D3.4 CREATIVE DESIGN AND WORK

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Executive summary

Deliverable D3.4, “Creative design and work”, presents the results of the co-design workshops organized for the organization and work Project area.

In order to correctly read the document and the results, we do want to point out the twofold objective of the different workshop sessions. The first objective is to emphatically involve people in the DiDIY field in order to obtain the enabled elements of DiDIY which they think are fundamental according with their own experience and knowledge. The second objective is to test and improve a design process and related tools that will end up in a design toolkit.

The deliverable is structured according with the two objectives just mentioned above and that are part of an only path. Some chapters give emphasis to the first and others to the second. In such a way the reader looking for methodological issues will be driven to the most suitable sections while the one interested only in work related outcomes will be able to easily identify the relevant chapters.

Section 2 presents the research model that will lead us to develop guidelines for the European Community intended to provide solutions for stimulating and engaging people in the application of DiDIY in their own professional field, in order to generate innovation and new competences. Due to its complexity, designing requires a structured and systematic approach.

The contents of sections 3 and 4 are fully described in D4.7 so we decided not to repeat here; we strongly invite to read this deliverable in order to deeply understand our ongoing work.

Chapter 5 carefully describes the designed tools and activities implementation based on their testing during workshop sessions. This experimentation allows us to further define a design process, based on digital landscape potentialities, that will help to identify new opportunity in the four Project areas. The testing and implementation will last until the Project deadline and the final results will be reported in deliverables D5.5 and D6.6. In order to fully understand some part of the section 5, “The Workshop Implementation”, please refer to D4.7 in which we report the Workshop Development approach and the previous tool development reflections based on the previous workshop on DiDIY&Education.

Sections 6 and 7 report the aims and obtained results of DiDIY&Work workshops from the point of view of the participants involved. Starting from reflections about people, key components and impacts, people identified the fundamental elements that enable DiDIY and design challenges related to the Work field. In conclusion, section 8 reports some reflections which contribute to the enrichment of the results of the research of the WP3 on Organization&Work.

Revision history			
Version	**Date**	**Created / modified by**	**Comments**
0.1	24/12/2016	POLIMI	First draft.
0.2	24/12/2016	LIUC	First revision.
0.3	28/12/2016	POLIMI	Revised draft.
1.0	30/12/2016	LIUC	Approved version, submitted to the EC Participant Portal.

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1. Introduction

1.1 Action Research Model

The present deliverable reports the main features and outcomes of the four workshops conducted within the Work and Organization Project area. According to the Project Grant Agreement, one explorative workshop and one generative – in two different countries – have been organized. Italy and Spain were chosen as significant countries for the number of FabLab, makerspaces, etc and DiDIY initiative as well as for the development policies adopted at national level.

As a transversal task to the four Project areas, we decided to implement a research model, based on design and creativity, which could be declined in each one of the project areas. The choice of the co-design is dictated by the desire to engage people and draw input from their experience.

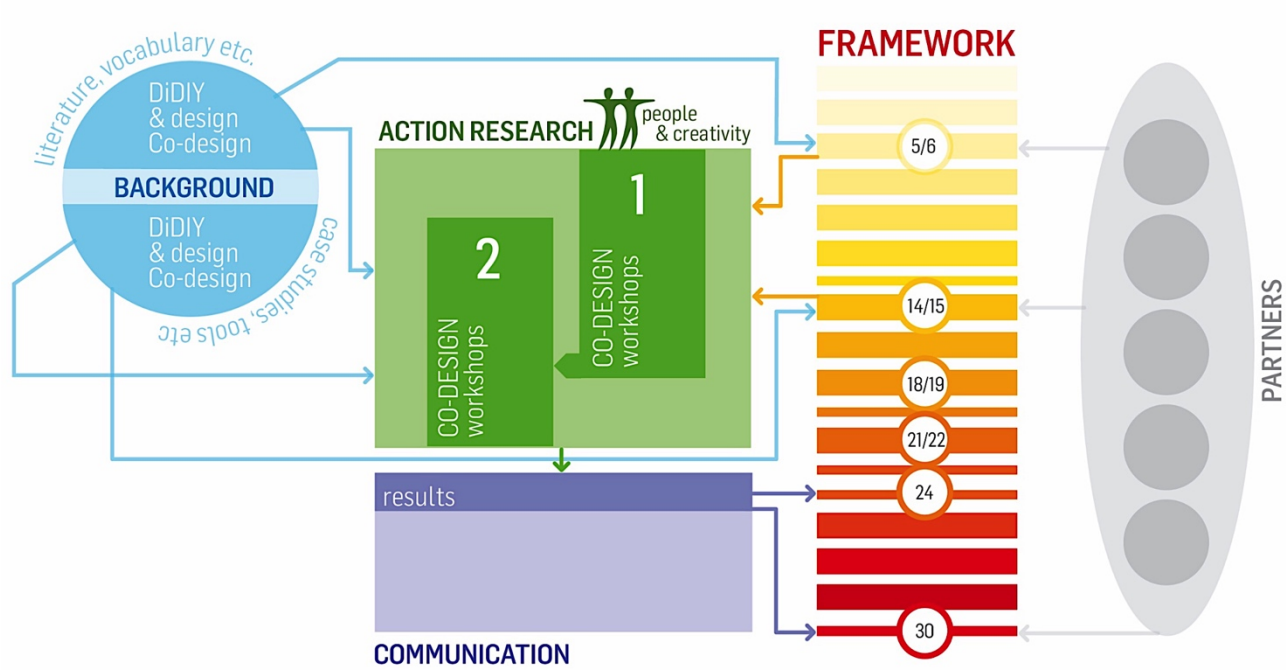

Figure 1 – Schema representing the Action Research Model.

We follow three main areas:

- the first area is the BACKGROUND RESEARCH;
- the second one is the ACTION RESEARCH, in which we will involve people;
- the last one is the communication area.

The main areas interact with the Project framework for the whole Project length.

In particular, through the literature and case studies analysis a research space was identified.

As is shown in the following image, we have collected existing tools and techniques in a Design tool collection (see Annex 1 of D4.7, “Design tool collection”). Another really important step, in order to realize the DiDIY toolkit is the designing of ad hoc tools.

In the background section of the deliverable we have included relevant information to identify our point of view about DiDIY.

The contribution is the identification of a design and creativity based model that is able to generate innovation in the Project areas, through the exploration of DiDIY as a mindset and a social practice. We can consider it as a (production) process, with a strong social connotation, where people's creativity and self-improvement through the development of new skills and knowledge are key-elements.

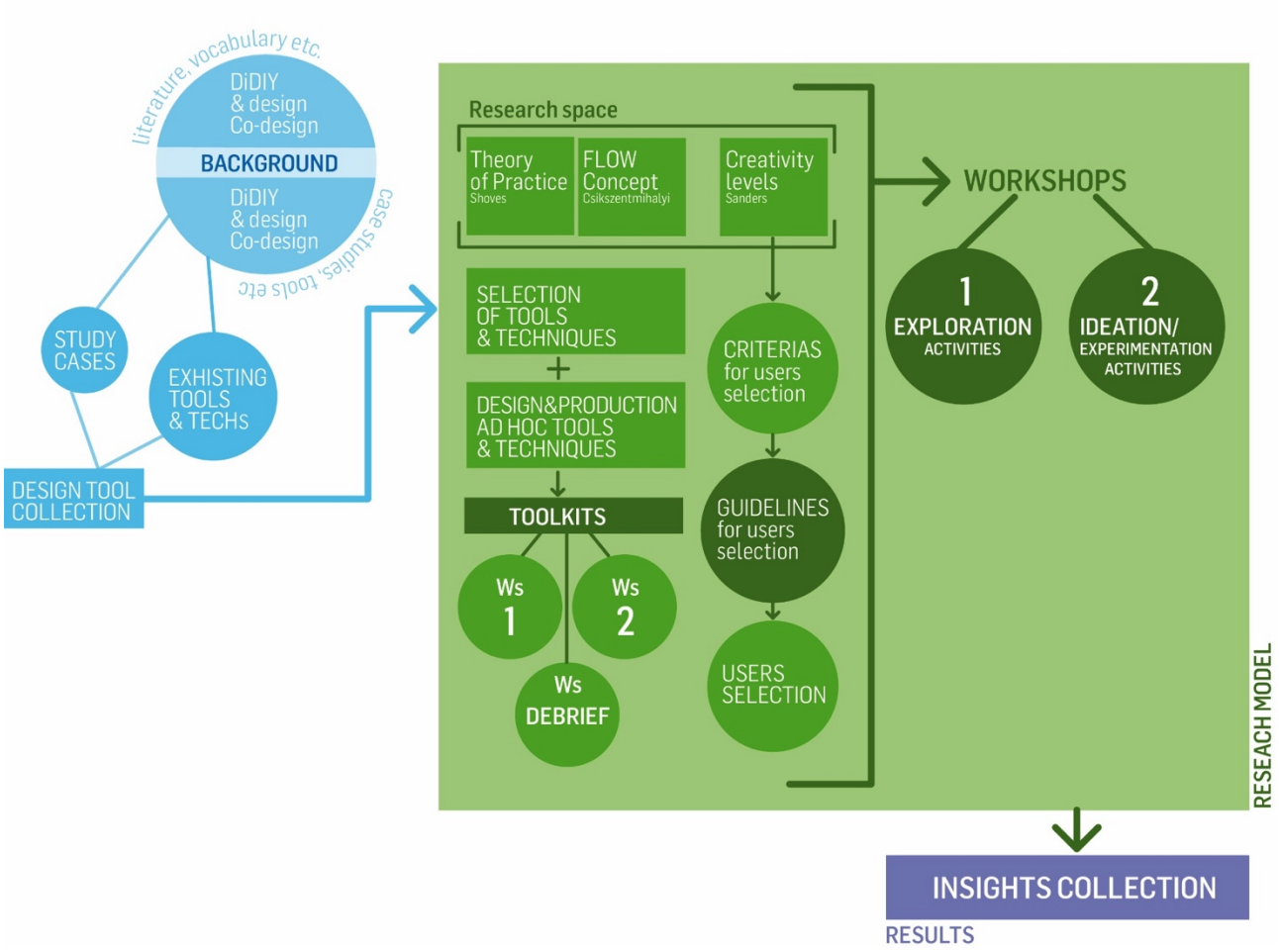

Figure 2 – Representation of research model steps.

1.2 Terms and acronyms

Term	Meaning
ABC	Atoms-Bits Convergence
DIY	Do It Yourself
DIYer	individual or organisation (formal or informal) that engages in DIY
DiDIY	Digital Do It Yourself
DiDIYer	DIYer that engage in DiDIY

fab lab	makerspace structured according to a specific model of DIY, as proposed by the MIT's Center for Bits and Atoms
Makerspace	community-operated physical place that affords sharing of tools, resources and knowledge motivated by maker culture, revealing specific ways of creation, collaboration and learning
DiDIY codesign process	process in which users or other stakeholders are invited to actively contribute with their experience to the design process considering the fundamental elements of DiDIY Note 1 – Co-design builds on a tradition of user-centered design, participatory design, critical design, and ethnography. It is growing and being fertilized by many other disciplines. It is about users, or more generally, people imagining and planning with issues that are not-yet-existing and utilizing the skills that are in the core of professional design competence. Co-design is a method and a mindset characterized by the belief that all people are creative. Note 2 – Co-design sessions are defined as "workshops for sketching and trying out possibilities" (Binder 2010) and "temporary spaces for experimentations and collaborative learning" that are "open-ended, collaborative and creative" (Brandt, Agger Eriksen 2010). During the sessions "a set of creative techniques whose aim is to inspire the design process" (Rizzo 2010) might be used. Note 3 – Co-design toolkit is intended as the way that specific techniques and tools are used to unlock people's creativity helping them to work collaboratively. Each toolkit is designed to serve a specific purpose.
DiDIY design model	design and creativity based model that is able to generate innovation through the use of DiDIY Note – A DiDIY design model will include the development of tools that facilitate the involvement of people in the design process. It has a strong social connotation and people's creativity and self-improvement through the development of new skills and knowledge are key elements.
DiDIY platform	(1) set of hardware and/or software components, designed from scratch or deliberately assembled, to be the basis for design and/or manufacturing of a DiDIY product, or family of products (2) website explicitly designed to enable any combination of (co)development, manufacturing, sale, or distribution of

	DiDIY products or DiDIY designs, as well as mutual support among DiDIYers Note (to def 2) – DiDIY platforms are sometimes intended as including also the DiDIY community that interacts through the website, for example for collaborative writing of documentation. Example (to def 1) – The ArduPilot Mega (APM) at diydrones.com, which is “a DIY software and hardware autopilot platform usable for model planes, multicopters, unmanned ground vehicles and many other devices”. Examples (to def 2) - Thingiverse.com; OpenBuilds.org.
KF	Knowledge Framework
STEM	Science, Technology, Engineering, and Mathematics

2. Background: literature review and vocabulary

This section reports the background literature review that allowed us to acquire the knowledge to design the workshop structure. The contents of this section are more extensively described in D4.7.

Please refer to D4.7 to read it and fully understand the ongoing research work.

2.1 Digital DIY and innovation

Self-production has been acknowledged as an opportunity to generate innovation. In particular, it was estimated that 80% of innovation in scientific tools have been generated by amateurs (Von Hippel 2006). DiDIY could even accelerate this process: “Access to tools capable of turning digital designs into physical objects, coupled with the ease with which digital files can and are being modified and circulated, is bringing a third dimension to the practices of sharing, mashup and remix, and giving everyone the opportunity to not only reinvent and shape the world of bits, but also the world of atoms.” (Mota 2011).

However, little has been done to map trajectories of innovation and possible effects namely on the environment.

2.1.1 Empowering the individuals and the community

DiDIY is seen as an opportunity for practitioners to learn, and thus empowering themselves. Knowing how to make, repair and transform artefacts has been seen also as a way to provide confidence to the DiDIYer about not only how things are made (thus being able to better judge the quality of purchased items) but also about themselves being able to solve everyday problems more easily in the future. In fact, the dominant paradigm of user-as-consumer gives way to alternative framings of the user as creative appropriator, hacker, tinkerer, artist, and even co-designer or co-engineer. There is an obsolescence of the notion of the “consumer” as a passive receptor of “products”. They want to retrieve areas of knowledge and practice that are not universally necessary in the industrial age (personal food production, handcraftsmanship, understanding the inner workings of machines), but that bring people pleasure and purpose to know (Tanenbaum et al 2013).

On a broader scale, DiDIY can empower groups of individuals, i.e., communities. For example, developing countries are typically characterized as being concerned with utility or disaster relief rather than the pleasures of making. Such hackery allows craftspeople to earn a living in a way that lets them control their schedule, express creativity, and maintain a sense of dignity. More deeply than that, it embodies a tradition of work that intrinsically includes elements of fun, sociality, and communal effort (Tanenbaum et al 2013). However, little has been investigated about the process and the effect of self-empowerment. Therefore future research could address the process of learning, acting and extending knowledge to other practice.

DiDIY is not representing a main stream practice yet. However, the spreading of such practice on a wider level might bring additional benefits. To this end, studies on transition management could help to identify levers for scaling up. In particular multiple level transition theories can help as their focus is often on the innovation brought by niches (e.g., Geels 2002, 2004).

Patterns of transition may be guided by specific environmental and social criteria to general sustainable scenarios such as the one modelled by Manzini (2010) and called SLOC (Small, Local, Open, and Connected) to address novel and visionary, yet viable, scenarios for sustainable design.

A first attempt to adapt SLOC model to DiDIY may consider:

- Small: DiDIY as geographically distributed niches;
- Local: engagement of local communities, use of local resources, preservation of situated traditions and skills;
- Open: collaborative nature of contemporary DiDIY, with open source;
- Connected: on-line platforms for designing collaboratively (and producing locally).

DiDIY can be understood as an amalgamation of different elements, politics, culture, arts and technologies enabled by digital means that linked in turn in different ways constituting diverse making practices. In contrast with the conception of consumers or more in general people to be passive receivers DIY has its emphasis on "doing" and the active roles linked to that such as interventionists, makers, hackers, modders and tinkerers.

DiDIY is an environment where real/virtual, direct/mediated experiences are not longer distinguishable; online and offline activities meld and morph within distributed networks afforded by mobile devices, social media and information and communication technologies. This kind of hybridity characterizing our lives and work is enabling new ways of engagement and participation and is contributing in redefining an evolved concept of DIY. DiDIY involves a new concept of participatory DIY democracy.

2.2 Design and Digital Do It Yourself: Explore the role of "design when everybody designs"

The self-design and production of the DiDIY practice reshape the definition of professional design. The Industrial Designer Society of America (IDSA), discussed the implications of DIY for designers at the 2010 conference named "DIY Design: threat or opportunity?". At the conference it was acknowledged that although DIY is not a totally new phenomenon, "The implications of this shift for the design professions are potentially massive. The DIY resurgence is making consumers question the need for mass production, and by extension, the need for designers".

Actually, design theorists have been investigating the potentiality of users' involvement in the creative process for decades, with examples of projects taking place nearly regularly over the XIX century, whenever major political, societal or environmental crises occurred. In those case, such designers as William Morris, Enzo Mari, Gillo Dorfless reflected on the role of design and the possibility of involving final users in the creative process.

Brown (2008) reports that "studies that were pivotal in articulating alternative histories and practices of "users" of the built environment, such as those by Victor Papanek, Amos Rapoport, Turner and Fichter, Colin Ward and Ward and Hardy, emerged from post-Marxian critiques of the distancing of users from the production of design. These studies advocated the need for dilettante practices and user participation in design as strategies for self-representation and self-help. While these studies focused on marginal groups and post-hoc consumer interventions in a world designed by professionals, they argued for a new kind of partnership between professionals and "users" such that designing might be conceived as providing a democratizing influence on housing provision". Brown continues highlighting the polemical discussion by Philip Pacey on the absence of non-professional design in design history, thus advocating a discussion of the relationship between professional and non-professional design on the basis that "it presents a wider social role for design over and above the dubious benefits of designer commodities".

Brown explores DIY in architecture and concludes that "there remains a substantial lacuna in the debate concerning the role of professionals in communities of amateur design practice and how the role of professionals might be reconceived as a co-creative practice, supporting and expanding the horizons of the amateur designer" (Brown 2008).

2.2.1 Contemporary design interest in DiDIY

It has been concluded that "[n]o accounts have really developed the key issue of how DIY acts as the antithesis of the prescribed design of the mass marketplace [considering that] DIY as a design activity has not been the focus of a great deal of attention" (Atkinson 2006).

However, Manzini stresses that "if it is true that we live in a society where 'everybody designs', designers should accept that they can no longer aspire to a monopoly on design and, at the same time, they have to be able to recognise what could be their new, and in my view important, specific role. In this new environment of diffuse creativity, designers have to learn how actively and positively to participate in the social processes where new and, hopefully, promising ideas are emerging" (Manzini 2006).

Therefore design is called to identify a role to play and some designers have been investigating potential areas of intervention in contemporary DIY practice. Notably, in 2010 the designer Yves Béhar curated the exhibition "TechnoCRAFT: Hackers, Modders, Fabbers, Tweakers and Design in the Age of Individuality", exhibited at Yerba Buena Center For the Arts, in San Francisco (USA). Béhar explored ways of interaction between the designer, or in other words "the different ways that consumers are personalizing design in efforts to assert creativity and individuality in an age of mass-production […] TechnoCRAFT explores how an emotional connection to objects has been resurrected in individuals and how the two realms—design and mass production—have combined to once again allow for 'Design in the Age of Individuality'" (TechnoCRAFT press release).

The exhibition showcased "all these new ways in which people are bringing the notion of craft into design, the notion of self-made, self-crafted, self-developed products and software. […] actually there's a new type of craft, a new type of involvement of the human and the hand in the mass-production process" (interview by Furio, for Metropolis magazine, July 2010). These different ways are grouped by the designer into six main categories, i.e.:

1. Crowdsourcing, addressing the collective talent of the community to develop new design solutions (e.g., Threadless);
2. Platforms, consisting of designers creating open, software-based platforms, that provide the tools for individuals to create and/or customize their own unique products (e.g., Nike ID);
3. Blueprints, and in general instructions provided by the designer to let final users to create the project by themselves (e.g., Autoprogettazione by Enzo Mari);
4. Hacks, and in general modification to achieve new functionality;
5. Incompletes, leaving the user to finalise the product according to personal skills and interests (e.g., Marijn van der Poll's Do hit chair by Droog);
6. Modules, intelligently designed components that come together to create customized creations (e.g., Ronan and Erwan Bouroullec's Clouds with Kvadrat).

The six categories above identify possible strategies for design to interact with the DiDIYers in a direct or mediated way. Designers' outcomes are not finished products traditionally intended and

typical of the mass consumption society but solutions that enable the user and allow for adaptation, also called “enabling solution” by Manzini.

It can be inferred that “the dominant paradigm of user-as-consumer gives way to alternative framings of the user as creative appropriator, hacker, tinkerer, artist, and even co-designer or co-engineer” (Tanenbaum et al. 2013).

Future research will explore features that design professional could use to trigger novel collaboration with final users, starting from the ones proposed by Béhar and expanding them considering the different steps of the product life cycle in which the user can be involved, from the idea generation till the extension of the end of life. Notable areas of investigation include processes of learning, acquisition of skills, and improvement of self-confidence.

In D2.2 the interest of contemporary society has been highlighted in self-production activities, enabled by digital means and technologies. This interest implies to re-think and probably re-define the role of professional designers in a society where everyone does design (Manzini 2010). The literature considered in the previous deliverable included showed the twofold argument of DiDIY as a threat or an opportunity for design. It has been concluded that the DiDIY trend could be an opportunity for design likewise. The main questions are:

- What is design? Can everyone actually be a designer?
- Is there room left for professional designers? What could be a role of designers in a DiDIY society?

These two main questions will be addressed below in order to identify trajectories for future research on the role and benefits that designers can bring about in DiDIY practices. Deliverable D2.2 reported an interest of professional designers to DiDIY and highlighted the *blurred boundaries between professional and amateurs designers.*

Therefore, what is design? Elements characterizing the approach of professional designer include:

- the design thinking;
- the abductive reasoning;
- the ability to work on multiple levels at the same time.

These three elements characterise the approach of professional designers, although they may also be adopted by or found in design amateurs. They could represent the added value that professional designer may bring when collaborating or relating with DiDIYers. Designers can contribute to the DiDIY practice mainly bringing the three components identified above. In order to do so, the conditions for collaborations must be generated. In the deliverable D2.2, it has been highlighted that *designers can contribute by designing ‘enabling solutions’*, i.e., “systems of tangible and intangible elements (such as technologies, infrastructures, legal frameworks and modes of governance and policy making) that enable individuals or communities to use their skills and abilities to best advantage and, at the same time, make a proposed solution more effective, more accessible and therefore more likely to spread” (Manzini, in Boeuf et al. 2006, p. 13).These enabling solutions will imply novel forms of collaboration in which the professional designer could lead, guide, provide scaffolds, or offer a clean slate to DiDIY practitioners, according to their interests and creativity level (Sanders, 2006).

3. Design tool collection

The design collection is in Annex I of D4.7, “Design tool collection” and also available on the Project website http://www.didiy.eu.

Please refer to D4.7 to fully understand the ongoing research work.

4. The Workshop Methodology approach

Please refer to D4.7 to fully understand the design of the workshop structure, activity, and tools.

5. The Workshop implementation

This section describes in detail the experiences collected from the exploratory and generative workshops, in Italy and in Spain, carried out in the Organization&Work area. These experiences allowed an experimentation which led to the cumulative acquisition of knowledge.

Carrying out the process and the planned tools allowed us refine and continually improve the flow of activity and of the tools, testing the changes made each time.

The reflections which led to these changes come both from the observation of the research team in the workshop phase and from the debriefs with the participants which allowed collecting their feedback.

The reflections on the evolution of tools are reported on the pilots and the explorative workshop in education field (see the paragraph 5.1, 5.2, and 5.3 of D4.7). This is followed by the descriptions of the exploratory and generative workshops in the two countries.

The different workshops will be related according to the following pattern: a short introduction, the description of the flow of the different activities, the tools used and finally, the conclusive reflections which are the points taken into consideration for the refinement, completion or change of activities.

5.1 Explorative workshop on DiDIY&Work – Milan

See flow description in section 6.

Participants: makers, makers that use digital tech for their work, start upper that create business by using open source method or digital tech, fablab manager, a representative from a company interested in this thematic, expert in digital innovation.

Tools

Gameboard cards

People cards

Figure 3 – People cards_v3. Front and back side.

The questions on 3 different cards were combined on a single one. The total number of aid cards was reduced to 3.

The list of the modified card with name and question is as follows:

ACTORS: Who is involved in the case study? What are the roles of the people involved? What are the motivations that drive the people involved?

Key components card

Figure 4 – Key components cards_v3. Front and back side.

Some less significant cards have been modified and implemented.
The list of cards modified with name and question is as follows:
TOOLS: Which tools, formats and processes are needed to make the case study happen?

Impact cards

Figure 5 – Impact cards_v3. Front side.

Some less significant cards have been modified and implemented.

NEW WAYS OF WORKING: Reflect on which new ways of working are triggered off by the case study, in relationship to the physical and virtual environment where the work takes place (e.g., decentralisation of production sites, promotion of collective work, ...).

NEW VISION: Can this case study be considered innovative? Why? Are the innovative aspects determined by each single key factor or by a combination of them?

NEW WAY OF THINKING: Do you think that this case study could stimulate creativity? How? Why? Individually or collaboratively?

NEW PRODUCTS: Reflect on the new ways of consumption and use of the products (physical or not) made in the case study.

NEW COMPETENCES: Reflect on how the competences implemented in the case study impact on the person.

NEW ENVIRONMENTS: Which impacts does the case study generate in the context and in the environment in which it takes place?

Case studies

Figure 6 – Best practice _v3.0. "Imaginieer" poster, front side. Dimensions: 50x70 cm.

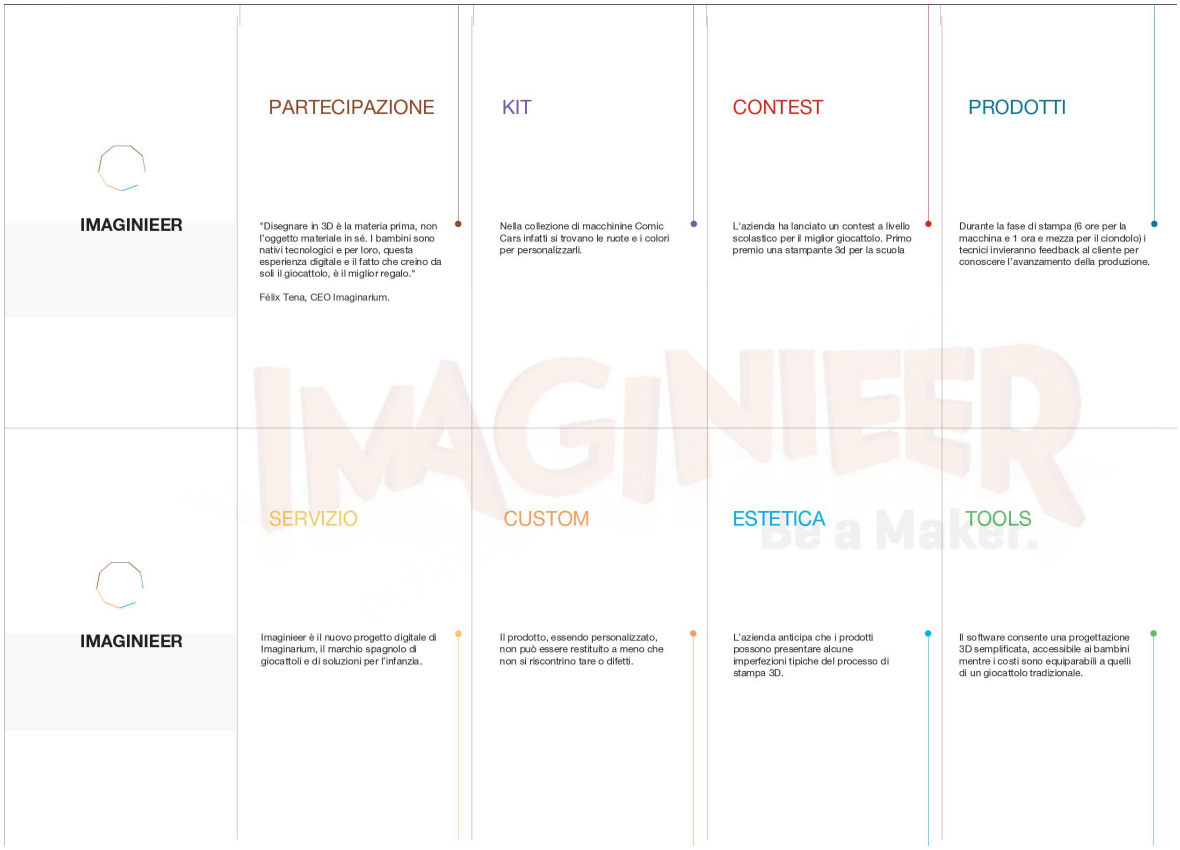

Figure 7 – Best practice _v3.0. "Imaginieer" poster, back side. Dimensions: 50x70 cm.

The decision was taken to return to the poster format but half the size, 50x70 cm folded like a wallet. The return to the poster version in an intermediate size was decided which presents the overall view of the elements of the case, makes consulting it easy and, at the same time, makes it a tool recognized by the participants. The multimedia presentation with Sway was provided in this case as well, consulted through the tablets and computers made available.

The case studies become 5. We chose to add "Imaginieer" because of its relations with the work field.

Imaginieer https://sway.com/leM9Jgb8v3BgmTQh

Input

Optimal configuration for the analysis of the case

Summary Reflections

Please refer to D4.7 to fully understand the ongoing research work.

As for the workshops in educational field, only the indications useful to implement the process and the tools will be described.

This paragraph reports just the last implementation: it will be useful for the reader to take a look of the correspondent section in D4.7.

The configuration reached has been kept and repeated for the other DIY&Creative Society and DiDIY&Legal System workshops.

5.2 Generative workshop on DiDIY&Work – Milan

Participants: makers, makers that use digital tech for their work, start upper that create business by using open source method or digital tech, fablab manager, a representative from a company interested in this thematic, expert in digital innovation, expert in how work will change due to digital technologies (organization or lecturer), people running co-working spaces or start up incubators.

Tools

Challenge – see section 4.5 in D4.7

The template, complete with the challenge phrase, is sent to the participants a few days before the workshop session. They are asked to collect ideas and bring them already filled in on the day of the workshop. Some participants do the task.

Scenario – see section 4.5 in D4.7

The template helps the participants in the workshop phase to collect personal knowledge and experience on the theme of the challenge in order to share the same vision.

Idea Description – see section 4.5 in D4.7

The template helps the participants rewrite and define the idea that emerged during the brainstorming phase.

It turns out to be a critical passage that does not require a template. At the following workshops, the idea is only written down on a blank piece of paper.

Factors star

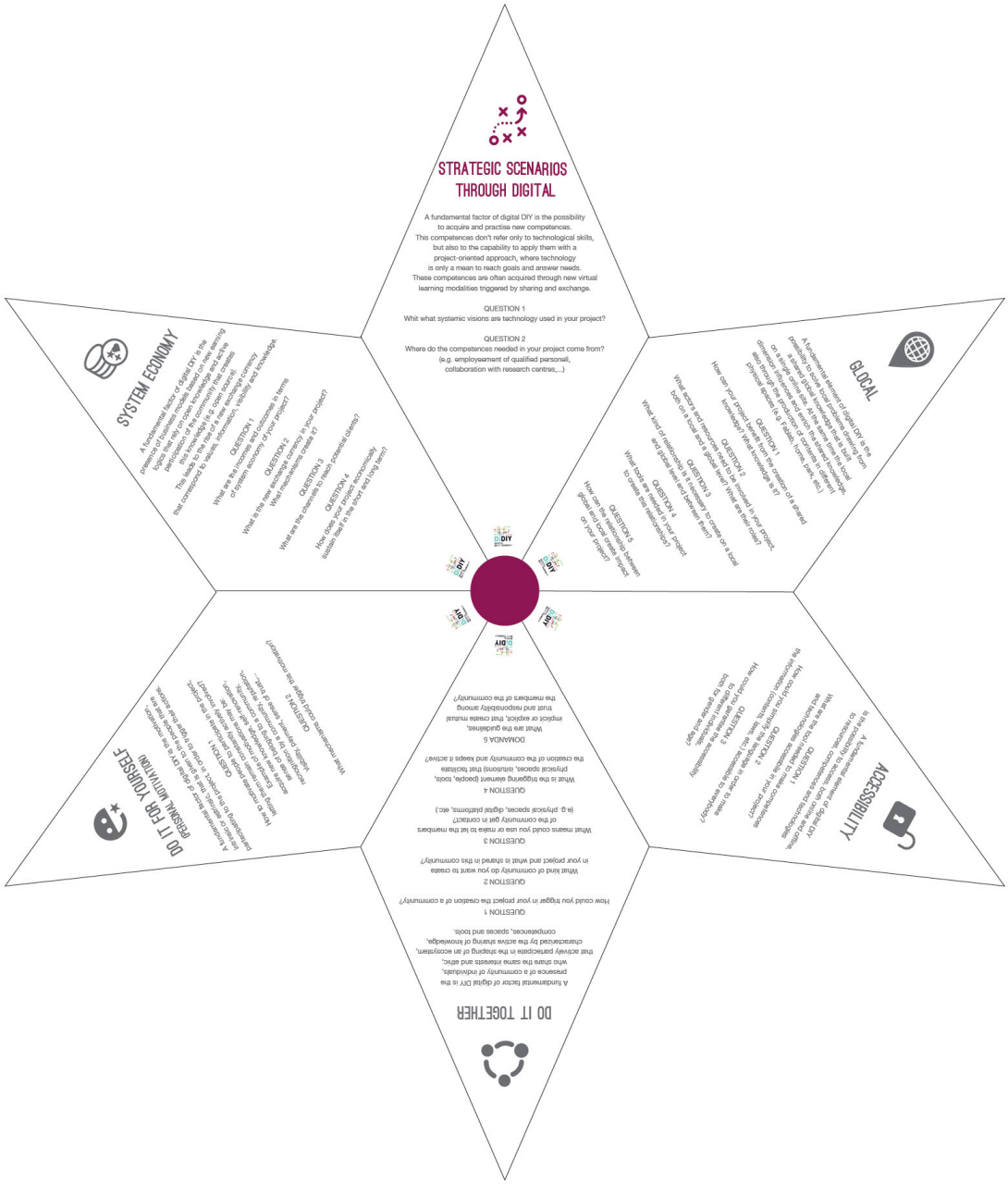

Figure 8 – DiDIY&Work factors star.

Input

The description of some factors was not easily comprehensible, therefore a simplification is necessary.

Project Description – see section 4.5 in D4.7

The template is not used in the DiDIY & Work workshop due to the absence of time, but it was a fundamental passage to clearly define the concept that emerged and how the fundamental factors were integrated.

Summary reflections

As for the explorative workshops, we also want to collect for the generative workshops all the *learning* and the *warnings* that emerged from the integration of the reflections made both on the flow and on the tools. For clarity and coherence with the previous ones, the inputs are listed by points. The reflections that emerged are listed as follows:

I. The video presentation was simple and effective. The participants understood well that they were taking part in the construction and verification of a process of project-building which has as its output the development of a toolkit of project-building that helps launch and design a challenge in the world of DiDIY.

II. The installation of the platform was not presented because in the explorative workshops it did not generate added value for the participants who, already overloaded by a great deal of information, were unable to enter into empathy. The platform is a further container of information useful for our future objective but not necessarily for the purposes of correctly carrying out the activities.

III. One of perhaps the most delicate points that emerged during the session concerns the involvement of participants who did not attend the explorative phase, the reasonings that emerged and the launch of the challenge. It was fairly difficult to make them become immersed in the context above all during the phase of the creation of a scenario. This difficulty leads to two reflections: the need to integrate in the generative workshops videos or images that can provide in a short period of time an overall view of the potential of DiDIY; the possibility of organizing integrated explorative-generative workshops held in one day (see paragraph 5.3).

IV. The brainstorming phase was coordinated internally by the facilitator. It would be interesting, especially from the point of view of the toolkit, to include tools to stimulate the participants, including cards, videos, images, etc.

V. The phase of defining the idea was a confused passage which entailed slowing down the times and therefore a downturn of collaboration and concentration of the participants. In defining the idea, the participants anticipated some aspects of the project-building, also conditioning the subsequent activities of the workshop. There is the hypothesis for the next workshops not to use the worksheet and to write the idea that has just emerged from the brainstorming on a piece of blank paper.

VI. The prototyping phase turned out to be very effective as it allowed visualizing the idea and freezing the concepts which until earlier had been stated orally. The decision is taken to keep this technique in all the workshops, slightly modifying the timetable: 10 minutes of prototyping of the initial idea, followed by 30 minutes of prototyping of the concept inserting the factors.

VII. The project-building with the factors was more a verification of the idea than help in planning the idea. The tool was included too late and many aspects had already been included in the idea as broken down in the attempt at its description. It is therefore necessary

to anticipate the inclusion of the factors and devote more time to project-building. In addition, the description of some factors is not easily comprehensible and simplification is necessary.

VIII. The activities of the generative workshop have to be concluded with a description of the concept that has emerged and how each individual factor has been integrated.

5.3 Integrated explorative + generative workshop on DiDIY&Work – Barcelona

Summary reflections

- The integrated workshop combines the activities of the explorative and generative workshops in a single day. The flow of activities is therefore optimized for 8 hours of work, omitting some passages which are not fundamental for the success of the activities (for example, the energizer "Create your Avatar"). Through these workshops, the new objective of the research group is to verify the project in a condition of use which is closer to the real one in which the same team of people deal with an exploratory phase and a generative one consequentially.
- The participants showed great enthusiasm and collaboration in dealing with the activities of the workshop and as they were very competent and motivated, they kept the flow of reflections high and active throughout its duration. This reflection is to be considered during the definition of the conditions of use of the toolkit.
- The clustering phase proved to be more critical with respect to the previous explorative workshops therefore there was not the possibility for the facilitator to intercept and collect potential subjects to propose as challenges. The episode leads us to reflect on the possibility of inserting a tool that helps the participants suggest challenges based on their personal interests. The tool will be used by those who want to design, but do not yet have a clear challenge to solve.
- The concept designed meets the challenge launched more coherently and also for the participants it was simpler and more linear as they were already immersed in the context. In addition to the simplicity, the satisfaction of having started a path and then completed it concretely also emerged.

5.4 Final conclusions

The experiences of the workshop have contributed to continuous experimentation, verification and implementation of a project-building process, of specific activities and relative tools in order to produce a *toolkit* and *guidelines* which also help non-designers to formulate a challenge and design a concept to apply the potential of DiDIY in their professional area.

The *toolkit* represents all the techniques and tools designed and collected whilst the *guidelines* include the conditions necessary to start and set up a session of co-design and the flow of activities to be performed during the session, referring to the specific tools.

The list of *learning* and *warnings* that emerged from the various workshops which will contribute to drawing up the guidelines is as follows:

I. With the sequence of workshops, various configurations of groups were experimented, in terms of number of participants and it emerged that the optimal number for the complete session of co-design (exploratory and generative) is 5-6 people.

II. If the group is made up of profiles with multidisciplinary profiles, complete results with many nuances are obtained. One of the highly-recommended conditions for the success of the co-design session will be to involve different profiles, including at least one expert of digital making, one expert of digital innovation or start up that is using open source method or digital tech, or a representative from a company and possibly a designer.

III. One of the highly-recommended conditions for the success of the co-design session is the involvement of competent and highly motivated people. This condition proved to be fundamental to keep the flow of reflections during the session high and continuous.

IV. It is fundamental that the contribution is collective for the wealth of details and for the different facets to emerge, therefore the management of the group dynamics which will become one of the Tips in the guidelines must be taken carefully into consideration.

V. One of the fundamental conditions for the success of the co-design session is assigning roles in the group. A facilitator has to be appointed, who moderates the reflections and leads the group in the various steps of the project-building path, and a time-keeper, who monitors the times established for each activity. It is certainly useful to involve a someone to document from outside the group who takes note of the intermediate results that have emerged from the various activities;

VI. One of the suggested and highly recommended conditions is the preparation of the working environment. The guidelines will include suggestions on how to recreate a creative environment which stimulates sharing and collaboration.

VII. We think that a web channel of sharing in which participants can consult, upload and insert useful information, case studies, interesting websites and presentations is fundamental. It should become the point of reference for those who want to develop a project with a strong social impact with DiDIY.

VIII. The combination of paper and digital material for the case study creates methods of consultation which satisfy various needs, those who prefer collaborate learning helped by the poster and those who prefer individual learning helped by the digital presentation. For the design toolkit it is necessary to reflect on the ways with which to create the archive of case studies and how to manage them, allowing people to add new ones following a specific format.

IX. The toolkit and the guidelines can be used both by those who already know the phenomenon of DiDIY and has in mind a challenge idea to design, and for those who do not know the phenomenon and therefore first have to explore it and identify a project-building challenge.

X. In the brainstorming phase, it would be interesting, especially with regard to the toolkit, to insert tools to stimulate the participants, including cards, videos, images, etc.

XI. An important reflection that is still open which emerged during the workshops concerns the decision to transform the fundamental factors into a tool. The phenomenon is so vast that it could be necessary in time to increase the number and type of factors both to adapt to the needs of the group of users who use the instrument and to keep continually updated with the passing of time. With this reflection in mind, it is important to continue the experimentation through the workshops.

The reflections that emerged derive from the workshops held to date in the area of Education, Work, Creative Society and Legal System. Further workshops are already scheduled in January and

February which will support the research group in the completion of planning the toolkit and the guidelines.

6. Workshop in DiDIY and Work Experience

This section describes in detail the experiences collected from the explorative and generative workshops, in Italy and in Spain, carried out in the Work&Organization area.

6.1 Workshop general aims

The co-design workshops on DiDIY&Work intend to explore how digital production technologies (e.g., additive manufacturing and coding) and sharing, e.g., open source) may influence and modify individual, organizational and inter-organizational levels.

To this purpose, we will deliver a process for ideas development and management. Drawing from design theories, we will generate a streamlined version of design thinking processes that can be equally applied to the four project areas. In particular, the workshop on work and organization for the DiDIY phenomenon will address the implications of open, collaborative environments and relationships towards the increasing of such skills as creativity, critical thinking, collaboration and communication. Participants engaged in this streamlined processes will be able to identify key factors for the success of best practices in DiDIY field.

The '*Digital DIY inspiring future*' two full-day workshop series are for ideas exploration and generation respectively.

Following a structured path, in the first workshop participants have the opportunity to *know and apply the innovative aspects of digital technologies of production and sharing* (e.g., additive manufacturing and open platforms), in order to develop innovative ideas and projects in a collaborative way.

During the explorative workshop participants have the chance to collaborate with other experts in their field and propose a topic for the generation of a design challenge shared with the other participants, to be addressed and solves at the subsequent generative workshop.

Participants share experiences and information, build knowledge, use a co-design process for idea generation together with your team.

Specific topics to be addressed:

Job attitude

Workers cannot do or focus on the job they want. They usually have a production plan to follow. On the other hand, Makers are free to focus on the task or job they want. This advocates a growth mindset, where, given effort and resources, anyone can learn the skills needed to complete any project they can imagine.

Digital technologies may impact on the job allocation by granting a certain degree of flexibility (i.e. anticipation or delay of specific tasks) that can empower workers in prioritizing jobs according to their job saturation.

The question addressed in the workshop is how personal attitudes and motivations can be fostered in the working environment building on the case/experience of the makers generating innovation?

Openness

Closeness represents a typical trait of workers' behaviour. Vice versa, sharing ideas, project, helping others, making and connecting characterize Makers under the collaboration perspective. The presence of digital technologies enabling information sharing may generate a higher degree of openness.

The question addressed in the workshop is when is it possible to introduce higher levels of openness and collaboration in the working environment to foster team building and innovation.

6.2 Workshop description

The different workshops will be related according to the following pattern: a short introduction, the description of the flow of the different activities, the conclusive reflections which are the points taken into consideration for the refinement of activities.

6.2.1 Explorative workshop on DiDIY&Work – Milan

The explorative workshop on DiDIY&Work was held in Milan on 16th September 2016.

Location: Polifactory – Campus Bovisa - Politecnico di Milano. Via Privata Schiaffino 22-30 Edificio B3

Length of the workshop: 10.00 a.m. - 5.00 p.m. (5 hours of activity + 1 h break)

Participants: the participants have been identified and selected on the basis of well-defined profiles and they were then sent a personal invitation. FabLab managers, makers, designers who work in FabLabs, company technicians who are experts in digital technologies, scientific directors of foundations that fund innovation took part in the workshop.

Environment: As anticipated, it is the same one that was used in the pilot workshop in Milan.

Description of the flow of the different activities

To start to create a convivial and relaxed atmosphere in which to express their creativity, the participants were welcomed immediately with breakfast. They were then guided shortly afterwards on a 10-minute visit of the Polifactory space to get to know the activity and see the machines at their disposal.

The workshop starts with a screened presentation about the DiDIY Project, the role of the POLIMI research team with the relative objectives to be reached, the objectives of the workshop, the project-building path, the platform and the activities of the day. This presentation is followed by sharing the rules of the day to be respected in order to keep a creative and collaborative atmosphere (see Annex II of D4.7, "Creative rules").

At the start of "Create your Avatar" the participants choose 7 images, from those put at their disposal, which most represent them and they go to the Log In centre alongside the platform. Here they are given a profile depending on the images chosen, through a label on which they write the user name that identifies them as avatar. Each of them is given the explanation which figure corresponds to their profile with respect to Foursight.

This is followed by individual presentations to foster the generation of collaborative dynamics and the formation of the work groups. A total of 3 work groups are formed, each one made up of 4 participants. The groups have been made up trying to create multidisciplinary teams with different

profiles and mixed skills linked both to digital making and to education. Each table is facilitated by an expert of the research group.

The analysis activity begins with the choice of the case study. 5 are made available, laid out on a table (see tools – case studies). Each group, after consulting with one another, selects the favourite one.

The pilot workshops allowed finding an ideal configuration for the work table. The tools that the participants find for the analysis activity are: Gameboard, Box with the Gameboard cards, the Instructions, the sheet with the QR code and a tablet to access the digital presentation of the case study and to access Internet information, coloured felt tip pens, Post-Its in different colours, and small games that help keep a creative atmosphere during the activity (tops, bells, etc).

The facilitator explains the analysis activity making use of the activity Cards and also highlighting he rules of the game which are also present near the gameboard.

After the group has analysed the case autonomously, each facilitator intervenes working together with their group. The activity as planned lasts one hour and the discussions stimulated by the tools should take shape on the Post-its.

The first phase of Discovery ends with a break and re-opens with the individual group clustering in order to identify the fundamental elements of DiDIY which have emerged from the analysis.

The group activities end and the participants come together to work collaboratively. A representative of each group relates the case analysed and shares the reflections and the fundamental elements identified. In the next phase the participants negotiate and identify the fundamental clusters shared deriving from the union of the three work tables (see section 7).

During the negotiation, there is heated discussion which allows the facilitators to identify potential challenge phrases to propose to the participants.

The challenge phrases are collected on a poster and in the end voted for by the participants (see section 7).

The workshop ends with a debrief in plenary session to collect feedback and ideas for project-building with respect to installation, flow and tools.

Figure 9 – Scenes from the workshop.

Figure 10 – Scenes from the workshop.

6.2.2 Generative workshop on DiDIY&Work – Milan

The generative workshop on DiDIY&Work was held in Milan on 11th November 2016.

Location: Polifactory – Campus Bovisa – Politecnico di Milano. Via Privata Schiaffino 22-30 Edificio B3

Length of the workshop: 10.00 a.m. – 5.00 p.m. (5 hours of activity + 1 h break)

Participants: none of the participants involved in the exploratory workshop was able to take part in the generative workshop. New participants on the basis of well-defined profiles were then identified and selected and they were sent a personal invitation. FabLab managers, makers, designers who work in research projects with companies, small businessmen took part in the workshop.

Environment: The workshops were held in the same area of the open space of Polifactory, the makerspace – fab lab of the Politecnico di Milano. Given the difficulties in the exploratory workshops, there was no longer the physical creation of the platform and it becomes a free use that can be exploited for the material dedicated to prototyping.

Description of the flow of the different activities

The workshop starts with a screened presentation of the European DiDIY project once again, the role of the Polimi research team with the relative objectives, the explorative experience already made with the results obtained and the activities of the day with the objectives to reach. This presentation is followed by sharing the rules of the day to be respected in order to keep a creative and collaborative atmosphere (see Annex II of D4.7, “Creative rules”).

The participants form a single work group to be able to sustain a more stimulating discussion. As planned in the planning phase. The generative workshop will start from the sharing of personal knowledge and experience on the theme of the challenge selected at the explorative workshop. The idea is refined and through a creative phase of brainstorming and project-building, the creation and construction of a well-defined project will be reached, which includes the fundamental factors (see section 7.3) and which meets the challenge launched.

In the generative workshop, the different activities are not accompanied by a relative card but are explained orally by the facilitator. They will however be structured for the toolkit to be issued.

The workshop session begins with the creation of the scenario using the Scenario worksheet (see section 4 of D4.7*)* already sent by email to the participants before the start of the workshop together with the challenge that they were to work on at the workshop.

In this first activity, the participants share their personal knowledge and experience on the theme of the challenge, bring able to design a scenario shared by all the members of the group. After this, through brainstorming they reach the formulation of many ideas, the one receiving the most votes will be selected to be designed with the factors in the subsequent phase (see *vote criteria* in section 4 of D4.7). After a break, the idea is talked about, the participants have to try and summarize in one sentence the idea that has just emerged using the Idea canvas (see Planning section). This passage is difficult for the participants who in the attempt to define precisely the idea begin to design it.

They then go on to the prototyping phase (see section 4 of D4.7) through which the participants visualize the first draft of their idea. This idea is implemented both conceptually and visually through the use of the *fundamental factors* of the “Factors star” tool for project building. Each point

of the star that corresponds to a fundamental factor of DiDIY and presents indications that lead to reflect on the meaning of the factor. In turn, each participant takes a point, reads the content and together with the group implements the idea. At the end of the project-building, the group makes a short presentation of the idea that has emerged.

The workshop ends with a debrief in a plenary session to collect feedback and ideas on project-building with respect to the flow and tools.

Figure 11 – Scenes from the workshop.

Figure 12 – Scenes from the workshop.

6.2.3 Integrated explorative + generative workshop on DiDIY&Work – Barcelona

The integrated workshop on DiDIY&Work was held in Barcelona on 2nd December 2016.

Location: Meeting Room in Ateneu de Fabricaciò La Fabriqa del Sol - Passeig de Salvat Papasseit, 1 – 08003 Barcelona

Length of the workshop: 10.00 a.m. – 5.00 p.m. (5 hours of activity + 1 hour break)

Participants: The participants were identified and selected on the basis of well-defined profiles and they were then sent a personal invitation. Makers, manufacturers of 3D printers, managers of co-working spaces, architects and experts in design thinking took part in the workshop.

Environment: The workshops were held in the meeting room of the Ateneu. The room was simply equipped with tables and chairs and was prepared ad hoc by the research group. An area of relaxation for the coffee break, an area for the work of analysis and clustering and an area for prototyping and design-building were created.

Description of the flow of the different activities

The workshop starts with a presentation on the DiDIY Project, the role of the POLIMI research team, the activities of the day, the relative objectives to be reached. This presentation is followed by the rules of the day to be respected in order to keep a creative and collaborative atmosphere (see Annex II of D4.7, “Creative rules”).

The participants introduce themselves and then they form two work groups, each facilitated by an expert from the research group. The groups start the first activity of analysis of the workshop.

In this session, the tools for the analysis activity are already present on the table: gameboard, gameboard cards, tablets, Post-Its, felt tip pens and small games which help keep a creative atmosphere during the activity (tops, bells etc.). The case study is chosen from the three available.

The participants proved to be very competent on the topic and the analysis was full of contents.

The analysis phase concludes with the individual group clustering activity which identified the fundamental elements of DiDIY which emerged from the previous reflections.

The workshop continued in the afternoon with the shared clustering activity, which was very complex due to the difficulty of identifying a shared vision of the various clusters that emerged and their definitions. This complexity also had repercussions on the collection of the challenge phrases.

The generative session starts directly with the brainstorming in which multiple ideas are generated, with the one receiving most votes being selected to be designed with the factors in the next phase (see section 7).

The next phase is that of prototyping and project-building with the fundamental factors of DiDIY. The activities end with the presentation of the concept designed.

The workshop ends with a debrief in a plenary session to collect feedback and project-building ideas with respect to the installation, flow and tools.

Figure 13 – Scenes from the workshop.

Figure 14 – Scenes from the workshop.

6.3 Final conclusions

The experiences of the workshops described so far have contributed to spreading knowledge of the project both in Italy and in Spain.

Overall, about 350 contacts, of educators, teachers, schools, researchers, FabLabs, museums, SMEs, artisans, lawyers, policymakers, … have received an explanation of the European DiDIY project and an invitation to take part in a workshop. All were directed to visit the website of the project and to consult the results produced by the different partners in the four specific areas. Many asked to be kept updated on the activities of the DiDIY Project.

The workshop was also spread through a visit to many FabLabs in Milan and through participation in events and conferences with topics related to the projects, held both in the Milan area and outside it, including the Maker Faire.

Overall about 30 people took part in the workshops in the sphere of DiDIY&Work, personally experiencing a specific project-building process for DiDIY, thus becoming ambassadors of the method to be reproduced in their working environment.

The experiences of the workshop have contributed to continuous experimentation, verification and implementation of a project-building process, of specific activities and relative tools in order to produce a toolkit and guidelines which also help non-designers to formulate a challenge and design a concept to apply the potential of DiDIY in their professional area.

The toolkit represents all the techniques and tools designed and collected whilst the guidelines include the conditions necessary to start and set up a session of co-design and the flow of activities to be performed during the session, referring to the specific tools.

7. Workshop results

The explorative and generative workshops based on the method of co-design allowed the research team to actively involve people in research activities and knowledge creation highlighting their desires and aspirations for the construction of new possible futures.

Involving people using a co-design approach allowed the research team to be in empathy with people, to have meaningful conversations with them and to collect their ideas regarding the impact of DiDIY on the Work field.

The importance of involving competent profiles active on the topics treated emerges from this, in order to collect significant data that can contribute to the specific research carried out by the leader partner of the WP3 on Organization and Work.

The section presents the data collected at the explorative and generative workshops on DiDIY&Work held in Milan and Barcelona.

In particular, the explorative workshops allowed collecting the fundamental elements that the people involved deemed were qualifying for DiDIY, together with a series of challenges that tackle real needs in the area of education.

The generative workshops, on the other hand, provided answers in terms of possible scenarios and benefits generated, to some of the challenges selected.

Paragraph 6.3 relates the process of processing the data which emerged from the explorative workshops held in Italy in the four areas investigated by the project, made by the research team in order to identify the fundamental factors of DiDIY common to the 4 areas and the fundamental factors of DiDIY specific for each area.

The section ends highlighting the contribution made by the co-design workshops to the research of the WP3 on Work and Organization.

7.1 Results of the explorative workshop on DiDIY&Work – Milan

During the explorative workshop, the participants, divided into groups, started from the analysis of a case study for each group. This analysis allowed them to break down the case study, taking into consideration people, fundamental elements and impacts. At the end of each analysis, the participants clustered the results, extrapolating the fundamental elements of the DiDIY. Subsequently, each group shared their clustering with the others, in order to reach a common clustering. During this process, the participants obtained challenges in the area of reference.

7.1.1 DiDIY fundamental element

Fundamental element from “Fab Academy”
(Cluster linked to the specific case study)

Participants

Makers who work in the FabLabs, managers of interactive areas in museums, students who work with new technologies.

Elements that emerged

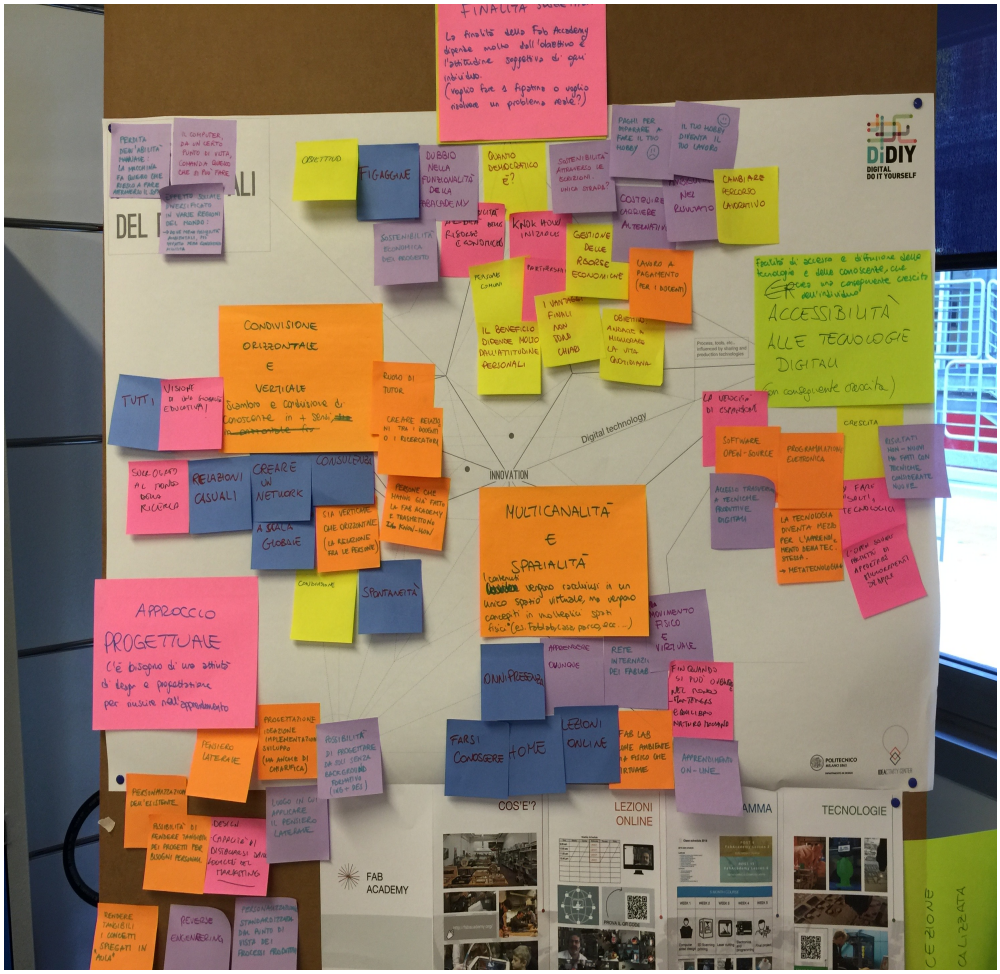

Figure 15 – Fundamental element from “Fab Academy”.

- **Project-building approach.** As well as following the online lessons, the students have to put into practice what they have learned and also have to produce a personal project. To do this, they have to apply a project-building approach, which stimulates lateral thinking and makes the concepts explained “in the classroom” tangible in a personal way. In the choice of the final project, the students can also draw on their own daily experience and think creatively about a problem they want to solve. Lastly, through the making activity, they contribute to overcoming the logics of standardization of the point of view of productive processes.
- **Multi-channel and spatiality.** The online lessons and the portfolios of the students are put into one virtual container which acts as a binder and group together the contents and the work done. At the same time, the students follow the lessons and produce their works in different places in the world (different countries and different cities) and in different contexts (in the local Fab Lab, at home, in the park, etc). All this entails the joint presence of channels and spaces in the case study.
- **Accessibility to digital technologies (with consequent growth).** The facility of transversal access to digital technologies and knowledge lets the individual grow in his/her skills, as the

results, although not new, will be produced by using techniques considered new. In addition, the ease of access leads to a consequent speed of expanding technologies and knowledge and mean that technology becomes a means for learning the technology itself.

- **Horizontal and vertical sharing.** The collaboration between individuals takes place on two levels; horizontal and vertical. Horizontal because the students draw on shared materials created by the teachers and by other students and they themselves create knowledge sharing their material online. In addition, anyone has access to these contents. In vertical collaboration, the learning takes place through a teacher-pupil hierarchy.
- **Subjective purpose.** The purpose of Fab Academy is not clear, as it is not explicitly stated by the Fab Academy itself and us left free to the interpretation of the individual student. An individual could join the educational programme to:
    - cultivate a hobby or a passion without this having a significant impact on their professional growth;
    - change their working life, give themselves a sort of second change and open up to new types of work.

  In addition, the perception on the purpose of the case changes greatly from one geographical area to another as in the least developed countries the probability that the Fab Academy is the opportunity for professional and social redemption increase considerably with respect to more developed countries, where it is more probable that everything is seen as a reinforcement of hobbies and personal interests. Lastly, the relatively high fee influences democratic access of the case, as not everybody can afford it.

Fundamental element from "Public Lab"
(Cluster linked to the specific case study)

Participants

Designers who work in Fablabs, technicians from companies experts in digital technologies, scientific directors of foundations that fund innovation

Elements that emerged

Figure 16 – Fundamental element from “Public Lab”.

- **Vision – Paradigms of companies.** Companies need to innovate with new knowledge linked to the new technologies and the new generations. In some cases the companies do not have correct information about the potential of the new technologies nor do they have the mindset to want to understand them in depth. For the company, technology must not be the starting point but a means to generate innovation in a responsible and ethical way.
- **Accessibility.** The possibility of identifying and drawing on skills and knowledge in an era which is midway between virtual, too vast and rich in information, and real, considered more limiting. In the work area, for example, companies have to understand how to draw on the digital skills necessary to identify the knowledge it needs. The FabLabs, the universities become know-how points at their disposal. This vastness of information available also gives the change to a wider basin of people to implement their idea. Openness generates companies.
- **Digital technology.** Digital technology is understood as a qualifying and inclusive factor which generates empowerment and skills. It allows us for example to build up open data on

our own by construing diffused knowledge and increase our own skills. Digital technology has enormous potential but of which we do not have full control and we are not certain of how it is used.

- **Glocal**. Interrelation between local demand/resources and global flows. The need of a local community or a specific area issue are the motive for a territorial action that takes advantage both of human resources and material resources, relating reciprocally with the flows of global knowledge. This relationship allows enriching and diffusing knowledge on a global scale to make the solution of similar local problems easier. The local area becomes a simplifier of learning which has repercussions.
- **Motivation.** The motor, spark that activates people to collaborate. Motivation can be varied and depends on the person: activism for a cause they have embraces, mindset, earning visibility which then allows them to be repaid.
- **Social interaction.** The phenomenon of DiDIY is contributing to a long process of change of mindset of society. We are going from an individualist mindset to one of sociality and sharing, but in which there is a constant tension between the need to identify a reference and the need for collaboration. It is therefore necessary to provide adequate education and training to understand and transfer the values of collaboration.

The members of the group decided to include the **Motivation** and **Social interaction** factors in a wider area called **citizenship or digital humanism** and which includes all the factors linked to people or communities such as skills, motivation, generational aspects (digital natives) and training.

Common DiDIY fundamental element

This classification and implementation emerges from the sharing of the single group clusters in order to reach a common clustering.

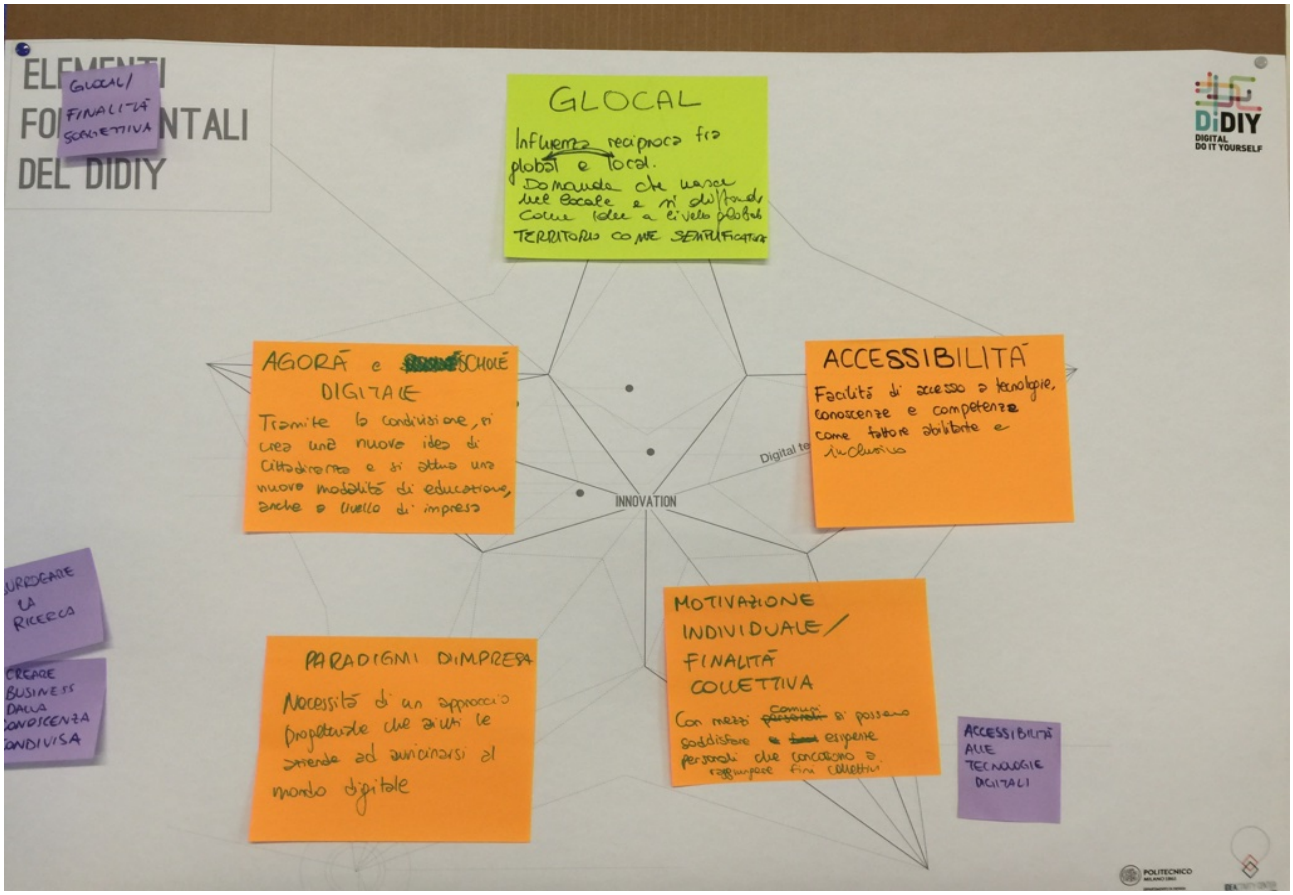

Figure 17 – Common DiDIY fundamental element.

- **Accessibility.** The ease of access to technologies allows individuals and organizations to draw on knowledge and skills, consequently qualifying their growth and including individuals and organizations in the processes of creating and generating knowledge.
- **Glocal.** The contents, subsequently collected in global virtual places, are initially produced at a local level and refer to the needs and demands identified in the local area. The contents will then be shared on global virtual supports, without overlooking the local production of these. For this reason, the local area becomes a stratifier of collective knowledge.
- **Individual motivation/Collective purpose.** The motivations which make an individual or an organization start a project or a DiDIY initiative are individual and limited to the satisfaction of personal needs. However, through these activities, individuals contribute to satisfying collective purposes and, through their individual actions, contribute to achieving common ends.
    - DIGITAL AGORÀ / SCHOLÈ: through sharing a new idea of citizenship is created and a new way of education is implemented, including at corporate level.
    - CORPORATE PARADIGMS: the need for a project-building approach that helps companies approach the digital world.

7.1.2 Design challenges

During the common clustering, the groups brought out different topics, reflections and criticalities deriving from the analysis of the case studies and from their personal experience. These criticalities were recorded and transformed in the form of a challenge, using the structure of the common question, “How can we…?” Afterwards, each single participant voted the 3 challenges which, in their opinion, are the most significant in the field.

Challenges

I. How can we create a virtuous system that allows individual interested in DiDIY to use the waste materials of companies to do something with them?
II. How can we transform the tacit and local knowledge linked to manual skills and craftsmanship in global and shared knowledge functional to?
III. How can we develop the physical and virtual places where the DiDIY takes place, in order to replace the research?
IV. How can we help companies to exploit the knowledge created by sharing projects and knowledge in a DiDIY context, in order to generate concrete and real business opportunities?
V. How can we monitor the DiDIY projects depending on their territoriality, in order to identify and anticipate the market changes of which these projects are evidence?
VI. How can we help organizations develop their closed mindsets into young and open mindsets, which are comfortable with digital technologies?
VII. How can we help individuals and organizations to be guided in the complexity of the information relative to technologies, knowledge and skills, qualified by the accessibility and sharing peculiar to DiDIY?
VIII. How can we help companies understand the technological possibilities of DiDIY, in order to exploit them in a mature and conscious way, going beyond the technological virtuosities and considering ethical and legal questions?

Challenge	Votes
I	4
II	5
III	1
IV	2
V	1
VI	1
VII	3
VIII	4

Table 1 – Challenge votes.

7.2 Results of the explorative workshop on DiDIY&Work – Barcelona

During the first part of the workshop (explorative) the participants started from the analysis of a case study. This analysis allowed them to investigate the case study, taking into consideration people, fundamental elements and impacts. At the end of each analysis, the participants clustered the results, extrapolating the fundamental elements of DiDIY. During this process, the participants derived challenges in the area of reference and chose one of them.

7.2.1 DiDIY fundamental element

Fundamental elements from "Public Lab"
(Cluster linked to the specific case study)

This classification and implementation has been made by the reflections which have emerged from the Public Lab case study. The group, after having analysed and discussed the project, as shown in the project-building section, with the help of the facilitator identified the main concepts that emerged.

Participants

Entrepreneurs in Digital Fabrication, architects who use new technologies

Elements that emerged

Figure 18 – Fundamental element from "Public Lab".

- **Open source.** The bottom-up approach in which information is given to everybody, shared, allows the spreading of know-how. This spreading is enable by documenting and sharing practices.
- **Glocality: global knowledge, local action.** People in the community think globally and share knowledge on a global level. On the other hand, they act locally, solving local issues and encouraging the creation of a local community.
- **Trustworthy**. The global and local community is enabled by the capability to produce authentic data, protect the generated work and ensure quality thanks to a collective evaluation of the data. This is enabled by a shared ethic.
- **S.I.T. – Solve it together.** Going beyond the "do it yourself" mindset, the "solve it together" one is the attitude of facing a challenge through the use of collective knowledge and an active and dynamic participation of the community.
- **Dynamic learning**. Rather than a linear, isolated way of learning, the new way of learning enabled by the DiDIY takes place exponentially by activating learning from each project carried out by the community (and the other way around).

Fundamental elements from "Fab Academy"
(Cluster linked to the specific case study)

This classification and implementation has been made by the reflections which have emerged from the Fab Academy case study. The group, after having analysed and discussed the project, as shown in the project-building section, with the help of the facilitator identified the main concepts that emerged.

Participants

Entrepreneurs in Digital Fabrication, architects who use new technologies, Co-working space manager

Elements that emerged

Figure 19 – Fundamental element from “Fab Academy”.

- **Digital fabrication.** This technology allows access to production technologies, in order to make the manufacturing process easier and cheaper.
- **Long term vision.** People who participate in the initiative feel the need to invest in themselves for the construction of a future career or a company. The participation indeed provides the achievement of an institutional approval. Moreover, people have the possibility to get to know other like-minded people and build up a network.
- **Geek mindset**. Need for people who participate in the initiative to be self-driven, passionate about technology and need to proactively create executable results. Moreover, they need to have an open mindset, a techie attitude and be able to be perseverant applying a learning by doing approach.
- **Elite initiative.** Even if the information is available online and everybody has access to them, the initiative remains an elite one, because it is limited only to a certain kind of people, since it is linked to the actual accessibility to facilities and economic resources.
- **People empowerment.** Possibility for people to live an engaging experience that empowers them and give them the tools to change their local environments. Moreover, people are

enabled to self- improve and acquire awareness, through a learning by doing approach and a quick education program.

- **Network.** People are encouraged to work together in a collaborative model, in which everyone is peer and everybody is on the same level. This allows the creation of a global network of people who share problems and issues and grow together.

Common DiDIY fundamental element

This classification and implementation emerges from the sharing of the single group clusters in order to reach a common clustering.

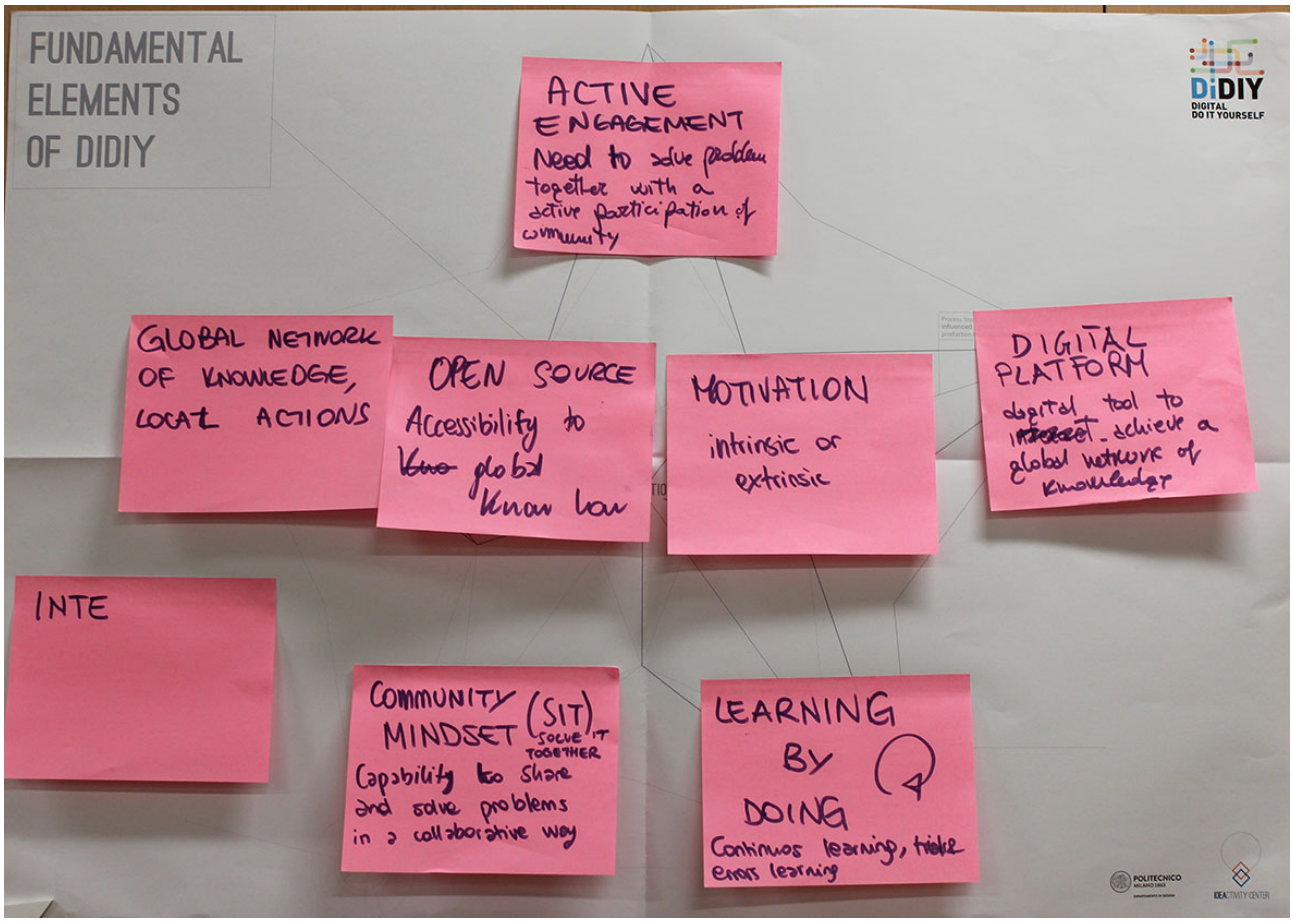

Figure 20 – Common DiDIY fundamental element.

- **Active engagement.** Need to solve problems, together with the active participation of the community.
- **Digital platform.** Digital tool to achieve a global network of knowledge.
- **Motivation.** Intrinsic or extrinsic motivation.
- **Open source.** Accessibility to global know how.
- **Global network of knowledge, local action.**

- **Community mindset (solve it together).** Capability of sharing and solving problems in a collaborative way.
- **Learning by doing.** Continuous learning, “trial and error” learning.

7.2.2 Design challenges

Challenges

I. How to moderate the activities going on on shared platforms?
II. How to verify the reliability of data?
III. How to build a community of people with an open mindset?
IV. How to empower networks to branch out of their work?
V. How to make the value of sharing sustainable in companies?

Challenge’s number	Votes
I	1
II	10
III	0
IV	2
V	11

Table 2 – Challenge votes.

7.3 Fundamental factors resulting from the explorative workshops in Milan

The fundamental common factors of DiDIY are already fully described in D4.7. In order to fully understand this important section and the generative workshop results, we decided to replicate it also in D3.4. Paragraph 7.3.2 report the Fundamental specific factor of DiDIY for Work.

A critical piece of the workshop is finding the insights that will drive our design out of the huge mass of information we have collected.

After having collected the results of the explorative workshops in the 4 areas investigated by the project, the research group has put into a system, combining and pairing the numerous concepts that emerged to identify the common aspects and the potential of DiDIY recognized by the participants.

This systematization is made up of different and repeated phases of processing in order to achieve complete results that include all the wealth and knowledge produced by the participants and the nuances that have emerged from the specific professionalisms involved. We want to recall that. As described in the section on planning of the workshops, the participants, with our support, grouped together similar concepts giving a name to the group and describing them.

A first interpretation of the results that emerged during the phase of clustering the workshops allowed us to identify those elements that can be replicated and designed which were then considered fundamental for the generative phase.

Subsequently, we identified the clusters common to several areas, making a detailed analysis and integrating their descriptions in order to reach a rich and complete definition of the elements. Specifically, the integrated clusters were selected not only if defined with the same name but above all if the descriptions corresponded.

After this first selection, choices were made regarding the elaboration of the clusters that emerged that were not identified as common. On the one hand, elements we deemed inseparable as components qualifying one another, such as for example the Do-It-Together cluster which includes community and sharing and which will be described later were integrated. On the other, we decided to transfer the concepts written in some clusters to others, because we deemed that they were facets of the elements in which they were included. An example of this type of choice is the Accessibility cluster.

Lastly, we decided to select a cluster which was representative of each area investigated through the workshops.

This enormous work of re-elaboration of the data obtained led to identifying *the fundamental common and specific factors* at the basis of the DiDIY and of the individual areas.

One aspect recognized by all the participants that is indispensable for the current movement linked to digital technologies in DIY is the change of mindset from individualist to collaborative. This aspect was not transformed into a fundamental factor as it cannot be planned as an element in itself but together with other factors which generate this type of attitude, but will be underlined and described in the guidelines of the tool kit as a positive attitude and approach to deal with a project in this context

The factors came from the integration of the explorative workshops held in Italy in the four project areas. The integration with the explorative workshops held in Barcelona will be reported in deliverables D5.5 and D6.6.

7.3.1 Fundamental common factors of DiDIY

Idea leader

One fundamental factor of the DiDIY is the necessary presence of an idea leader, i.e. a driving force, who stimulates in order to keep the participation in the project high.

The leadership is therefore defined here as the motivating force to reach the objective.

This driving force can also be represented by a leader figure identified as a super guru, i.e. a charismatic person with a strong and engrossing vision who does not necessarily have technical skills. The three key words which identify this element are stimulate, motivate and coordinate for a common objective.

In order to create a community or to keep high the participation in a community project, the presence of an idea or of a positive figure leader that can stimulate the creativity and the motivation of the participating community is necessary.

Do It for Yourself – personal motivation

One fundamental factor of DiDIY is the personal motivation of the people involved, Motivation is the factor necessary to activate the interest in taking part in a community project and to keep its involvement constant.

Motivation can be intrinsic, therefore linked to an innate predisposition of the individual and extrinsic, linked to external factors of reward and satisfaction.

The elements on which pressure can be put to involve people and activate their participation are described as follows:

- to acquire skills: the people take part because they enrich and acquire new skills and knowledge;
- to reinvent themselves: people take part because they have an opportunity to refresh and improve certain aspects of themselves;
- a sense of belonging to a community: people take part because they feel part of a large community made up of people who share similar interests;
- hedonism/reputation; people take part to be recognized by a community that considers cool;
- showcase/visibility: people take part for promotional purposes;
- remuneration: people take part because they have something to gain or a return;
- sense of intrinsic confidence: people take part to increase their self-confidence.

Do It Together – Community and sharing

One fundamental factor of DiDIY has been defined Do It Together. This factor refers to a community of individuals, who have in common an interest, a vision and ethical values, who take an active part in the collaborative construction of an ecosystem in which sharing represents a new way of operating and a new attitude. The members of the community are active users and share ideas, knowledge, skills, spaces and tools.

In some cases the community is characterized by a set of explicit or tacit guidelines which correspond to the manifesto within which the community identifies itself.

As a member of the community, the individual has to be responsible for his/her actions with regard to the other members and in turn has to be able to trust the knowledge shared internally.

In the community, the presence of an activating element is necessary: this can be a person, a place, an institution. The activator supports constructs and reinforces the elations within the community. On example if the Fab Lab or the figure of the community manager.

Accessibility

One fundamental factor of the DIY is the possibility of easily accessing technology, knowledge and skills, both online and offline. Accessibility is understood both as the physical possibility of reaching points of access to technology but also the need to translate the technical languages to develop empathy and make consulting the contents easier for a vast public of peers, men and women, of different ages.

Accessibility is also translated into a simplification of the normative languages which regulate the use of the shared ideas of the community.

The ease of access to technologies allows individuals and organizations to draw on skills, consequently allowing their growth and the development of determined skills.

The individual also, through the practice of DiDIY, has the possibility of accessing personal resources to experiment his/her capacities in order to reinvent him/herself both in professional life and in daily practice.

Glocal

One fundamental fact of DiDIY has been defined Glocal. This Glocal factor refers to the interrelation between local demands/resources and flows of global skills.

The reflection originates mainly from the idea that a problem or a need come into being at the level of local community. From a need that originates locally, there is then diffusion as an idea at global level. The force of this element is that it is a local problem (and relative solution) which can be common to different situations in different countries is shared globally. There is therefore the *reciprocal influence between local and global*.

The local area is seen as a stratifier and as simplifier of contexts, The contents, collected in global virtual places, are initially produced at local level and resume the needs and the requirements identified locally, These contents are then shares on global virtual supports, without overlooking their local production, In the enormous mass of data, thinking of one's local reality can guide the choice of the useful ones. For this reason, *the local area becomes a stratifier of the collective knowledge but at the same time a simplifier*. The close bond with the local area allows exploiting the human and material resources of the same, generating benefits for the community.

Other important aspects linked to local and global are: the possibility that a local need is solved by shared skills and multi-channel, or when the contents which are enclosed in a single virtual space, are conceived in multiple local physical spaces (e.g., fablab, home, park, etc). Local understood as multispatial and Global as a single online container where knowledge is conveyed.

System economy

One fundamental element of DiDIY is defined System Economy where system means a set of elements that are interconnected with one another by reciprocal relations, but which behaves as one. This refers to different elements which contribute to making a project in the DiDIY context sustainable such as: business models, social impact, economic sustainability and planning.

DiDIY, according to the participants, can generate two distinct business "models": the first is translated into new markets of reference for the world of traditional production, the second creates new models that did not previously exist. The companies that understand their potential have the possibility of exploiting DiDIY to create new hybrid forms of production and communication, working not on the simple use of the tool but at strategic level. In the second case, the technologies qualify new forms of unforeseen innovation which can also appear on alternative unnamed markets.

As far as economic sustainability is concerned, in addition to the traditional forms of financing, one factor deemed fundamental is the presence of business models based on new logics of gain which put pressure on open and diffused knowledge and on the active participation of communities that process this knowledge (e.g., open source). All this allows the birth of a new money of exchange which corresponds to values, information, visibility and knowledge.

7.3.2 Fundamental specific factor of DiDIY for Work

Corporate scenarios with the digital

One fundamental element of DiDIY is the strategic project-building approach, at the basis of the activity of digital making, which allows both training digital skills and learning a process where technology becomes a tool that activates new opportunities for the company.

7.4 Results of the generative workshop on DiDIY&Work – Milan

During the generative workshop, the participants started from a challenge launched in the explorative workshop and first of all examined the context of the challenge and built up a scenario. Subsequently, the participants generated different ideas through a brainstorming session, they grouped them together, gave them titles and voted for them. The voting took into consideration criteria such a feasibility, coherence with the brief and the desirability for the user. Lastly, the participants planned this idea in the details, considering the fundamental factors identified in the exploration phase.

Participants

Makers who work in the FabLab, small businessmen, students who work with new technologies, design consultants

Challenge

During the exploratory workshop the participants extrapolated challenges. The challenge most voted for is taken as a starting point and launched in the exploratory workshop.

How can companies understand the technological potential of DiDIY, in order to exploit it consciously going beyond the technological virtuosities and considering social, ethical and legal questions?

Scenario

From the challenge launched, the participants were asked to share their knowledge in the context of the challenge and to share some case studies or ideas that they consider interesting. Following this sharing, the participants built up a shared scenario.

An opening to companies to the world of DiDIY first of all means the possibility of learning about the possibilities offered by this potential new way of bringing innovation into and outside the company.

To create and increase this knowledge, the companies therefore need to come into contact with the FabLabs, places which have the spirit and attitude of DiDIY. In this scenario, the FabLabs form a strong and clear network with one another, in order to present themselves univocally to the companies and to be more cohesive and coherent in communication. This network of FabLabs thus appears in relation to companies as a research centre where new projects can be developed.

In addition, as the FabLabs are situations that are very close and sensitive to the changes of society and attracting a network of people who take part and actively create change, the FabLabs perform above all the function of being the litmus test for the companies on what is happening in the local area and on the evolutions that are taking place in the social fabric.

On the other hand, lastly, the companies allow the FabLabs to survive and support themselves, thanks to the different projects that are started and the possibility offered to coming into contact with these situations.

7.4.1 Brainstorming ideas

After having constructed the scenario, the participants took part in a brainstorming session to find concrete ideas in the scenario described. The ideas were then clustered and each cluster was given a

title. Lastly, the ideas were voted for according to three criteria (feasibility, coherence with the challenge and desirability) and the idea receiving the most votes was selected.

- *Communication of the FabLabs*: Communication activity to define and clearly say what the FabLabs are, in order to create an identity univocally recognizable by the companies. Communications takes place through case histories of projects and interesting initiatives of collaboration between FabLabs and companies.
- *FabLabs as the belly of the company*: make the FabLabs places where companies can be updated on changes and come into contact with the themes of innovation and with the change of mindset.
- *FabLabs as centres of certification for consultants:* make the FabLabs places where to train and update the consultants who usually interface with the companies. The consultants who take part in the educational and refresher programme are then specifically certified with a certificate issued by the FabLabs, which they can present to the companies as recognition of the path covered.
- *Company networks:* Creating small networks between companies of the same dimension.
- *FabLab as a bridge towards the creative community:* Use the FabLabs as a bridge and place of exchange between the companies and the creative communities that usually meet around the FabLabs. This way the companies have the chance to come into contact with the talents that have a digital mindset.
- *Open projects:* Identify in the companies a professional figure dedicated to following and implementing open projects. This professional figure must work in close collaboration with the FabLabs and with the entities that perform projects in the DiDIY context, which could start up profitable collaborations with the companies.
- *Census of the Fablabs:* Make a census of the different FabLabs present in the local area, placing special emphasis on the specific specialization of each individual FabLab, in order to create more clarity for companies on the possibilities offered and also to give the FabLabs a means to start up collaborations and gain benefits from one another.
- *Meetings between companies and FabLabs:* Organize meetings between companies and FabLabs, in order to stimulate reciprocal knowledge.
- *Skills market*: System that supports the FabLabs in the case of performing shared projects and carried out by several FabLabs in collaboration with one another. The system has a clear division of roles, also corresponding to a clear division of the project resources available, in order to create clarity and stimulate healthy collaboration between FabLabs.

Idea	Votes for feasibility	Votes for coherence with the challenge	Votes for desirability	Total votes
Communication of the FabLabs	1	5	2	8
FabLabs as the belly of the company	3	2	2	7
FabLabs as centres of certification for consultants	2	3	1	6

Company networks	2	1		3
FabLab as a bridge towards the creative community	0	2	1	3
Open projects	1	2		3
Census of the FabLab	2	0	0	2
Meetings between companies and FabLabs	0	0	2	2
Skills market	0	0	2	2

Table 3 – Ideas votes.

7.4.2 Idea-building

The idea selected was developed through rapid prototyping. The participants made a tangible representation of their idea using the material supplied. In addition, the participants continued the project-building of their idea, integrating the fundamental factors obtained from the exploratory workshops.

Idea – Fab Academy for companies

Fab Academy for companies is a path which helps companies to approach new ways of self-learning, work and management of projects typical of the digital context, applying these principles to their area of reference.

In a company context where the working methods are usually inflexible and do not facilitate the growth of the individual as an individual worker capable of producing concrete results in short times and with few resources, the spirit of the FabLabs is taken as inspiration and example to change the mindset of the employees and managers. Fab Academy brings together different FabLabs throughout Italy and, through a structured path, takes the company's employees to visit this structure but above all to spend working time in them, in order to breathe in daily the climate that characterizes it. Inside the FabLabs, the company employees can carry out their usual tasks or start projects of collaboration with the structure.

As the FabLabs are a network, the company employees will have the possibility of not always staying in the same place but going from one to another, in order to come into contact with the different specializations and the different working styles that characterize each individual FabLab and realize the potential offered by these structures. The focus will not be on acquiring technical skills, but on acquiring a mindset.

At the end of the path, each participant will be given a badge, which certifies their participation in the path and which may be used in the company as recognition to start up and take part in open projects of innovation.

The various participants in this path will also have the chance to come into contact with one another and with the FabLabs to share their experiences.

7.5 Results generative workshop on DiDIY&Work – Barcelona

In the generative section of the workshop on DiDIY&Work in Barcelona, the participants generated concrete ideas in the challenge, voted for the best idea and developed it taking into consideration the fundamental elements which had emerged in the first part of the workshop.

7.5.1 Brainstorming ideas

After having constructed the scenario, the participants took part in a brainstorming session to find concrete ideas in the scenario described. The ideas were then clustered and each cluster was given a title. Lastly, the ideas were voted for according to three criteria (feasibility, coherence with the challenge and desirability) and the idea receiving the most votes was selected.

Group 1

- *Training and immersive experience:* educational program for the employees in order to get a better understanding of the company and more shared knowledge. Possibility to create this educational program as immersive experience, for example supported by social drinking activities or supported by webinars in between local pubs
- *Open the source:* practice of selecting the sources of specific company's products and open them up, in order to open the knowledge to specific agents and potentially address problems that have impact on the global welfare.
- *Collectivize the company:* let employees cooperate at all levels, such as mutual support for tasks, roles+cooperative ethos and legal constitution of company. Give employees the possibility to be seen as co-owner of the company, also by creating a shared system of intellectual property.
- *Internal sharing of interests:* organization of internal sharing of interests and skills within the employees, in order to create groups of interest.
- *Create rewards:* create a rewarding system inside the company for the employees who sustain shared ideas.

Ideas	Total votes
Training and immersive experiences	3
Open the source	2
Collectivize the company	1
Internal sharing of interests	0
Create rewards	0

Table 4 – Ideas votes.

Group 2

- *New project's contribution:* online platform to collaboratively contribute to new products for the companies the employees work for. At the end of the contribution process the employees who have contributed to the project are rewarded with a bonus or a share of the profit coming from this product.
- *Skills based project:* platform that enables the creation of working groups for a project, starting from the skills, even the soft ones, that the employees have.
- *Employees mutual help:* organization of groups of employees who help each other on daily issues, such as babysitting, preparation of lunch breaks and so on. According to the task each

employee of the group prefers for himself, he will give his contribution to the group and have in return other tasks done by other employees.

- *Fab Erasmus:* possibility for employees to carry out an exchange program in FabLabs, and vice versa.
- *Connected hubs:* networks of employees who share the same interests and attitudes in different companies, in order to create connected hubs.
- *Company time bank:* time bank for employees where everybody is asked to accomplished common task, getting in return the accomplishment of other tasks. The employees can get points or coins that are then turned into rewards.
- *Company's crowdfunding:* crowdfunding program in the company, in order to promote employee's projects.
- *Tequila Friday:* friday afternoon initiative when each employee is asked to go to somebody he doesn't know, offer a drink and start sharing insights about each other's work and knowledge.

Ideas	Total votes
New project's contribution	3
Skills based project	2
Employees mutual help	2
Fab Erasmus	1
Connected hubs	1
Company timebank	0
Company's crowdfunding	0
Tequila Friday	0

Table 5 – Ideas votes.

7.5.2 Idea-building

The idea selected was developed through rapid prototyping. The participants made a tangible representation of their idea using the material supplied. In addition, the participants continued the project-building of their idea, integrating the fundamental factors obtained from the exploratory workshops.

GROUP 1 – S.I.T. (solve it together) Digital platform

SIT is a digital platform that helps a company create a collaboration environment and generating knowledge by finding the pieces of information in the intersections between a company and the outside.

The platform enables an exchange program that brings together groups of people coming from different companies. These people are merged, in order to work together in the company and learn from each other.

Public FabLabs are also involved by also proposing to the exchange program people who are not working in companies but could bring a meaningful contribution.

The role of the platform is indeed to deal with the complexity of understanding what's inside and what's outside the company in terms of knowledge. Nevertheless, in order for the platform to work, there should be fair sharing and an open source attitude.

The motivations that will drive employees could be either money or even better environmental and common goods motivations.

GROUP 2 – New project's contribution

The new project's contribution is a platform that allows a collaborative process of creating new products inside a company. Each employee can login in the platform, that will take his own information from his social networks, in order to understand his personality, attitude and skills.

The skills are then associated with the needs or business opportunities that are found by the employees in their local community and are at the same time related to the company's business. By matching people who have complementary skills, the platform creates some virtual groups working on a specific challenge coming from the needs or business opportunity identified in the local community. In this way the project the employees will work on will generate profit for the company, but at the same time will give employees the chance to work for an issue that is important to their community, creating a win-win situation.

The projects are rated or approved by the employees all over the company, by the management and also by the local community the project is made for.

Once approved, the working groups can use the virtual space in order to design together the new products throughout all the design phases. At the same time other employees from all over the company, and even from other neighbourhoods, can make their own contribution to the project. By collaborating on the project, the employees will gather insights that can be used later on in their local eco systems.

During the process the platform records the contribution made by each participant and, at the end of the process, is able to declare the collaboration level of each person. After the product has been launched on the market, the company will reward the employees. The more somebody has been collaborating, the higher the reward will be. The reward could be a share of the product's profit, a company benefit such as a bonus or the possibility to get some extra free time.

8. Conclusions

The data collected are the result of a path of co-design which took place together with professionals from companies, craftsmen, innovation manager and experts of digital making.

The design toolkit under development will thus give the opportunity to those who use it to continuously generate reflections on the topics approached and also project-building solutions to apply the potential of digital making to the area of work. One of the elements that emerged during the workshops and recognized as fundamental by the participants is defined as the “geek mindset” that stands for the need for people who participate in the initiative to be self-driven, passionate about technology and who feel the need to proactively create executable results. Moreover they need to have an open mindset, a techie attitude and be able to be perseverant, applying a learning by doing approach.

As sustained by some participants from Italian SMEs, companies need to innovate with new knowledge linked to the new technologies and the new generations. In some cases, the companies did not have correct information about the potential of new technologies and do not always have the mindset to want to understand this in depth. For the company, technology must not be the starting point but a means to generate innovation in a responsible and ethical way.

During the generative workshops on DiDIY&Work, many ideas emerged to try and develop collaborative and sharing attitudes and openness in the companies that at the same time let them stay updated on technological and social changes.

As shown in section 7, an openness of companies towards the world of DiDIY allows in particular the possibility of becoming aware of the possibility and potential offered by this phenomenon and to understand which innovative aspects to take into the company, how to integrate them and which to keep outside. One of the reflections that emerged several times from the workshops is the need for companies to enter into contact with Fablabs, maker spaces, hacker spaces, etc., i.e. places which enclose the spirit and the attitude of DiDIY, through paths of immersion in the context that allow the working attitude to carry out the potential of the phenomenon. In addition, as these places are very close and sensitive to changes in society, by attracting a network of people who take part in and actively create change, they perform above all the function of a litmus test for the companies on what is happening in the area and on the evolutions that take place in the social fabric.

Section 7.4 and 7.5 show the main ideas generated to try and develop projects that aim to bring companies closer to new ways of self-learning, work and project management typical of the digital environment, applying these principles to one’s own area of reference.

References

Atkinson, P. (2006). Do It Yourself: Democracy and Design. *Journal of Design History*, *19*(1), 1–10.

Brandt, E., Eriksen, M.A. (2010). Rehearsing the Future.

Brown, T. (2008). *Design Thinking*, in Harvard Business Review.

Brown, R. (2008). *Designing Differently: the Self-Build Home*. Journal of Design History 21(4), 359-370.

Franke, N., von Hippel, E., Schreier, M. (2006). Finding Commercially Attractive User Innovations: A Test of Lead-User Theory. *Journal of Product Innovation Management*, 23(4), 301–315.

Geels, F.W. (2004). From sectoral systems of innovation to socio-technical systems: Insights about dynamics and change from sociology and institutional theory. *Research policy*, *33*(6), 897-920.

Geels, F.W. (2002). Technological transitions as evolutionary reconfiguration processes: a multi-level perspective and a case-study. *Research policy*, *31*(8), 1257-1274.

Manzini, E. (2006). Design Research for Sustainable Social Innovation. In R. Michel (Ed.), *Design Research Now: Essays and Selected Projects (Board of International Research in Design)* (pp. 233–245). Birkhäuser Basel.

Manzini, E. (2010). Small, local, open, and connected: design for social innovation and sustainability. *The Journal of Design Strategies*, *4*(1), 8-11.

Manzini, E. (2015). Design, when everybody designs: An introduction to design for social innovation. Cambridge, MA: The MIT *Press.*

Mota, C. (2011). The Rise of Personal Fabrication. *Proceeding of C&C '11 Proceedings of the 8th ACM conference on Creativity and Cognition*. Atlanta, Georgia, USA. pp. 279-288 ACM New York, NY, USA.

Tanenbaum, J.G., Williams, A.M., Desjardins, A., Tanenbaum, K. (2013). Democratizing Technology: Pleasure, Utility and Expressiveness in DIY and Maker Practice. *Proceedings of CHI 2013*, April 27–May 2, 2013, Paris, France.