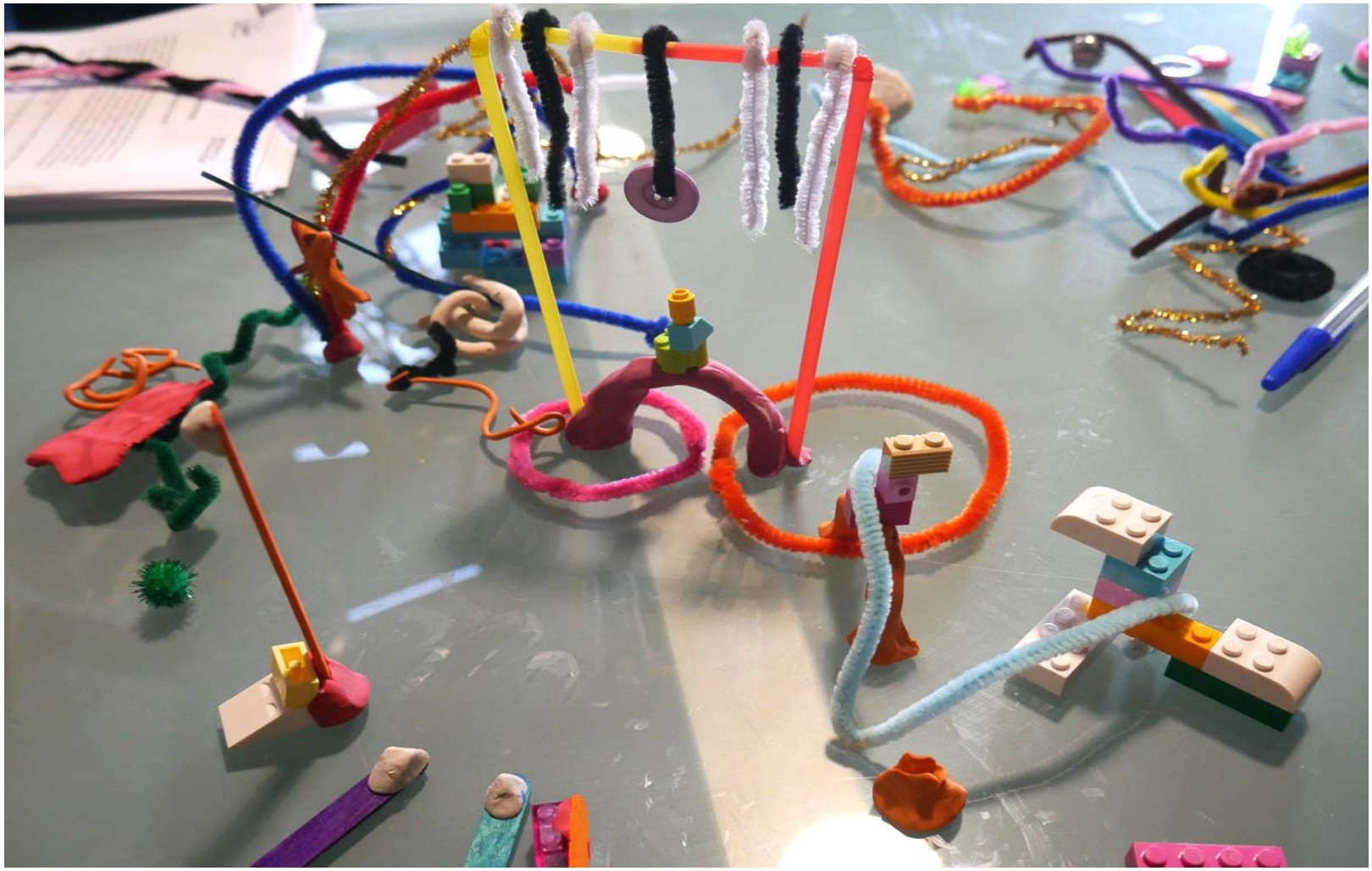

Collective benefits

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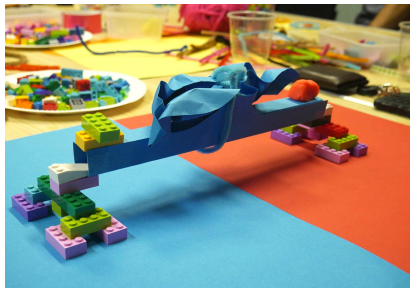
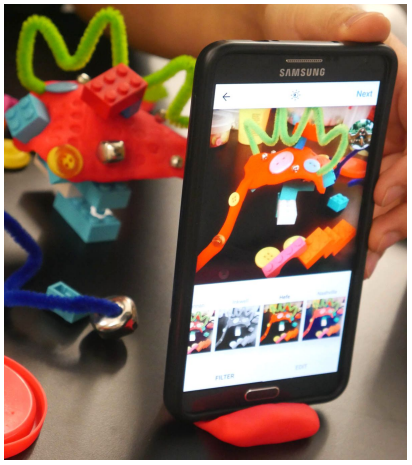
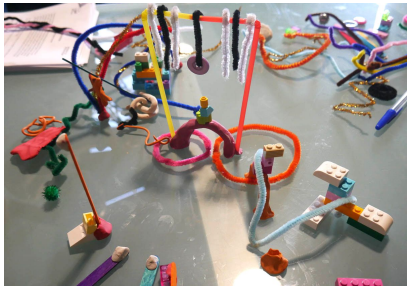
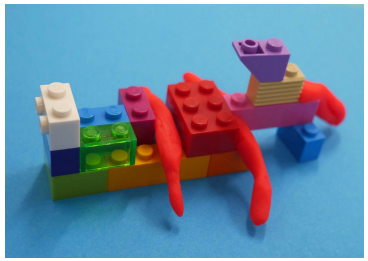


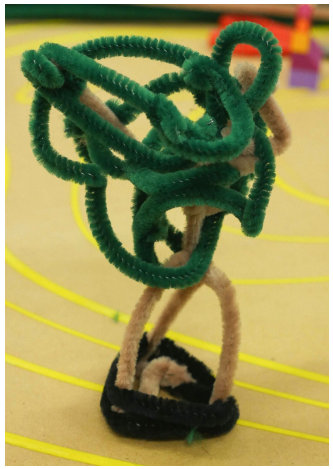


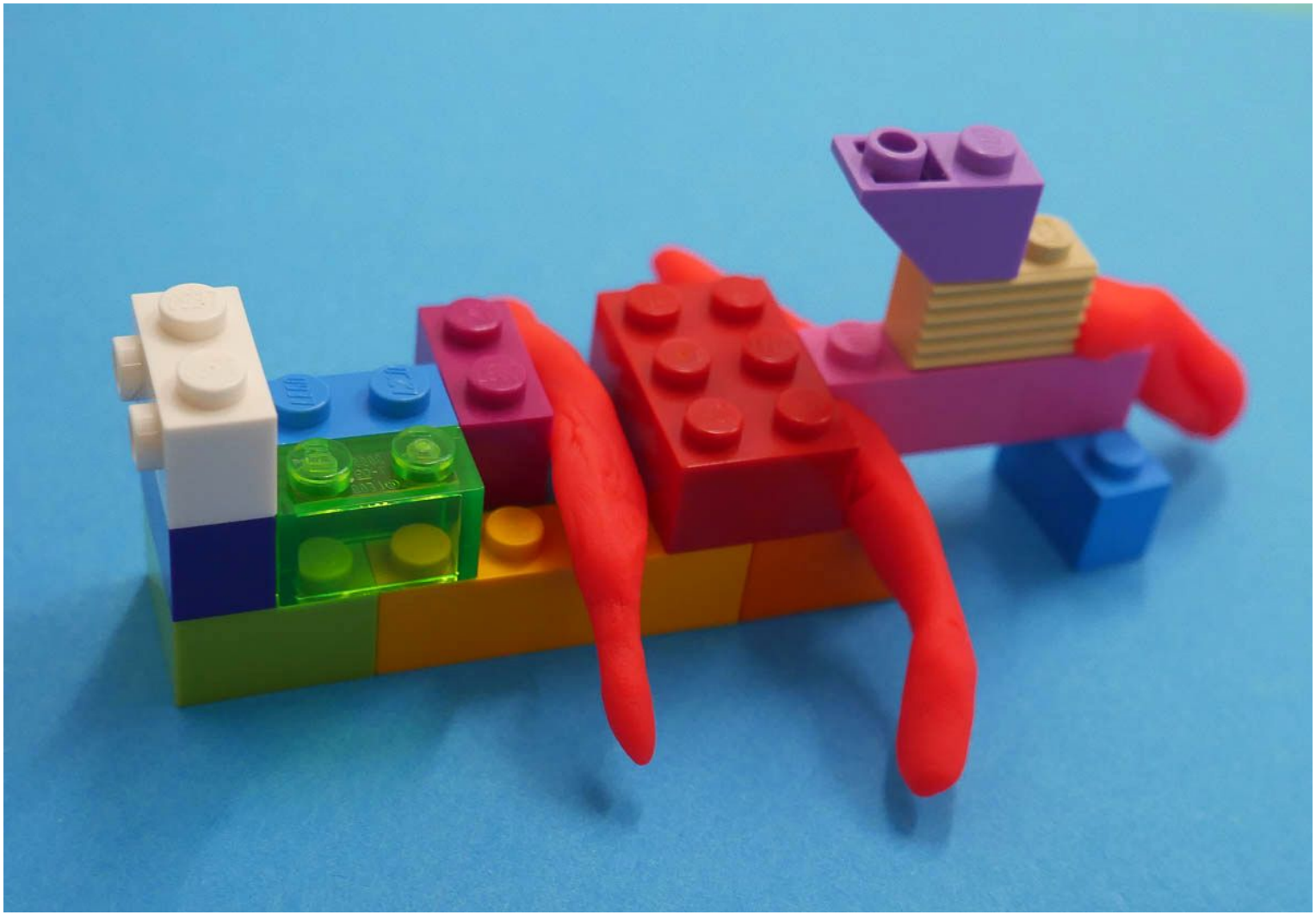


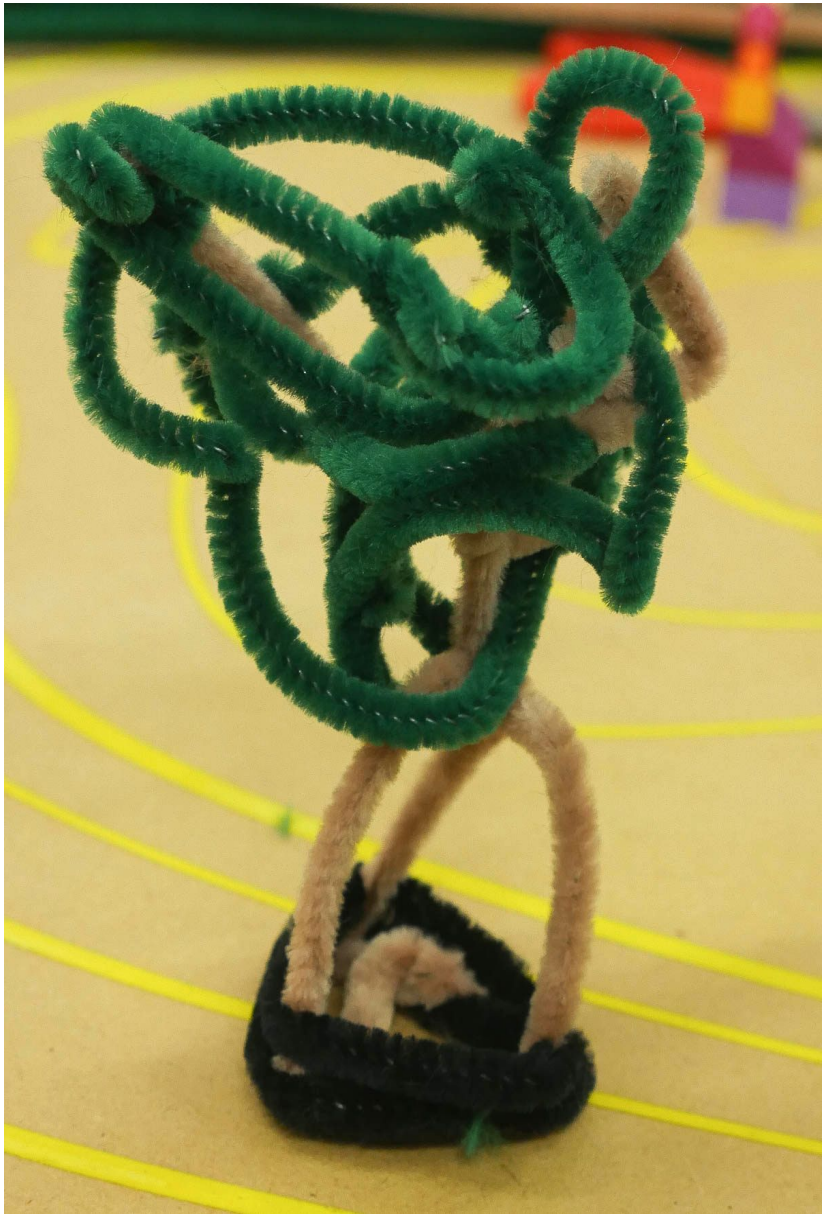
Societal benefits

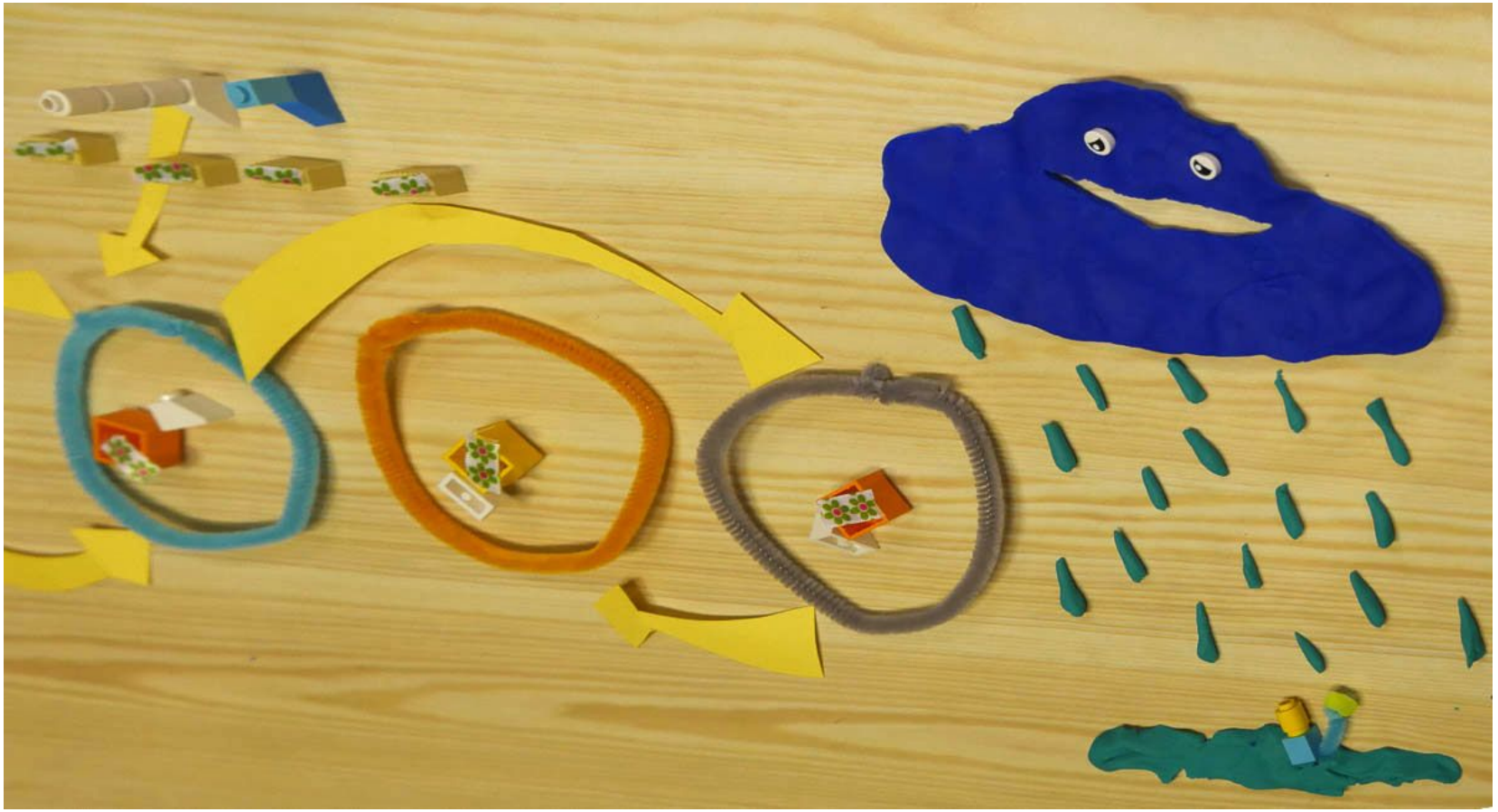
- Material awareness
- Challenge consumer culture
- Entrepreneurship
- Creativity and sharing











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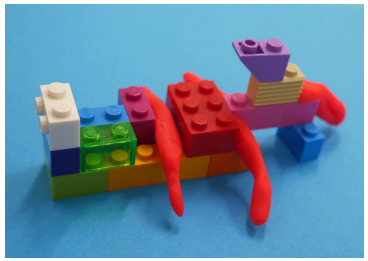
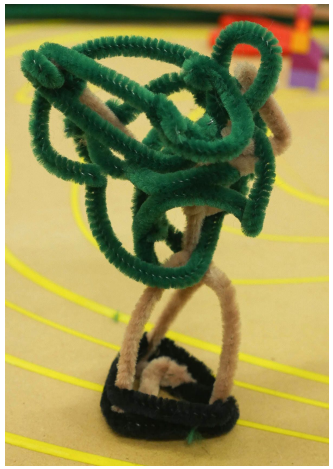




This fieldwork established that . . .

- Making is highly valued by makers, as a source of creativity and happiness, but also as a way to think about problems and find solutions.
- Has many personal benefits from confidence building to connecting people.
- Making has societal benefits from materials awareness to challenging consumer culture and fostering entrepreneurship.

Creative society: potential

Creativity and sharing reinforce each other and are magnified by digital capabilities.

- Maker spaces providing opportunities as social and learning environments, including promoting skills and entrepreneurship.

- Connected communities have the facilities and resources to pursue local projects, e.g. ‘Smart Citizen’ environmental monitoring initiative from Fab Lab Barcelona.

Creative society: potential

We need to think about new ways to engage girls and women in digital DIY, and extend opportunities and networks across more diverse groups.

Conclusion: Creative platforms

We need to promote opportunities for a thriving circuit of sharing, learning and inspiration in all DiDIY cultures.

This includes exploring alternate forms of creative platform – online, offline, and interlinked – which offer new opportunities to make, share, connect, include and inspire.

Digital DIY and co-design

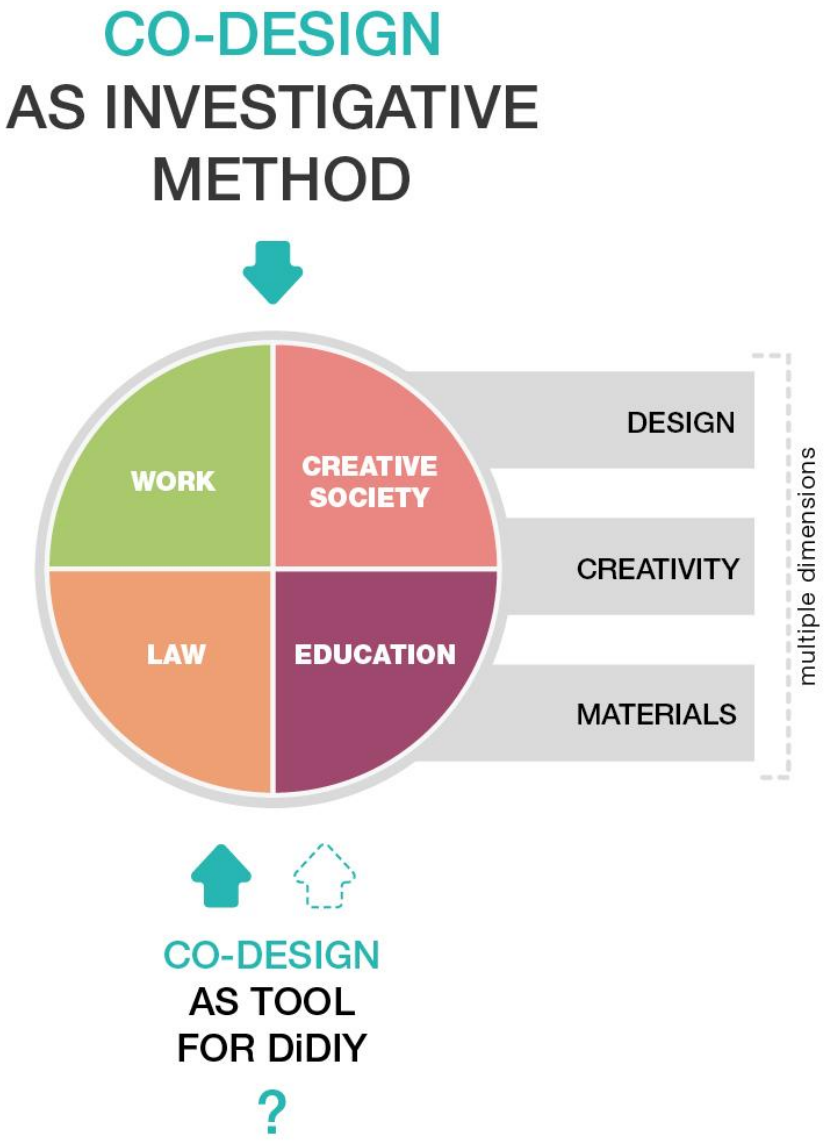
Marita Canina & Carmen Bruno

Co-design method

Digital DIY is a complex phenomenon where **people** are directly **involved in the research and production of knowledge**.

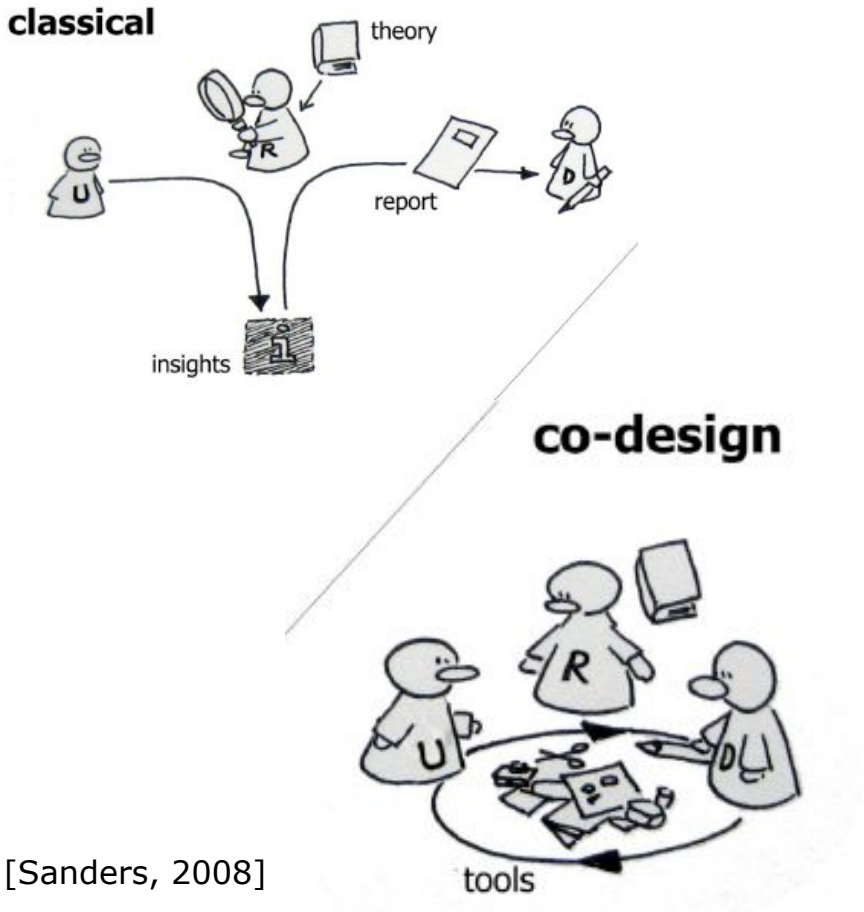
The close relationship with the final user makes co-design a powerful means for accessing and making explicit **people's needs and aspirations** for the construction of new possible futures.

Codesign as a tool to enhance Digital DIY projects?



Co-design is...

...a **collaborative innovation model, engaging people** (consumers, users, stakeholders…) in the design process of the products and services they are experts about.

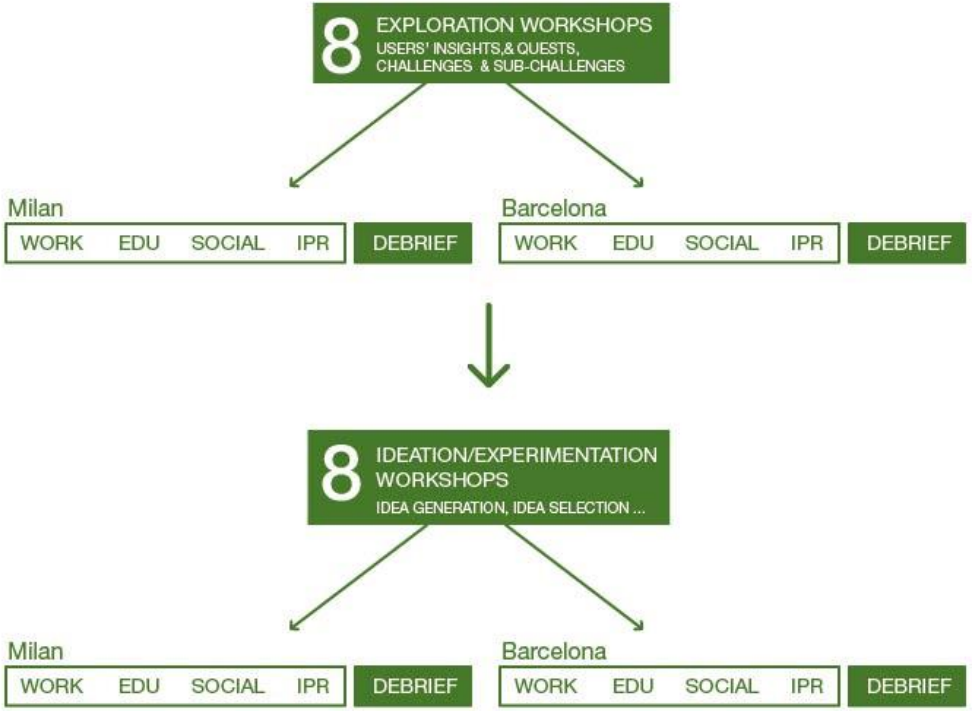


[Sanders, 2008]

Co-design workshop

Multidisciplinary team: makers, DiDIYers and professional from the four project areas

Design of an **iterative workshop methodology** based on a design process and specific ad hoc tools



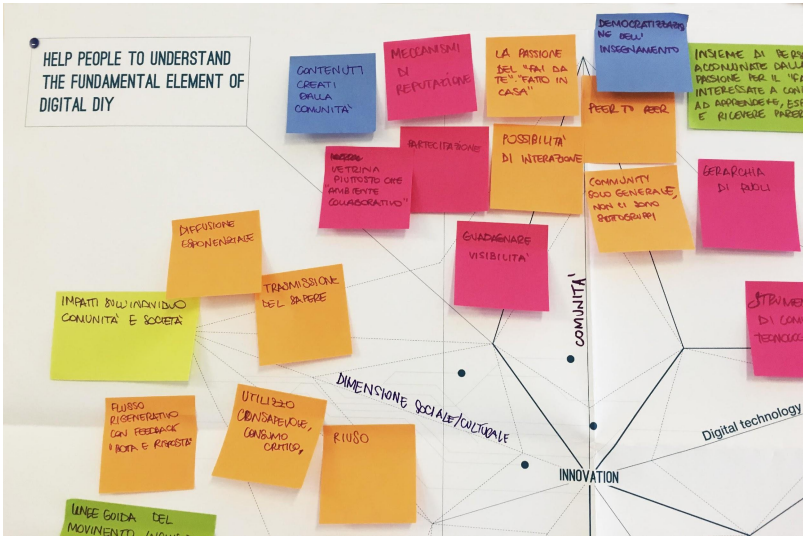
Explorative workshop

Identify the common aspects and **potentialities of Digital DIY**, as recognized by the participants.

Areas of opportunities generated by participants ideas through workshop activities.

Collection of **project challenges**, based on personal experience.

Explorative workshop

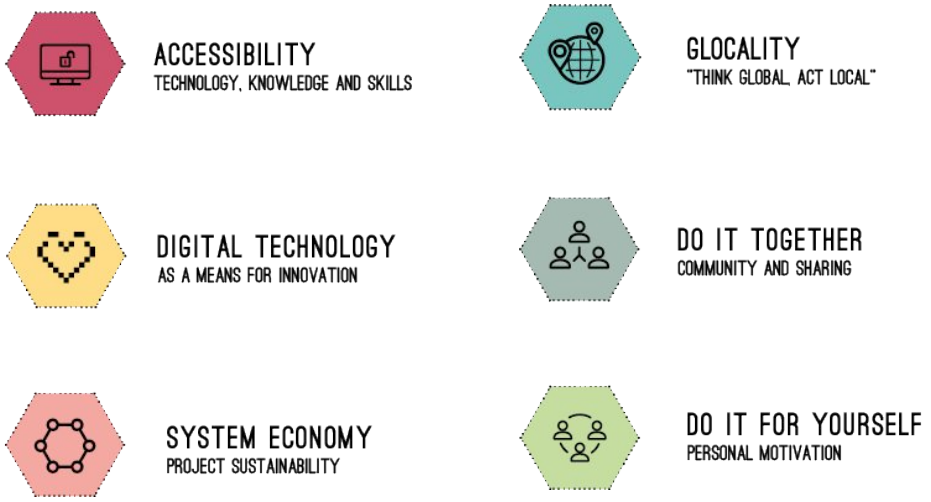


DiDIY fundamental factors

Factors enabling the Digital DIY phenomenon.

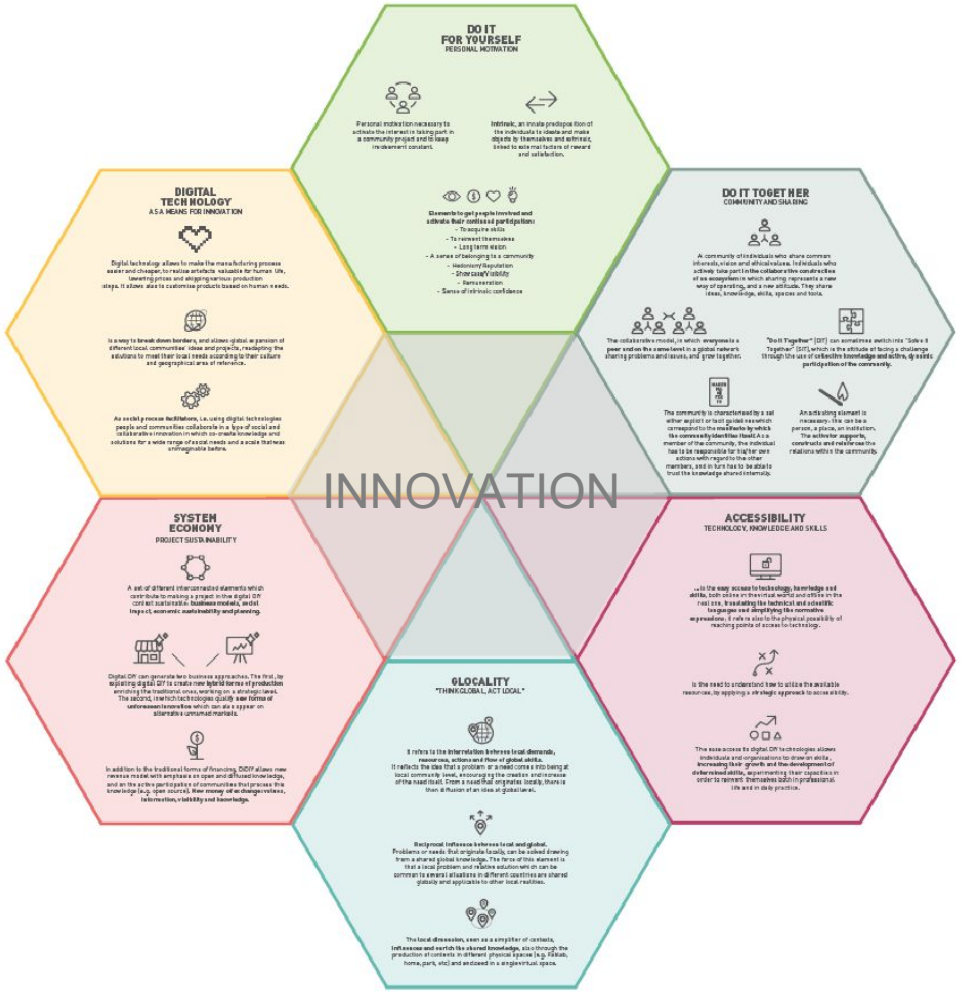
Common to all the main areas

Indicator of a growing digital culture that is leading to a new mindset and a new social behavior



DiDIY fundamental factors

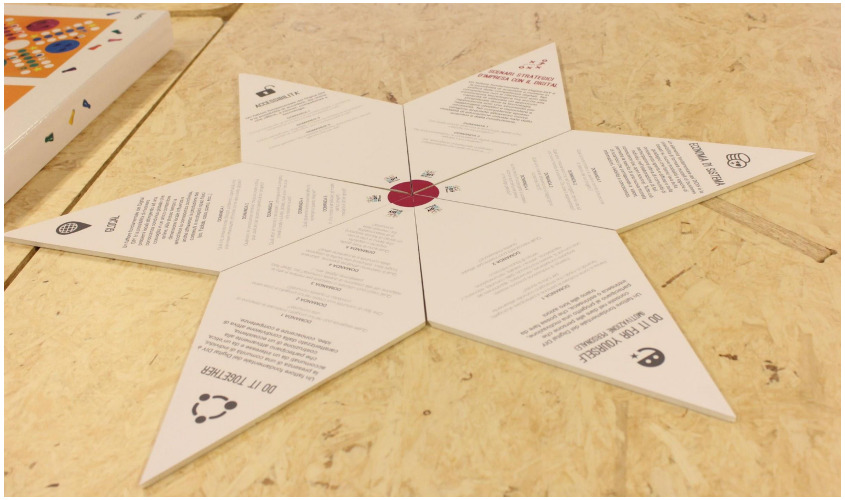
Only the **intersection** of all the fundamental elements of digital DIY can lead to innovation.



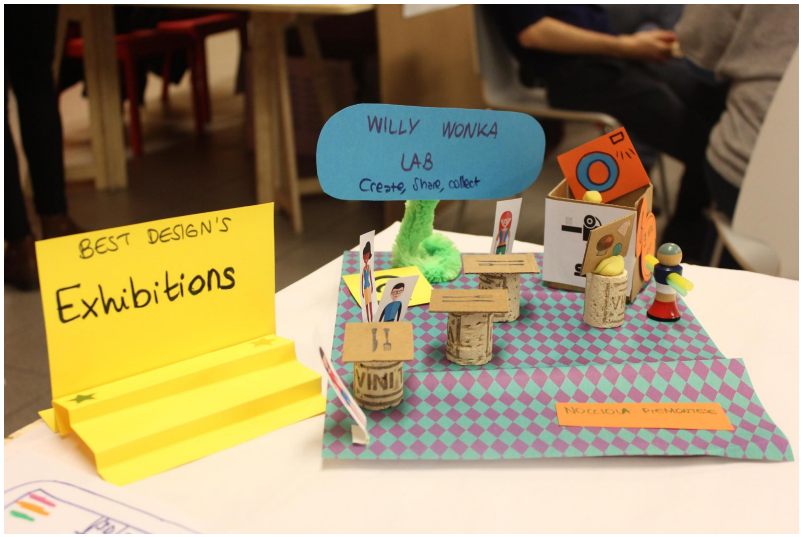
Generative workshops

Generation of **many new ideas** for the collected challenges

Inclusion of the DiDIY fundamental factors in the ideas.



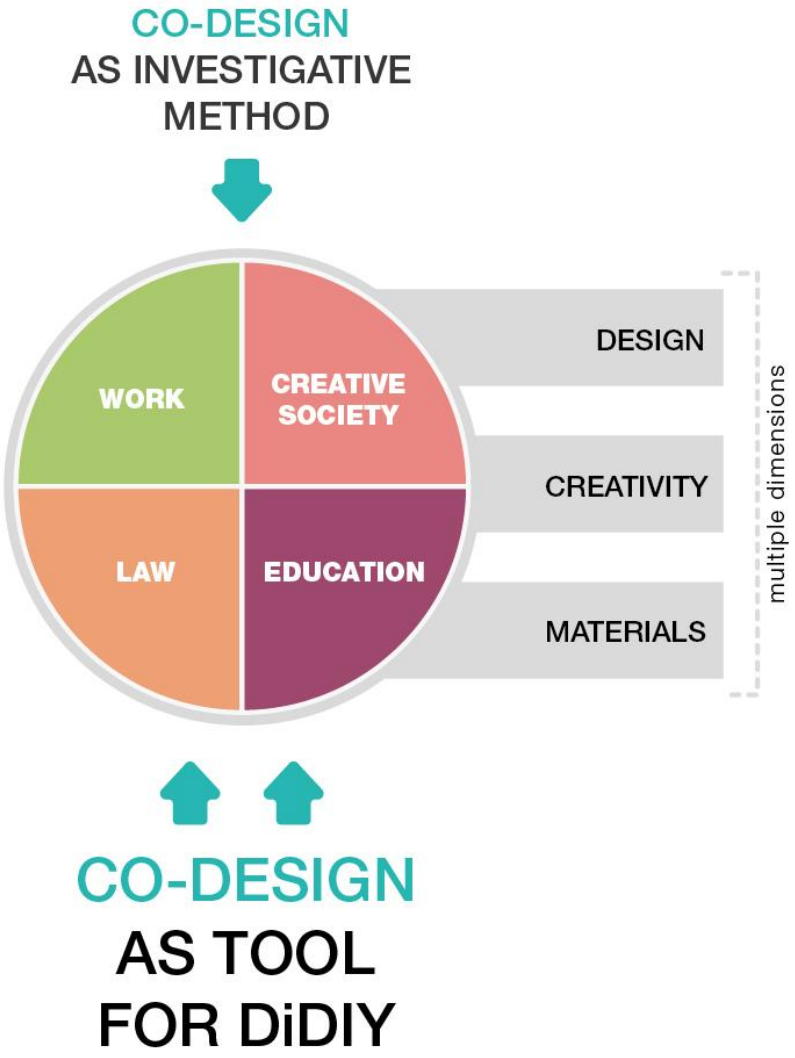
Generative workshops



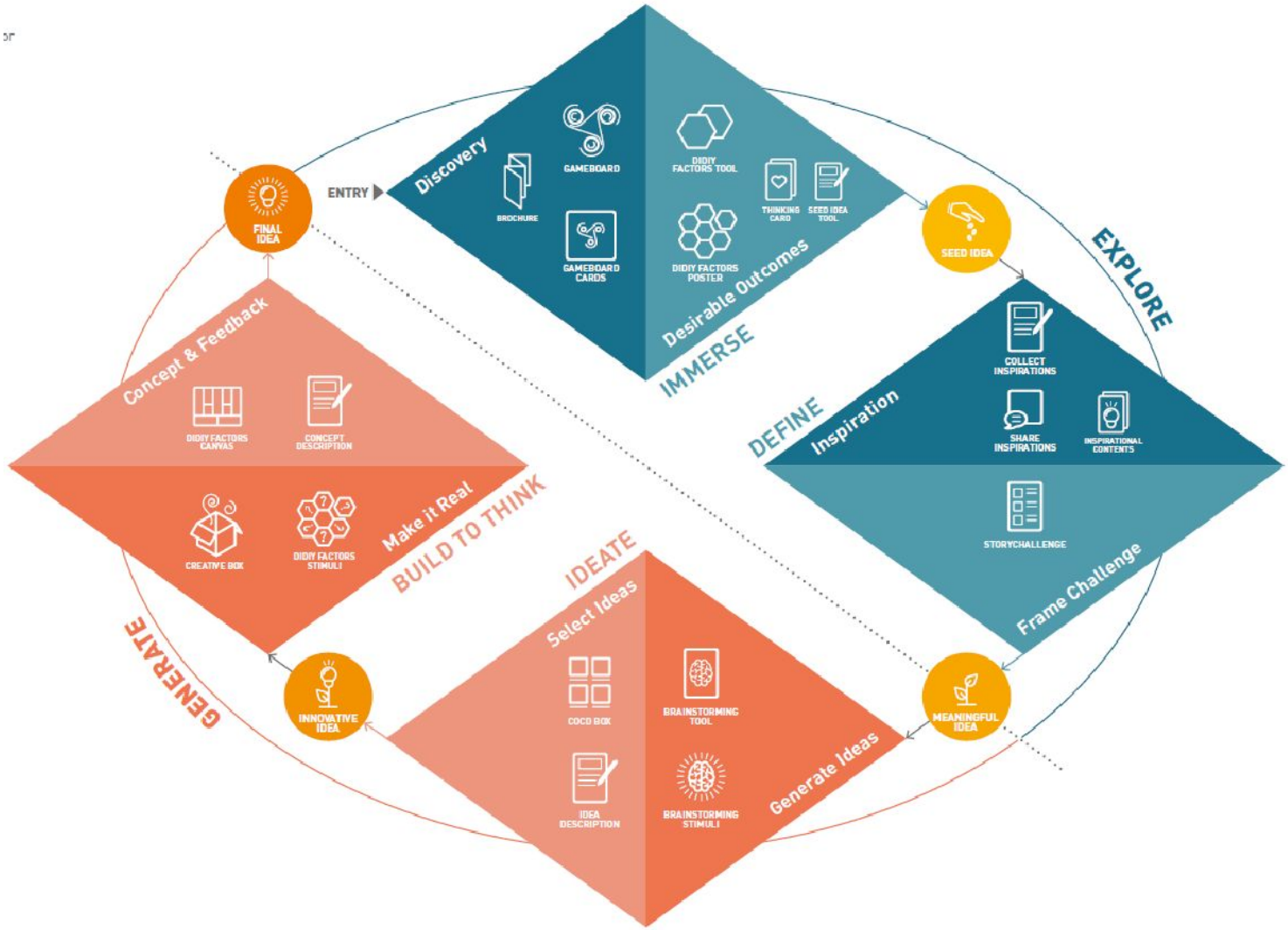
Co-design as a tool

Strategic approach to digital technologies

Generate innovation in different field of application



DiDIY co-design process



The toolkit includes...

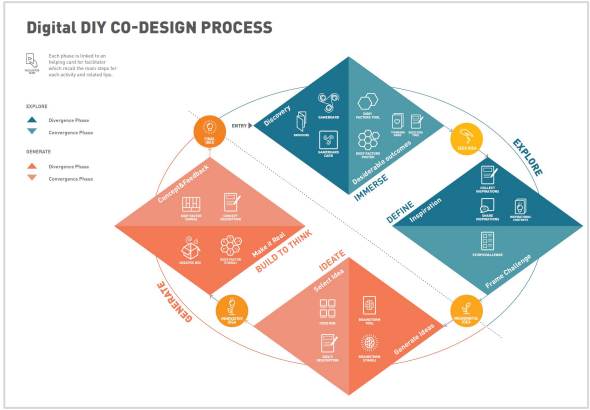
Toolkit and guidelines provide instructions, tools and background information to guide you through the process of Co-Design within Digital DIY.

http://www.didiy.eu/design

www.ideactivity.polimi.it/toolkits/didiytoolkit/

GUIDELINES

TOOLKIT



DIDIY CO-DESIGN PROCESS

Sec1_Introduction

Provide a guide to **applying a strategic design approach** to the use of digital technologies to activate **new innovative opportunities.**

Improve a service or a **strategy** in your organisation, to i**nnovate some working modality**, to **activate new forms of collaboration**, and also to solve social challenges.

1 WHAT IS THE POWER OF THE TOOLKIT?

2 WHO CAN USE THIS TOOLKIT?

3 WHEN IS IT USEFUL?

4 WHY WORK WITH IT?

5 WHERE TO DO IT?

6 HOW TO USE THE TOOLKIT?

Sec2_Digital DIY Scenario

14 DiDIY Fundamental Factors
9 fields of insipiration

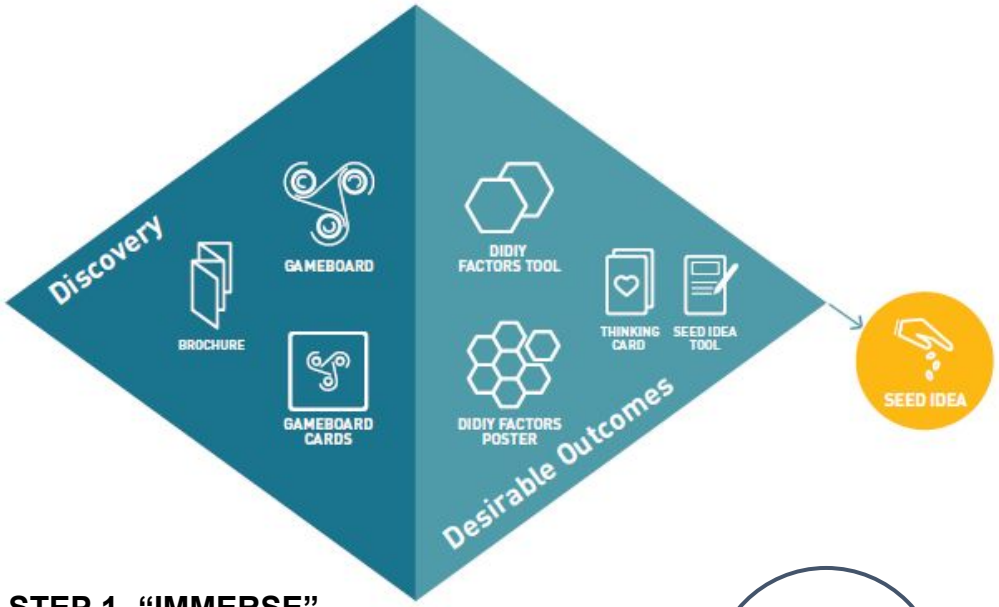
The inspiring scenarios are **challenging areas to possibly work on**, opened up by the phenomena of Digital DIY.

They can be used as inspirations for starting a personal project.

Sec 3_Process

This **specific Co-design process** invites you to the development of ideas or strategies through Digital DIY.

Each step consists of two **activities carried out with the support of different tools**, used to stimulate creativity and to support people in achieving the specific activity goal.



STEP 1- “IMMERSE”

Sec4_Get Started!

SET UP

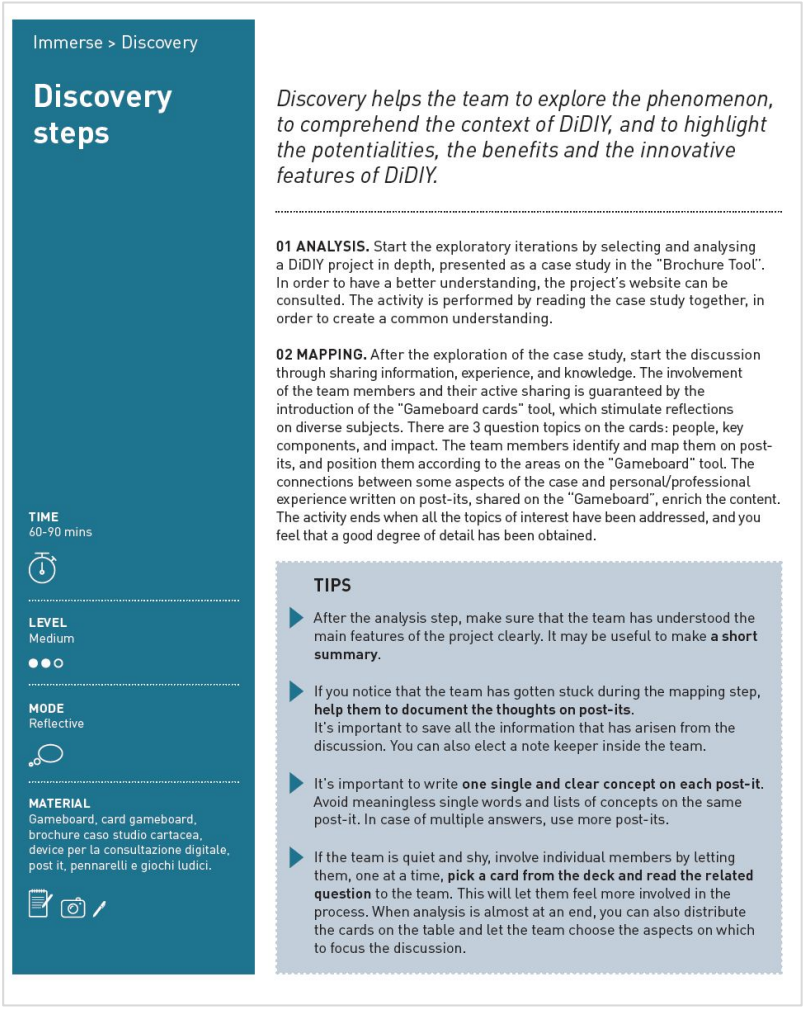
Applying the toolkit means setting up the various elements, in order to structure the process and the creative session at best.

The elements to be considered are:

Sec5_Steps, activities and tools

For each activity the following is provided:

- Description of the **activity meanings and goals** to achieve
- Instruction on how to **set up the activity** and the specific activity tools to prepare
- Detailed **steps and tips to run the activity** with instructions on how to use the specific tools
- **Suggestions** to keep in mind to obtain good results



Immerse > Discovery

Discovery steps

Discovery helps the team to explore the phenomenon, to comprehend the context of DiDIY, and to highlight the potentialities, the benefits and the innovative features of DiDIY.

01 ANALYSIS. Start the exploratory iterations by selecting and analysing a DiDIY project in depth, presented as a case study in the "Brochure Tool". In order to have a better understanding, the project's website can be consulted. The activity is performed by reading the case study together, in order to create a common understanding.

02 MAPPING. After the exploration of the case study, start the discussion through sharing information, experience, and knowledge. The involvement of the team members and their active sharing is guaranteed by the introduction of the "Gameboard cards" tool, which stimulate reflections on diverse subjects. There are 3 question topics on the cards: people, key components, and impact. The team members identify and map them on post-its, and position them according to the areas on the "Gameboard" tool. The connections between some aspects of the case and personal/professional experience written on post-its, shared on the "Gameboard", enrich the content. The activity ends when all the topics of interest have been addressed, and you feel that a good degree of detail has been obtained.

TIME
60-90 mins

LEVEL
Medium

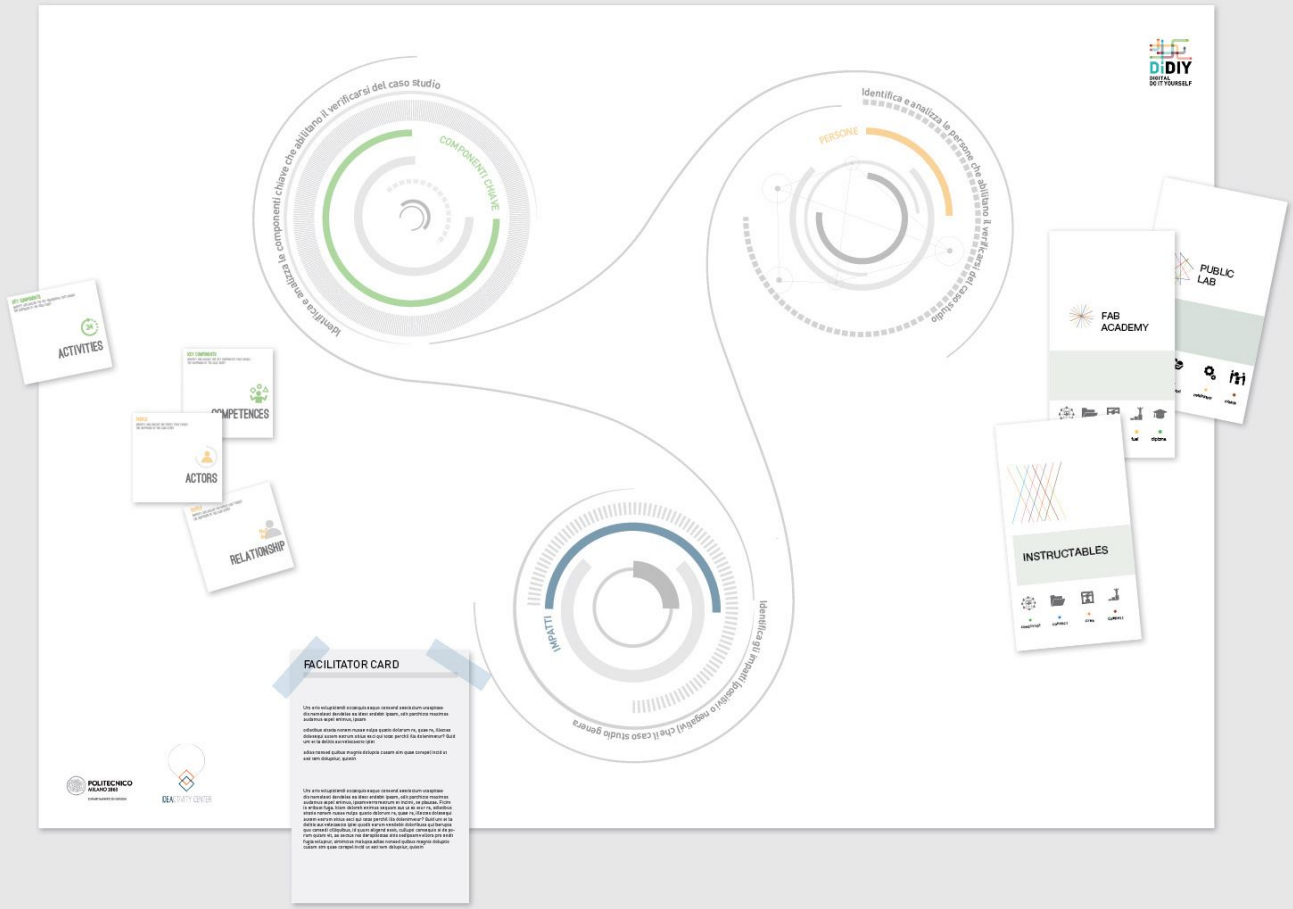
MODE
Reflective

MATERIAL
Gameboard, card gameboard, brochure caso studio cartacea, device per la consultazione digitale, post it, pennarelli e giochi ludici.

TIPS

- After the analysis step, make sure that the team has understood the main features of the project clearly. It may be useful to make **a short summary**.
- If you notice that the team has gotten stuck during the mapping step, **help them to document the thoughts on post-its**. It's important to save all the information that has arisen from the discussion. You can also elect a note keeper inside the team.
- It's important to write **one single and clear concept on each post-it**. Avoid meaningless single words and lists of concepts on the same post-it. In case of multiple answers, use more post-its.
- If the team is quiet and shy, involve individual members by letting them, one at a time, **pick a card from the deck and read the related question** to the team. This will let them feel more involved in the process. When analysis is almost at an end, you can also distribute the cards on the table and let the team choose the aspects on which to focus the discussion.

Sec5_Steps, activities and tools

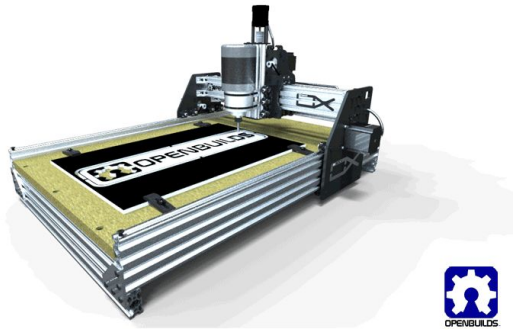


Digital DIY and rights and obligations

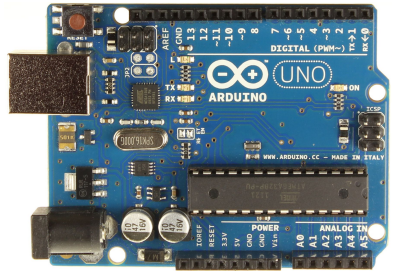
Wouter Tebbens

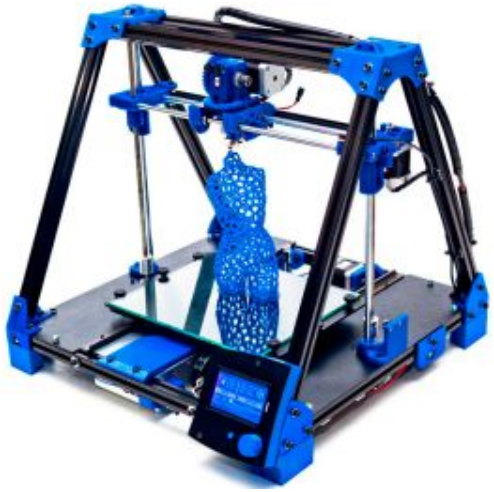
Sharing of knowledge: open & free licensing

OPENBUILDS



OX CNC MACHINE





Collaborative peer production: A third mode of production

Co-creation
and
collaborative spaces

Online design sharing platforms

Open Hardware Repository

WEVOLVER

yeggi

SOLDER Pad

Bld3r
A 3D Printing Social Network

fritzing

OPENBUILDS

Thingiverse

YM Youmagine

Thing Tracker Network

MS

GitHub

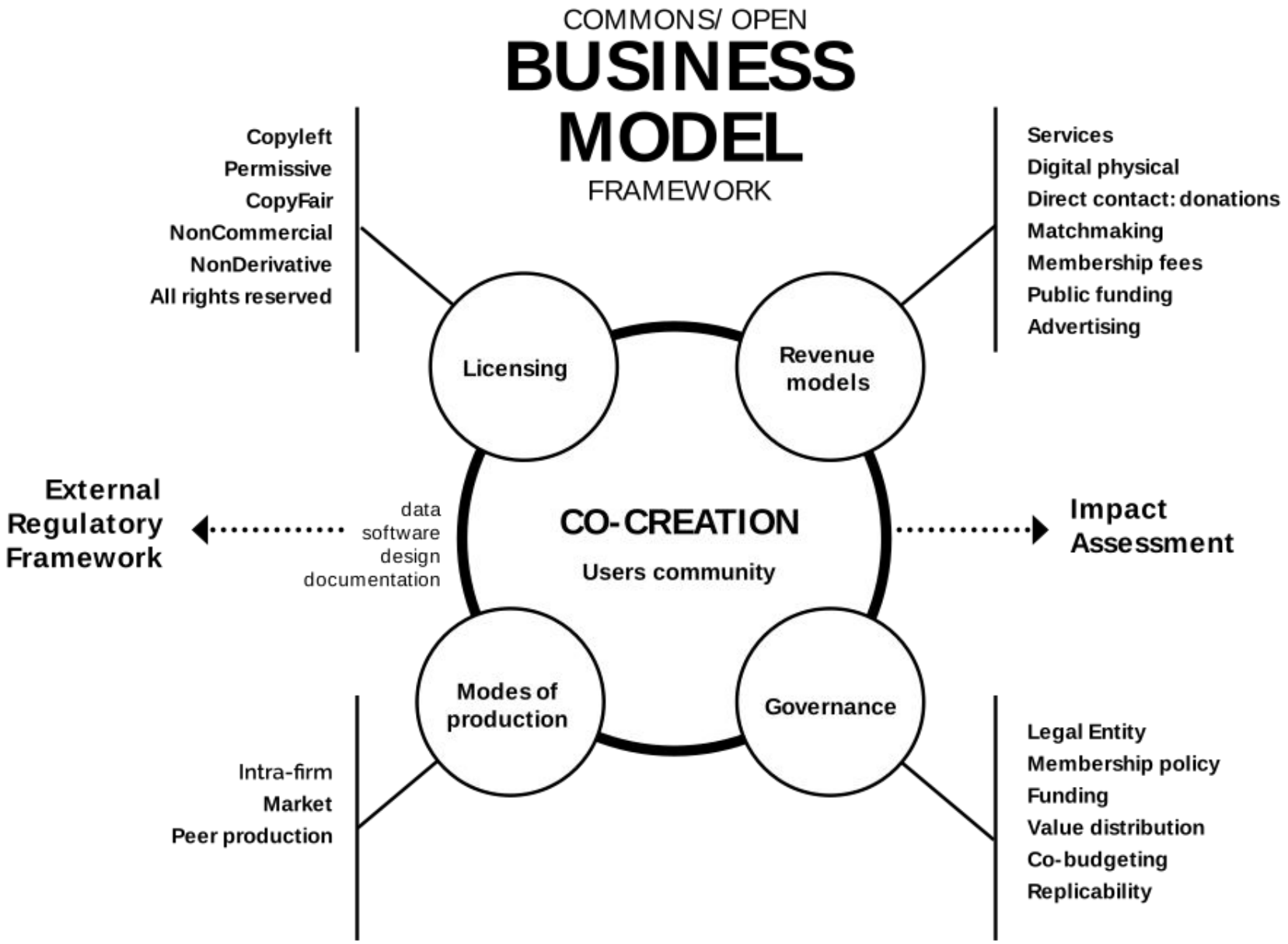
GitLab

Makey Street

instructables

DIY DRONES
The Leading Community for Personal UAVs

hackster.io


COMMONS/ OPEN
BUSINESS MODEL
FRAMEWORK
Copyleft
Permissive
CopyFair
NonCommercial
NonDerivative
All rights reserved
Licensing
Revenue models
Services
Digital physical
Direct contact: donations
Matchmaking
Membership fees
Public funding
Advertising
External Regulatory Framework
data
software
design
documentation
CO-CREATION
Users community
Impact Assessment
Modes of production
Governance
Intra-firm
Market
Peer production
Legal Entity
Membership policy
Funding
Value distribution
Co-budgeting
Replicability

Responsibility
and
duty of care

Privacy and anonymity

Digital DIY and ethics

Alexandre Erler

Risks of DiDIY: weapons

Techniques like 3D printing or CNC milling make it easier for private individuals to build their own untraceable guns. This presents a challenge for gun control.

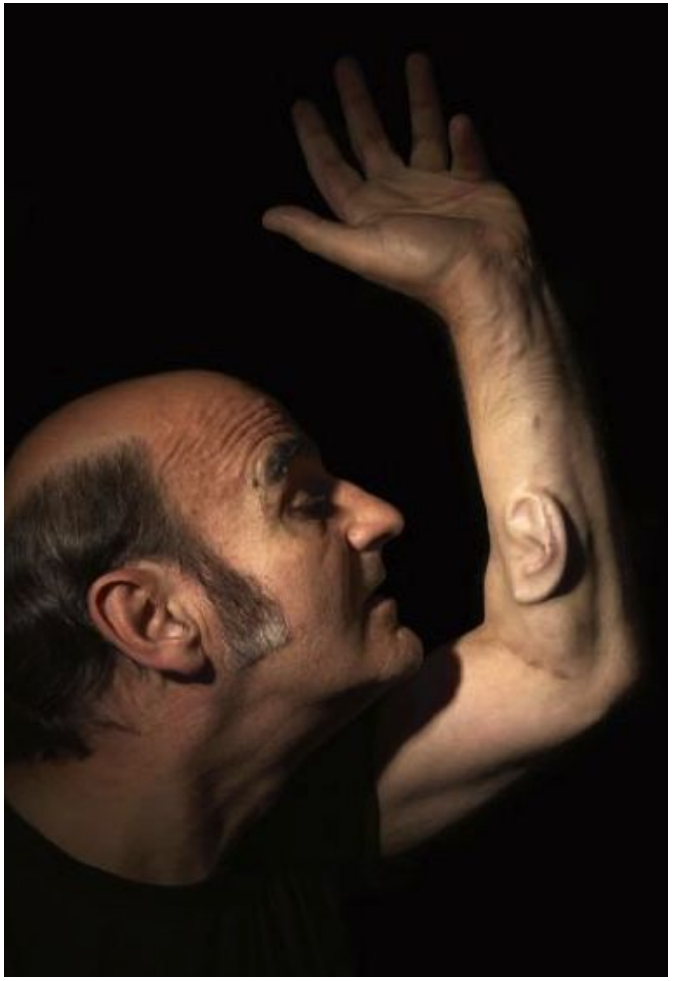
So far, however, there have been no reported killings (let alone mass shootings) featuring such guns.

A sensible preventive approach, besides monitoring future developments, might be to focus on controlling materials like gun powder, rather than digital blueprints or the range of things that DiDIY tools can make.

DiDIY and bio-hacking

“Bio-hackers” like performance artist Stelarc are using new technologies to experiment with &/or augment their own bodies. DiDIY tools might be of interest to them.

This presents a dilemma for medical professionals who might get called on to assist bio-hackers with surgical procedures for non-medical purposes. We suggest that it is permissible, but not obligatory, for them to consent to such requests.

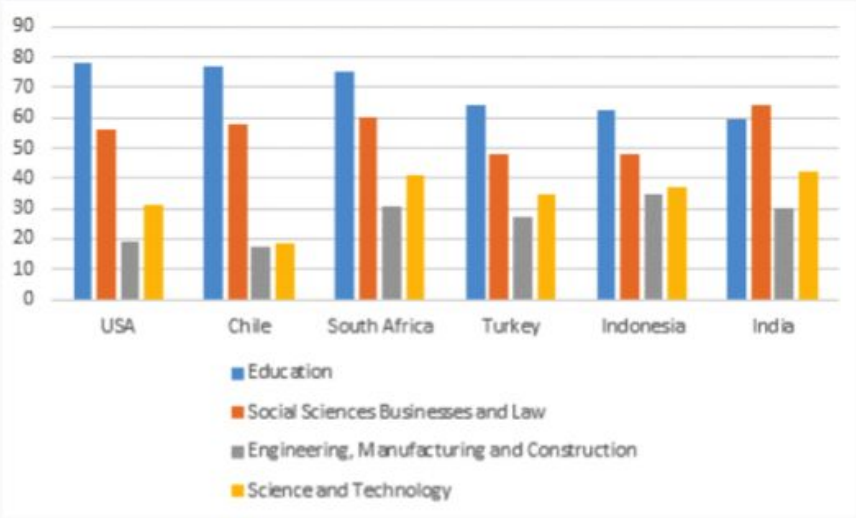


DiDIY as a tool to attract more women to science and technology

Women are currently under-represented in science & technology fields.

Our view is that – whatever the explanations for this may be – there are strong reasons to use DiDIY to promote greater participation of women in science and technology fields (future jobs, facilitate informed preferences...).

Figure 1: Percentage of female graduates from tertiary degrees in selected subjects (2014)



Source: Source: World Bank Education Statistics based on UNESCO Institute for Statistics

Our main message

DiDIY does raise a number of ethical & legal issues.

That said, we have concluded that it is important not to exaggerate the magnitude of its risks, & to avoid regulatory overreach.

We recommend closely monitoring the future development of DiDIY, & only introducing new regulation if it is justified by conclusive evidence.

The Complexity of Digital DIY and our responses

Bruce Edmonds

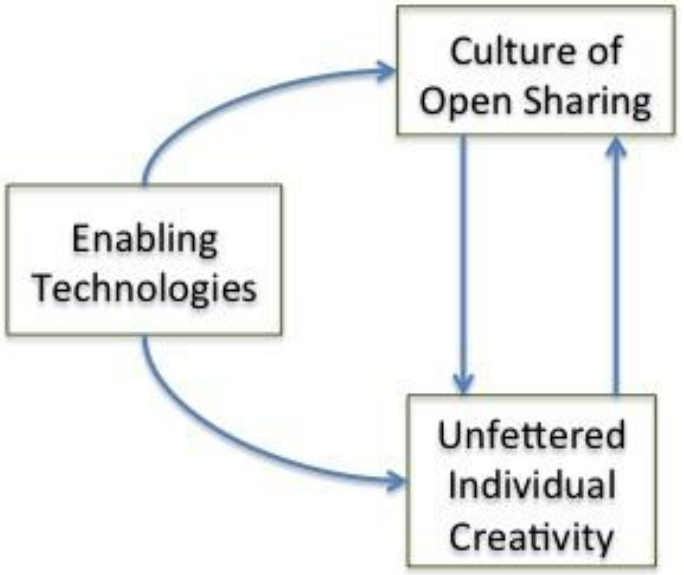
The Complexity of Digital DIY

DiDIY is a self-propelling, complex mix of social, cultural, individual and technological elements.

Technology enables people to design and make things without professionals.

Technology enables people to share ideas and designs in new flexible ways.

A culture of free and open sharing means that expertise is freely shared.



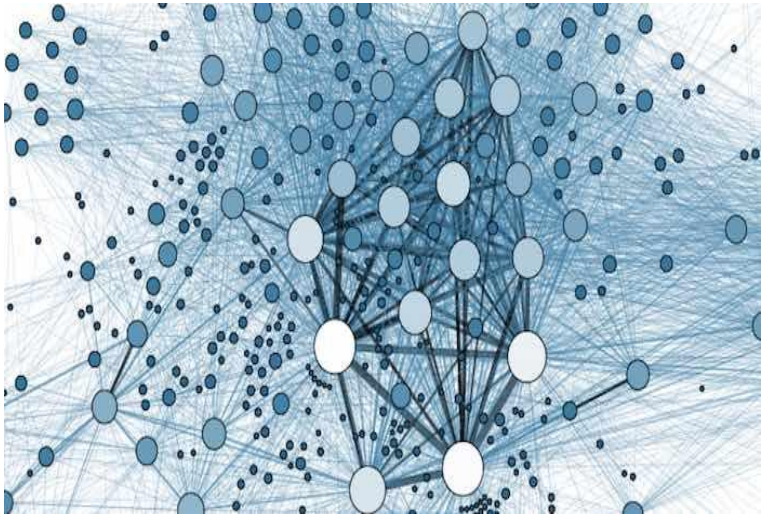
New Patterns of Cooperation

New forms of cooperation are emerging for these kinds of phenomena.

Not centralised hierarchical structures.

Not completely flat distributed systems.

But more of an overlapping ‘fractal’ pattern of ad-hoc dynamic cooperation at a variety of levels.



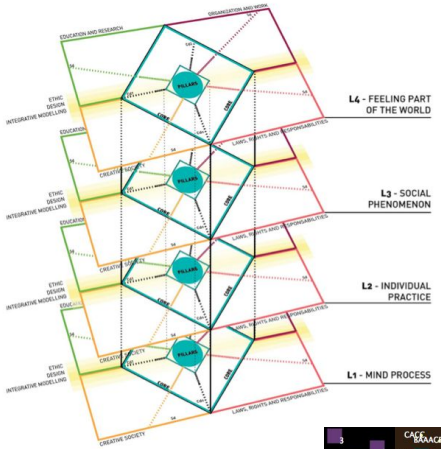
Understanding the DiDIY Complex

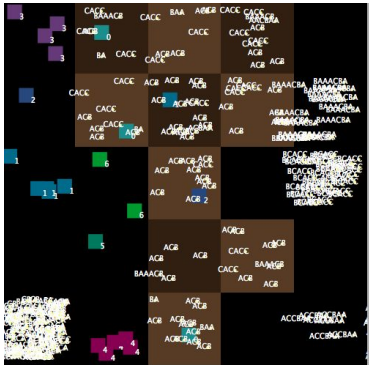
Given the complex and interelated nature of DiDIY just looking at one aspect at a time does not work well

Thus we had two approaches to formally representing this:

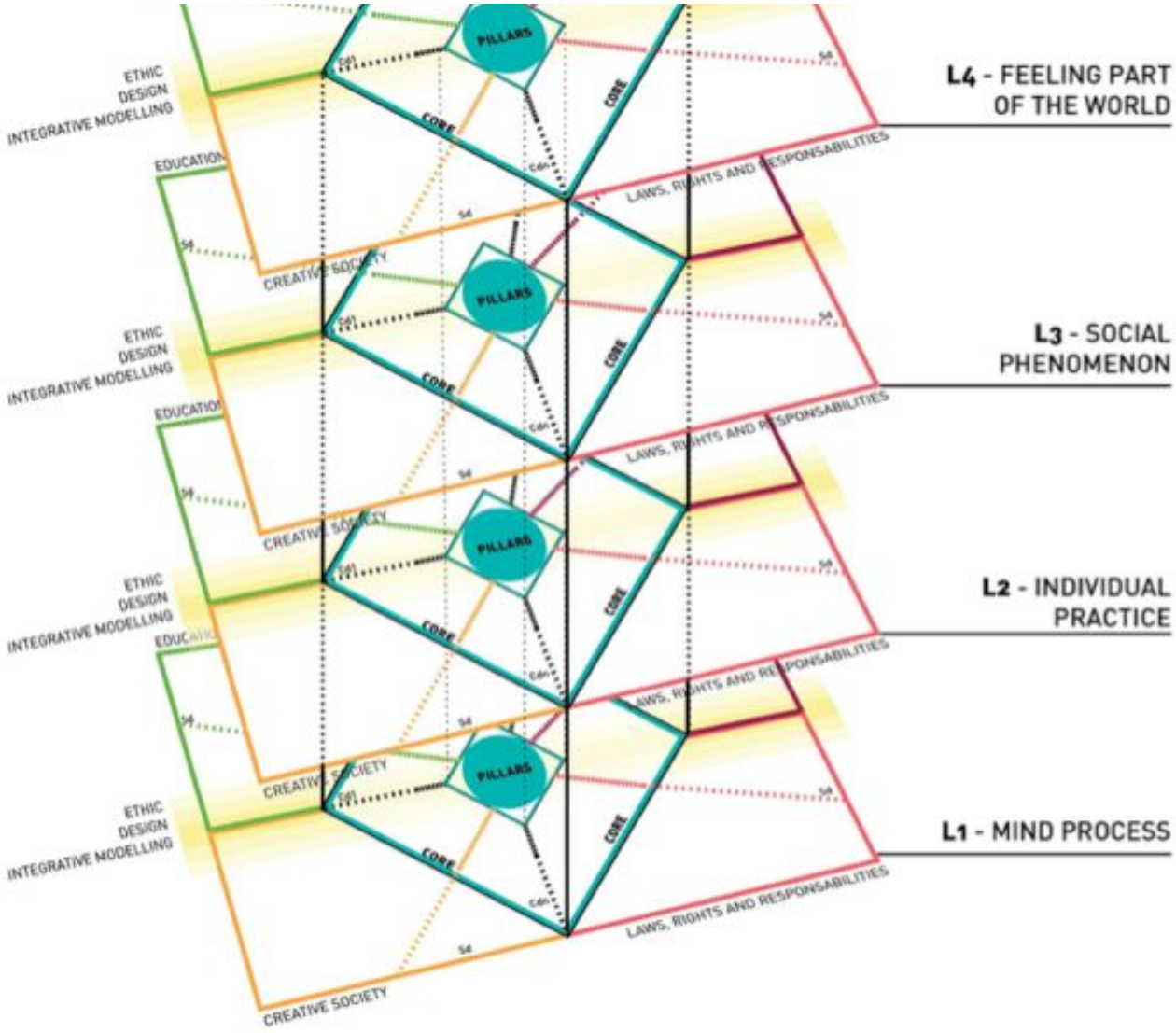
1. ‘From the outside’ – a knowledge framework that outlines the aspects and dimensions of DiDIY

2. ‘From the inside’ – detailed computational simulations o

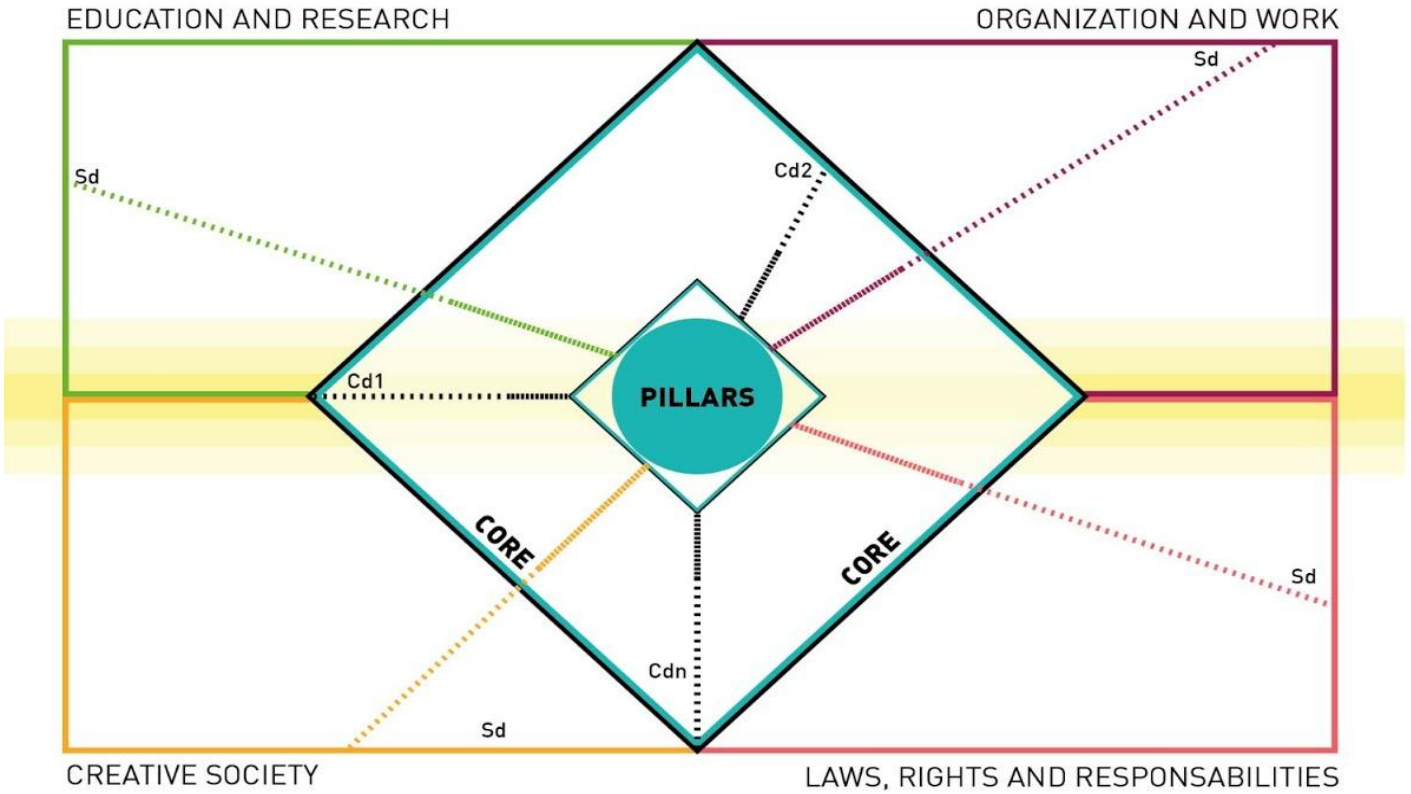




The DiDIY Knowledge Framework – *Levels*



The DiDIY Knowledge Framework – *Application at each level*



The KF is at: http://www.didiy.eu/public/didiy-kf.pdf

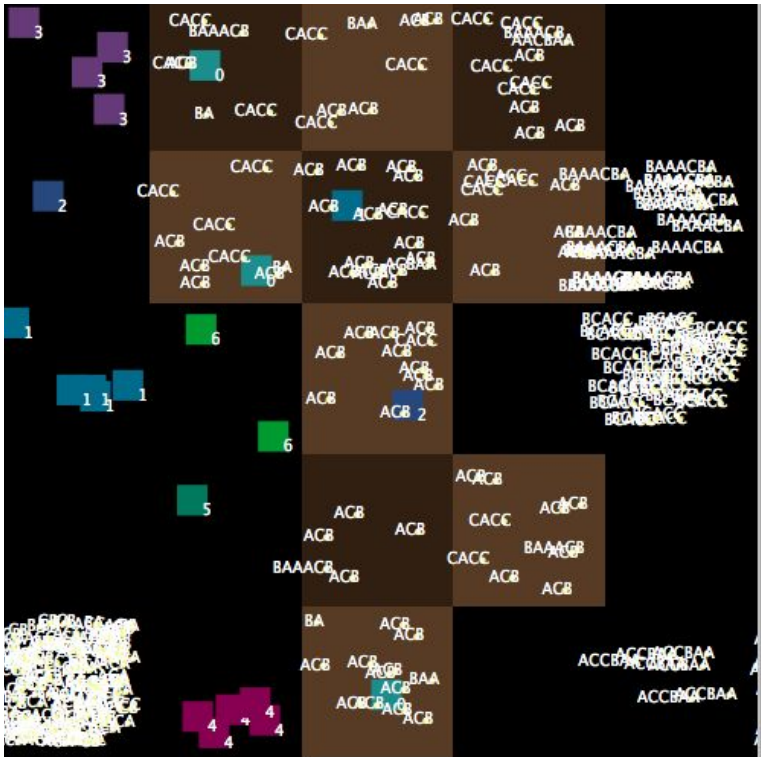
Computer Simulations of DiDIY

In these simulations, individual people and objects are explicitly represented – a bit like a serious “Sims” game

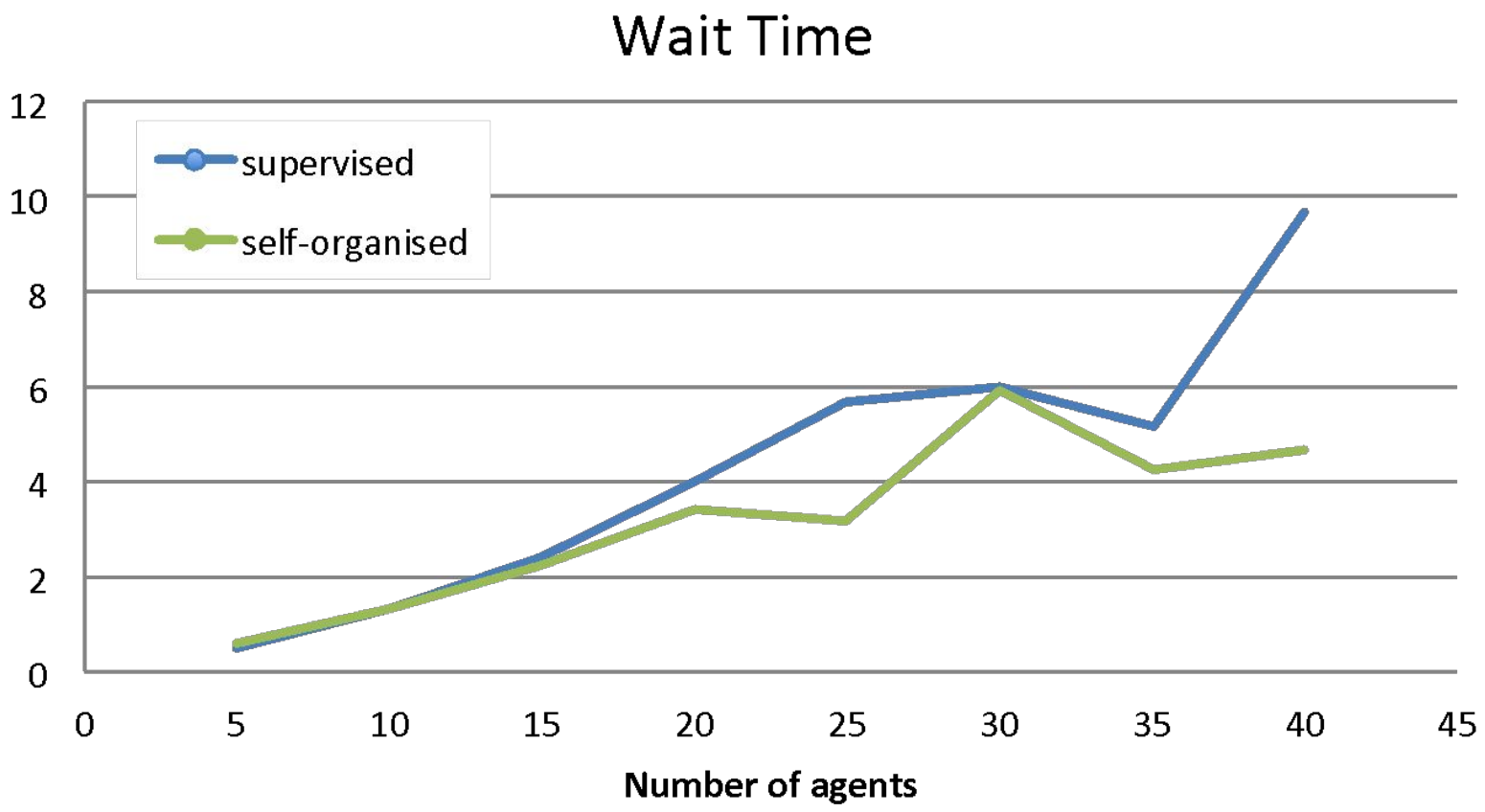
The people are represented using agents which have their own knowledge

The culture and outomes emerge from the complex interaction of the agents in a similar way to that of people

One can then experiment with these trying different structures and abilities



Using Simulations to explore possible outcomes



More about the simulations at: http://cfpm.org/didiy

A context-specific resource of ‘solutions’

Although there are some general recommendations from the project, we did not want to be a body of ‘experts’ declaming generic solutions

Rather we wanted to try and do this the ‘DiDIY way’, in particular:

- To ‘seed’ a community resource that others can add to and refine
- Rather than recommendations to provide a ‘menu’ of possible solutions that users can adapt using their knowledge
- That such solutions should be specific to particular contexts and problems, rather than generic

Our Solution: “Patterns”

The idea of patterns was originally invented to democratize architectural design but applied here

Each pattern is a structured description that gives *one possible solution*

It describes the problem and context the pattern might be applicable to

It should be continually be evolving and splitting into patterns in the light of experience

Title
The problem is…
The proposed solution might apply when…
The solution proposed is…
The expected outcome is…
Additional information
Rationale
Significant influencing factors
Evidence / Example
Related Patterns
Links to further resources

An Extract from a DiDIY Pattern

The problem is…

How to get makerspaces to be economically viable.

The solution proposed is…

Running paid courses using the resources of the makerspace.

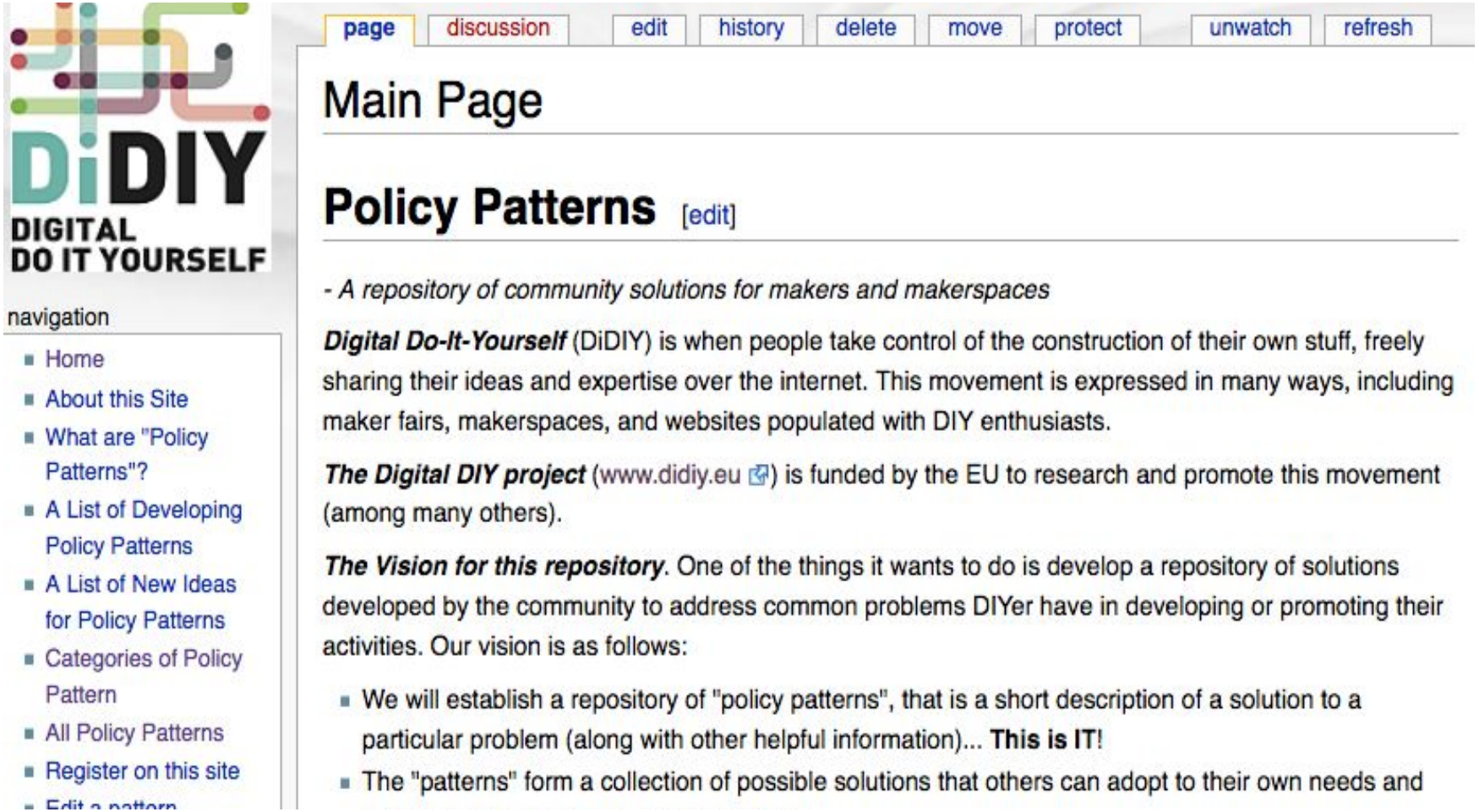
The expected outcome is…

Generated income contributes to make the makerspace economically self-sufficient. Running courses is quite time consuming and can use space and facilities needed by regular members.

Rationale

etc. …

The Patterns are online: http://didiy.eu/patterns




DiDIY
DIGITAL
DO IT YOURSELF

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