



D5.5 CREATIVE DESIGN AND SOCIETIES

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Executive summary

Deliverable D5.5, “Creative design and societies”, presents the results of the co-design workshops organized for the creative society Project area. During the investigation we have involved two countries chosen in different European areas: Italy and Spain. In each country we have replicated the same workshop structure, with small differences given by the development of the workshops in the different areas. Their structure includes two main steps:

- *exploration activities*, aimed at assessing the identified critical issues and opening new possible areas of intervention assessing new visions on the subject as well as deepening and broadening identified challenges, while amplifying the potentials of the most important subjects (e.g., work, society);
- *generative activities*, aimed at putting into practice the identified solutions to the encountered difficulties in using open-source technologies. Furthermore they aim at detecting the evolution of the creative process in relationship to the opportunities offered by the open-source technologies investigated.

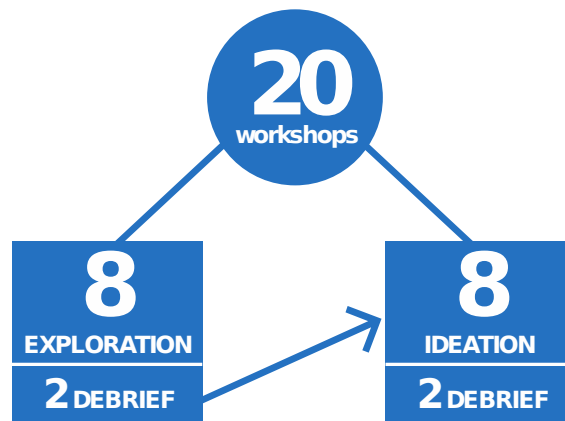


Figure 1 – Workshop structure.

The activity was developed for WP3, WP4, WP5, and WP6 using the same structure and ad hoc tools such as design games and performative toolkit. Even if the structure of each workshop is similar, the results are different from each other and are all very interesting.

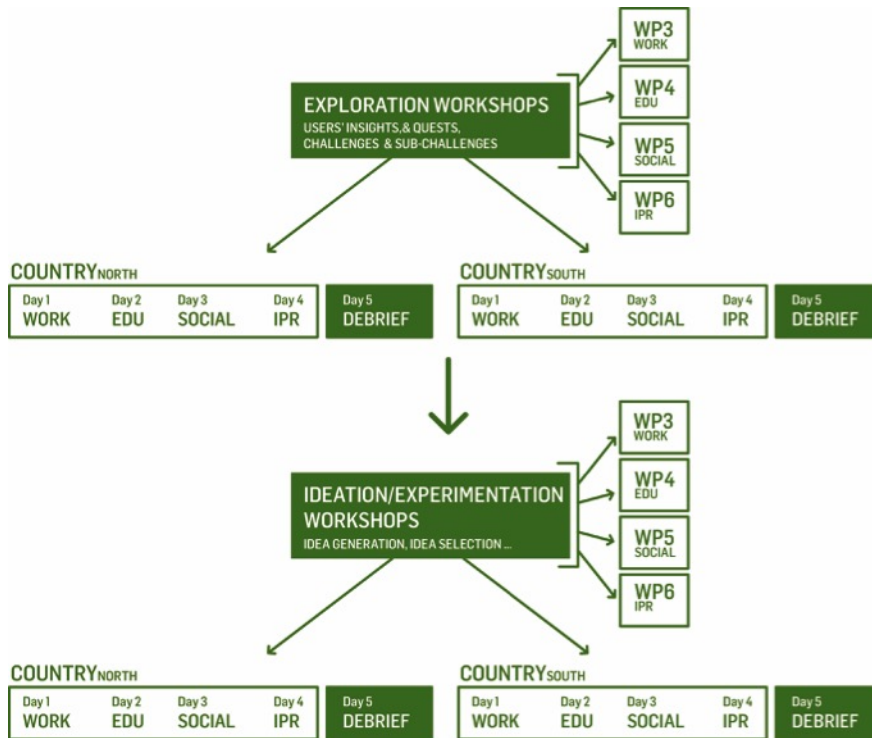


Figure 2 – Workshop structure.

In order to correctly read the document and in particular 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 to 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.

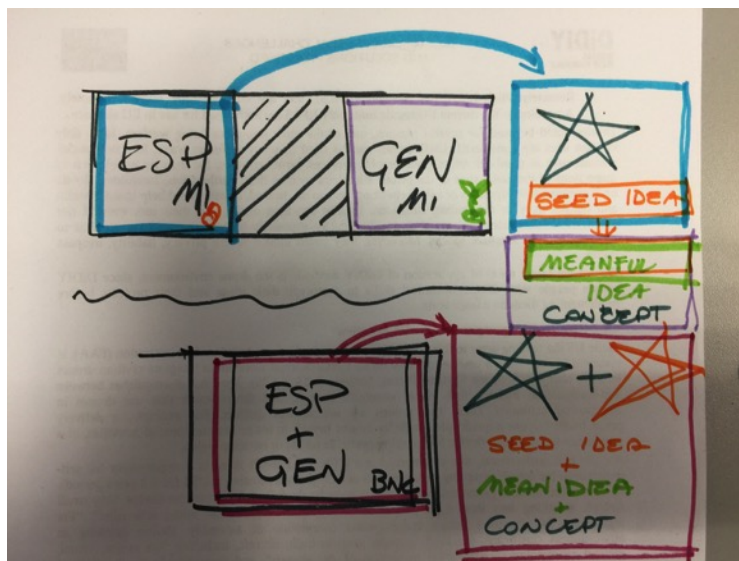


Figure 3 – Workshop structure with corresponding results in Italy and in Spain.



The deliverable is structured according to the two objectives just mentioned above and that are part of a single path. Some sections give emphasis to the first and others to the second. In such the one interested only in work related outcomes will be able to easily identify the relevant sections. The Introduction 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. In the second chapter the useful information for the workshop in the Creative Society area are gathered to build up the research background. Some parts can be found in the knowledge framework and in the deliverables of WP5. 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. Section 5 describes the implementation activities tested during the workshop sessions and the only tools that are changed in this workshop. In order to fully understand this section please refer to D4.7 in which we have described the Workshop Methodology approach and the various implementations of the tools based on the previous workshop on education and work. Sections 6 and 7 report the aims and obtained results of DiDIY&Creative Society workshops from the point of view of the participants involved. Starting from reflections about people, key components and impacts, participants identified the fundamental elements that enable DiDIY and design challenges related to the creativity field. In conclusion, section 8 reports some reflections which contribute to the enrichment of the results of the research of the WP5 on Creative Society.

Revision history

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1. Introduction

1.1 Action Research Model

In the present deliverable are reported the four workshops conducted within the Creative Society project area. According to the project, 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.

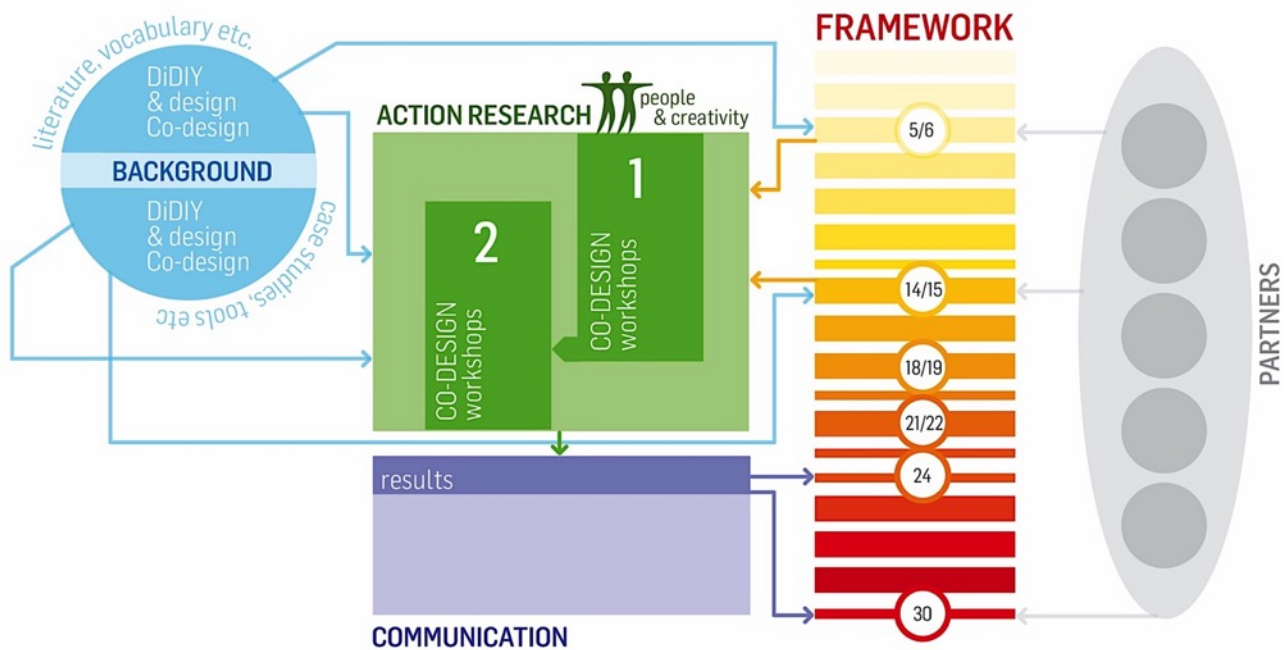


Figure 4 – Schema representing the Action Research Model.

We follow three main areas:

- background research;
- action research, in which we will involve people;
- communication.

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 has been identified.

As is shown in the following image, we have collected existing tools and techniques in a Design tool collection (see Annex I – 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 the 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 mind-set 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.

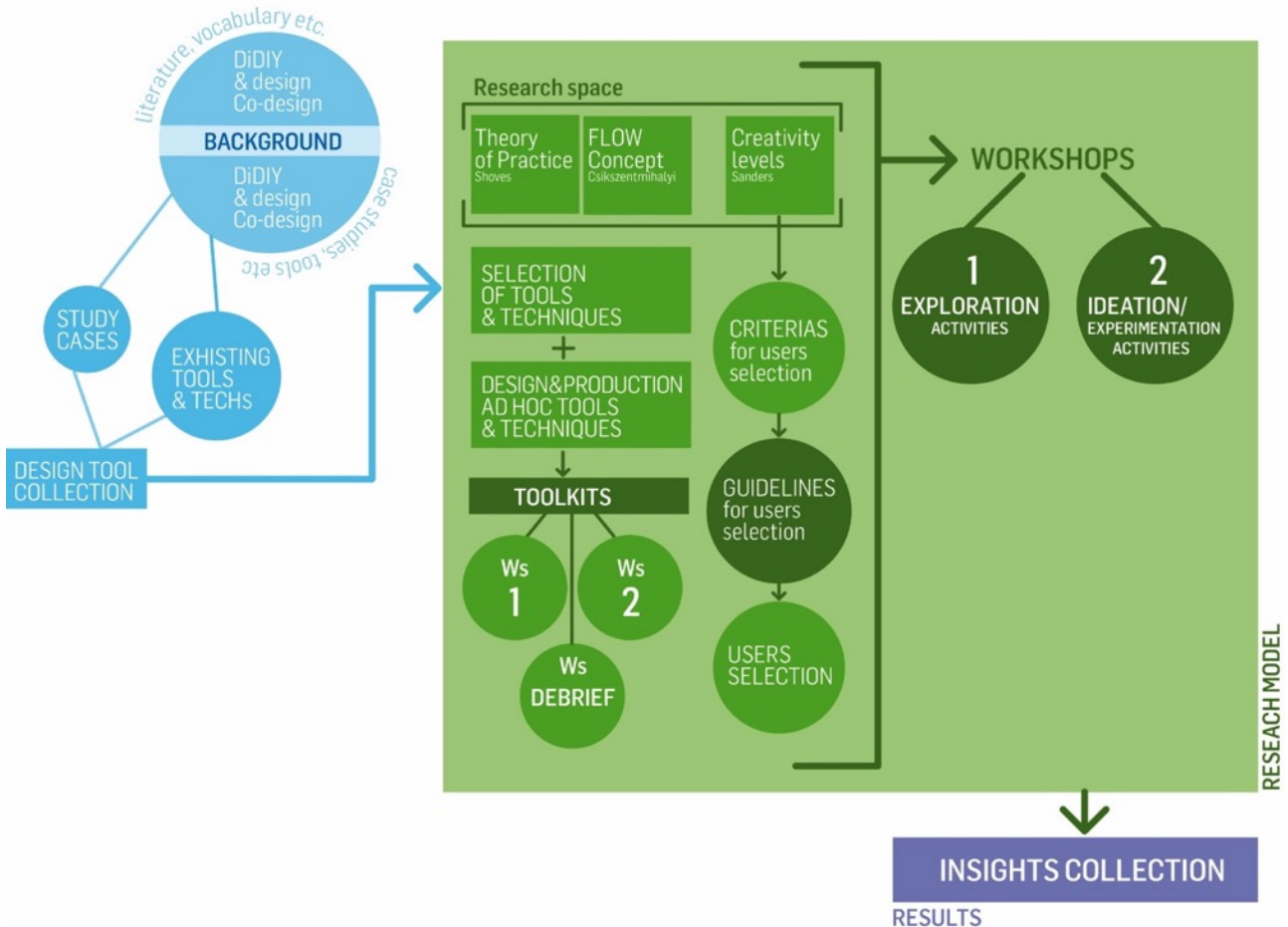


Figure 5 – Representation of research model steps

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	<p>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</p> <p>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.</p> <p>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.</p> <p>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.</p>
DiDIY design model	<p>design and creativity based model that is able to generate innovation through the use of DiDIY</p> <p>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.</p>
DiDIY platform	<p>(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</p> <p>(2) website explicitly designed to enable any combination of (co)development, manufacturing, sale, or distribution of</p>



	<p>DiDIY products or DiDIY designs, as well as mutual support among DiDIYers</p> <p>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.</p> <p>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”.</p> <p>Examples (to def 2) – Thingiverse.com; OpenBuilds.org.</p>
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 according to the Creative society main topics. Some of important contents of this section are more extensively described in D4.7 and D5.5. Please refer to those one to read it and fully understand the ongoing research work. We decided to specifically refer to some of the research topics proposed in the WP Creative Society to explore an aspect of the maker movement: Creativity, Sharing and Community.

The analysis of the current scenario of DiDIY as a social innovation phenomenon will enable us to define a model that takes into account the interplay of DiDIY main expressions enacting on different levels also addressed above, which include:

- DiDIY as a phenomenon of social innovation for the fundamental role of collaboration and sharing;
- DiDIY as a practice carried out by the individual connecting materials, meanings and competences;
- DiDIY as a creative process, developed through cognitive tasks.



Figure 6 – Three dimensions of DiDIY.

There is a fundamental tension in (DIY and) DiDIY, as something that someone:

- does, e.g., an *activity* for the creation, modification or maintenance of objects or services; in this sense DIY and DiDIY are *objective* phenomena, that can be studied from the analysis of tools, products, structure of collaborations, etc;
- has, e.g., a *mindset*, and then a producing and consuming culture; in this sense DIY and DiDIY are *subjective* phenomena, that can be studied from the analysis of motivations, competences, social contexts, etc,

where the co-presence of objective and subjective components activates positive feedback (self-reinforcing) process, thus progressively transforming DiDIY into a socio-technical system.

The dynamics itself of such a system is complex. DiDIY may originate as an activity and later on turn into a mindset, as sometimes it happens in education: students start from an assigned activity, that for them at the beginning is just a task to be completed, and progressively some of them develop a mindset transferring the concept to other learning activities.



The social dimension of DiDIY

About the importance of common people and the innovation they can offer, Times magazine elected “You” as the person of the year 2006: “It’s about the many wresting power from the few and helping one another for nothing and how that will not only change the world, but also change the way the world changes”. Four years later, the same prize goes to Zuckerberg, founder of Facebook, because “In less than seven years, Zuckerberg wired together a twelfth of humanity into a single network, thereby creating a social entity almost twice as large as the U.S. If Facebook were a country it would be the third largest, behind only China and India. It started out as a lark, a diversion, but it has turned into something real, something that has changed the way human beings relate to one another on a species-wide scale.”

In the more specific case of DIY, the spreading of physical and virtual places where people can undertake creative activities is enabling the coalescing of committed individuals who support each other in ‘communities of practice’ (Lave and Wenger 1991) or even ‘creative communities’, i.e., groups of people who cooperatively invent, enhance and manage innovative solutions for new ways of living (Manzini, in Bœuf et al. 2006).

The establishment of the Internet, web 2.0 and social media has contributed to the spreading of groups who collaborate on a wide scale, often at a global level, for shared purposes. This is an example of commons-based peer production, whereby “large groups of individuals...co-operate effectively to provide information, knowledge or cultural goods without relying on either market pricing or managerial hierarchies to co-ordinate their common enterprise” (Benkler and Nissenbaum 2006, 394). It has led to several phenomena, initiatives and communities (e.g., open source, peer-to-peer, etc) emerging with the aim of contributing to a more community-oriented society. Peer production has been envisaged as “an opportunity for more people to engage in practices that permit them to exhibit and experience virtuous behavior” (Benkler and Nissenbaum 2006, 394).

Further research could address how the dynamics of communities and social networking are reshaping DIY and if they are bringing innovation in knowledge and practice.

The following are excerpts from the DiDIY Knowledge Framework (as developed in deliverable D2.4: the current version is available from the Project website at the page <http://www.didiy.eu/project/results>) and Online course that help us to situate the nature of DiDIY and relate this to the identified topics.

2.1 Digital DIY and creativity

DiDIY is a creative activity because it is about the process of transforming ideas into outcomes. One aspect of creativity is the ability to generate something different, for example an original and innovative product.

Drawing on the IDEActivity method and in relation to DiDIY, creativity can be considered as the combination of three main theories and approaches.

- First, creativity is fuelled by creative thinking, i.e., the ability to face problems and find innovative and effective solutions, building on sound knowledge, yet adopting new perspectives. This involves the development of a – less than linear – process of information collection, selection, reconfiguration, and identification of the relationships generating new results (Testa 2011).



- Second, creativity is the ability to recognise the usefulness of new configurations of existing elements. (Poincaré 1908).
- Third, creativity is an ability that everyone can potentially exercise – it is not the privilege of a few talented individuals. However, creativity needs support, encouragement and practice, or it can become suppressed. Creativity can be developed by learning to think in particular ways – open, diverse, experimental, willing to take risks and try things out – and through positive interactions with other creative people.

2.1.1 How design can foster DiDIY creativity

Designers can contribute to the development of makers' creativity. In fact, in a world where everyone does design, professional designers may have to find new roles to play. We envisage that they could lead, guide, provide scaffolds, or offer a clean slate to DiDIY practitioners, according to their level of interest and creativity.

The contribution of designers will be significantly influenced by the scale of action (from local to global) and the typology of possible collaboration with DiDIYers. In fact, designers could help by:

- creating devices (such as 3D printers, parts and toolkits) globally distributed to facilitate DiDIY tasks, that may compensate the lack of manual skills of the DiDIYer;
- setting-up global networks of DiDIY amateurs and professionals who enact on a local level;
- collaborating with local institutions and services, typically to increase the awareness of DiDIY and support actions for DiDIYers;
- leading or facilitating creative experiences (such as participatory workshops) to directly support DiDIYers in places arranged according to their needs, such as FabLabs and makerspaces.

Designers can support DiDIYers either as collaborators or facilitators according to the creativity level. As collaborators, designers bring an equal contribution into a project shared with DiDIYer. As facilitators, designers support the development of the project drafted (or defined) by the DiDIYer.

2.1.2 DiDIY and creativity

In a narrower view DiDIY fosters creativity as people make things using state-of-the-art digitally controlled technologies, while in a broader view it is also about the ways in which creativity can be fostered much more widely, as people connect using digital tools and systems (such as the internet) to develop various digital or non-digital kinds of creative practice. Within this research, the term “creativity” is intended to encompass a range of creative interactions. It includes the creativity of individuals who are making objects using DiDIY technologies; the creativity that results from the social interaction of individuals coming together and exchanging ideas and working on DiDIY projects; and creativity in the wider community, for example, the creative impact on society that results from how DiDIY projects are manifested in the wider world. The level of ‘creative engagement’ itself may be subjective to the participants. It may encompass a wide range of activity from simple engagement in a making activity to complex original design and construction of original objects or projects. Similarly, creative groups, and creative society impacts, are likely to operate at a range of scales. As a mindset DiDIY may also be seen as a creative continuum, in particular small creative projects and activities may lead to a self-reinforcing DiDIY mindset and lead to more complex creative activities. There are creative implications for this progressive engagement, for example, the exchange of creative ideas and inspiration via online communities enables widespread dissemination of designs. Collaborative engagement opens the way to



potentially enabling creative solutions to local, social and environmental problems. Free and open access is concerned with the protocols allowing or restricting the use and modification of designs and as such has implications for both the creators of designs and those wishing to use them, moderating the shared use of creative capital. DiDIY enables the shared production of creative content and therefore greater opportunities for co-design and the creation of collaborative value chains. It may also lead to the need for a new class of creative professionals mediating DiDIY. Research, in context, will be carried out to establish how creativity is sparked, fostered and sustained within DiDIY activities and how this impacts on wider creative society. The extent of creativity needs to be studied in the context of the specific creative engagement and its perception by the participants involved. DiDIY is an emergent phenomenon and our research is aimed at exploring DiDIY in relation to creativity, through case studies of emergent and current practice and hands-on workshops.

Users are progressively upgrading their degree of involvement in DiDIY (adapted from Sanders 2006) so to become:

- *doer*, who operates to accomplish something through productive activity with minimal amount of interest and skills (doers are then reluctant DiDIYers);
- *adapter*, who operates to make something one’s own by changing it in some way, with the interest to personalise the object so that it better fits their personality or contextual constraints;
- *maker*, who aims at creating something that did not exist before, with a genuine interest in the practice as well as the experience;
- *creator*, who operates to express themselves or to innovate, fuelled by passion and guided by a high level of experience, and relying on the use of raw materials and the absence of predetermined patterns.

Level of creativity	Motivations	Requirements
Doer	To get something done / to be productive	Minimal interest Minimal domain experience
Adapter	To make something on my own	Some interest Some domain expertise
Maker	To make something with my own hands	Genuine interest Domain experience
Creator	To express my creativity	Passion Domain expertise

Table 1 – Levels of creativity as means to interpret the engagement of DiDIYers in the practice (adapted from Sanders 2006).

2.1.3 DiDIY and critical thinking

In a narrower view DiDIY is a means for fostering critical thinking, while in a broader view it is done by individuals who may not necessarily use such competence on a deep level. Critical thinking allows people to make effective analyses, inferences, evaluations, reasoned decisions and to take purposeful action. This skill is important namely for students to deeply understand academic content and for workers to think about how to continuously improve products, processes or services.



2.2 DiDIY and sharing

Collaboration, both with peers (i.e., other DiDIYers) and with facilitators (who are acknowledged as so by the digital DIYers) is here believed to be possibly the most significant elements characterising the latter evolution of conventional DIY towards the digital one. Collaborating is an opportunity to acquire knowledge and develop skills through other peers, to strengthen social bonds and to make an impact on a wider level than the individual one, which are less likely to happen in conventional individualistic DIY.

2.2.1 DiDIY and collaboration

In a narrower view DiDIY is about activities carried out collaboration (the plural form of “you”, also known as “Do It With Others”, DIWO, or “Do It Together”, DIT) and trans-disciplinary, while in a broader view it is about activities carried out by one person (the “yourself”). By taking a helicopter view, one can find almost always some form of collaboration, as even the individual maker builds on previous knowledge produced by others. The individual can be seen as standing on the shoulders of giants: building on collective works produced and shared within (online) communities, typically by many others.

2.3 Empowering the individuals and the community

DIY 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 DIYer 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, DIY can empower the groups on 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.

2.3.1 DiDIY and open communities and releases

In a narrower view DiDIY is about openly sharing knowledge in communities and openly released outcomes, while in a broader view it is also of individuals operating alone and about outcomes that are maintained proprietary. The legal rights under which the digital files are shared determine the affordances that users in these communities have, and thus their possibilities to use, reuse, share, adapt and become economically sustainable. Liberal licensing schemes like free and open licensing are typical in online design sharing platforms, as they convey the maximum freedom or rights to their peers (for an overview of online design sharing platforms in the context of DiDIY, see http://wiki.freeknowledge.eu/index.php/Design_Sharing_Platforms).



3. Design Tool Collection

The design collection is in Annex 1 – Design tool collection and also available on the Project website at http://www.didiy.eu/public/codesign-workshops/annex_i_desig_tool_collection.pdf. Please refer to D4.7 to fully understand the ongoing research work.



4. The Workshop Methodology approach

This section, aimed at reporting in detail the design of the workshop structure, activity and tools, is already fully described in D4.7: please refer to that deliverable to fully understand the ongoing research work.



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 Creative Society area. These experiences allowed an experimentation which led to the cumulative acquisition of knowledge. Carrying out the process and the planned tools allowed us to 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: (1) pilots; (2) explorative and generative workshop in education field (see the paragraph 5.1, 5.2, and 5.3 of D4.7) and (3) explorative and generative workshop in the Organization and Work field (see the paragraph 5.1, 5.2, and 5.3 of D3.4). 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&Creative Society – Milan

See flow description in section 6. 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. Please refer to D4.7 to fully understand the ongoing research work. Only the indications useful to implement the process and the tools will be described.

Workshop structure: In this specific case the DIY&Creative Society and DiDIY&Legal System workshops were merged into a single one, to experiment a new relationship's modality among the participants. The aim was to understand whether there could be a contamination between the different topics and an enrichment in the creation of the challenges. The interaction between people involved in the intellectual property and laws fields and people who work with digital technologies in order to develop new ideas could have created an interesting process of shared identification of problems and generation of solutions. The activities' flow was enriched, but the way the two different topics was treated has slightly changed. Please refer to chapter 6.2.1 for the workshop flow description. The only activity that has slightly changed was the collection of challenges that have been simultaneously discussed among the two groups.

Tools

Please refer to chapter 5 in D4.7 and D3.4 for the description of the last improvement of the tools.

Summary reflections

We collect all the *learning* and the *warnings* that emerged from the integration of the reflections made both on the flow and on the tools. As for the workshops in educational and work field, only the indications useful to implement the process and the tools will be described. For clarity and coherence with the previous ones, the inputs are listed by points. The reflections that emerged are listed as follows:



- I. Dealing simultaneously with two different topics, DIY&Creative Society and DiDIY&Legal System, in the same workshop didn't bring any positive result or meaningful contribution in the identification of the fundamental factors. The activities worked out only in the first part that is the analysis through the gameboard and the identification of the fundamental factors in the single group. The participants of each group could indeed concentrate in the given topic and coherently use the gameboard and do the single clustering. However when they did the common clustering it has been difficult to talk simultaneously about the two different topics and then identify the fundamental factors.
- II. A single clustering that puts together 3 different ones it is complex, since the factors are many. The difficulty lies on aligning factors that are generated by different people with different background and experiences, who therefore use own languages to identify similar situations. Many times indeed factors with different names express similar contents and it is therefore difficult to map the factors starting from the definitions given by each single group.
- III. A meaningful reflection point is related to the reflections described above. Using the same analysis process, each group generated outputs that are tied to their specific topic. The common results get in this way consolidated and gain value because they come from different experiences and knowledge. As researchers we aligned and clustered factors that, even if different words, expressed the same concept.
- IV. Using two different posters to write the challenges coming from the two different topics was effective. The participants could indeed separately visualize the challenges of DIY&Creative Society and DiDIY&Legal System. This visualization helped them to generate challenges that are relevant for their topic.
- V. The working group of DiDIY&Legal System, formed by a higher number of participants, generated interesting and full of information discussions. The analysis of the case study was more accurate and complex since many points of view were taken in consideration and therefore some new aspects emerged.

5.2 Generative workshop on DiDIY&Creative Society – Milan

See flow description in section 6.

Tools

Please refer to chapter 5 in D4.7 and D3.4 for the description of the last improvement of the 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.



After the identification of the scenarios, the participants were asked to re-write the challenge based on the discussion just carried out, in order to make the challenge more consistent and closer to the inputs given by the participants. The participants were moreover suggested to use images in order to enrich the visual re-writing of the challenge.

Idea Description – see section 4.5 in D4.7

The template was not used in this workshop.

Factors star

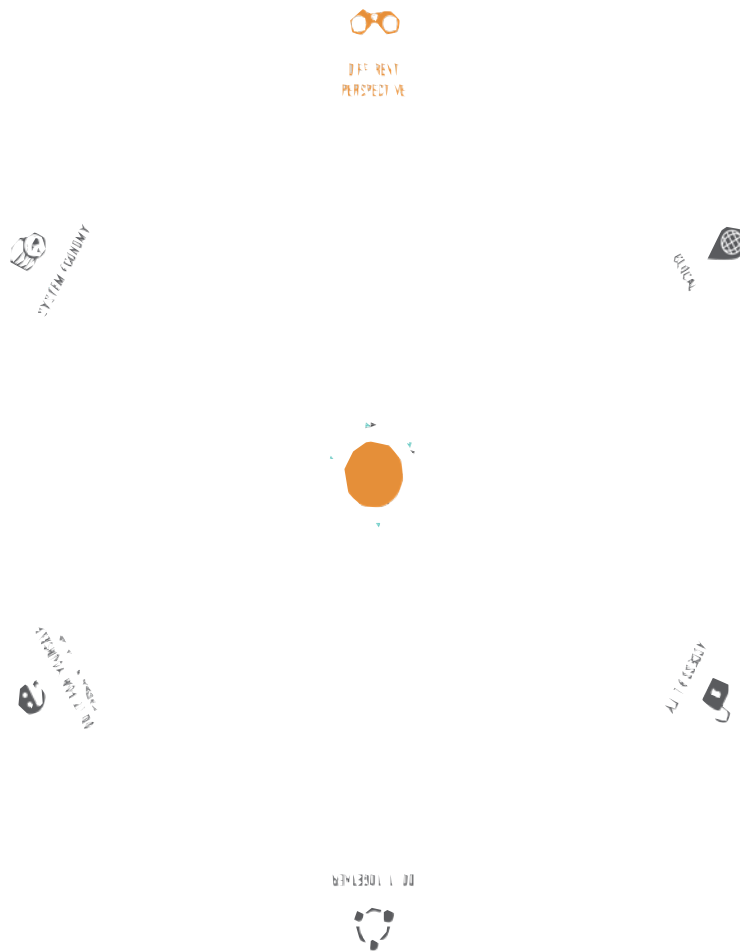


Figure 7 – The Factors star.



Project Description – see section 4.5 in D4.7

The template is not used in the DIY&Creative Society 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. 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 reasoning 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).
- II. To fill the gap identified in the previous generative workshops in the topics DiDIY&Education (please refer to section 5.3 in D4.7) and DiDIY&Organization and Work (please refer to section 5.2 in D3.4) some research materials were given to the participants, such as papers, brochure or interesting articles. This paper material didn't work because it was too dispersive and long to read.
- III. The collection of information from the participants was decisive for the success of the generative workshop. For this reason a template is sent in advance to the participants in order to stimulate them to gather everything they know regarding the given challenge. During the workshop one participant was very good prepared, since she read a lot about the topic and researched many case studied and information, and this represented a great contribution in the development of the scenario.
- IV. The difficulty of this phase is the setting of a research from people that are not used to do it. In the Toolkit it is therefore needed a tool that supports and facilitate the gathering and the organization of the information.
- V. The brainstorming phase generated many ideas that, due to the absence of time, weren't clustered, were not given a title and were not properly selected. As a consequence the idea selection wasn't based on the solid criteria identified during the workshop implementation and so the ideas that were selected could be not the best one.
- VI. 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.
- VII. An important step was jumped, since the template for the description of the idea wasn't given to the participants. However this gave the possibility to conclude on time the definition of the idea and start early to visually design the idea, making it tangible through the prototyping.



- VIII. 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.
- IX. The redefinition of the timing of the prototyping and of the project-building phase made this activities even more effective. Anticipating the inclusion of the factors and of the related questions made this inputs a concrete help for the development of the idea and not a simple verification.
- X. 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. The lack of this conclusion leads the participants to forget the specific contribute each factor is adding to the project.

5.3 Integrated explorative + generative workshop on DiDIY&Creative Society – Barcelona

See flow description in chapter 6. *Workshop in DiDIY and Education Experience*

Tools

In this section, only the tools that were implemented with respect to the indications of the previous workshops are described.

Please refer to chapter 5 in D4.7 and D3.4 for the description of the last improvement of the tools.

Facilitator Card

The facilitator cards have been created as instructions for participants to allow them to learn the activities and facilitate them during the session. An A5 card for each activity has been created.














<p>ACTIVITY CARD - GAMEBOARD</p> <p>WHAT Analyze the case study using guided questions.</p> <p>WHY This activity helps to enter in empathy with the context of DiDIY and identify the key aspects of the case study presented.</p> <p>WHO The facilitator and the conciliator together with all the group members.</p> <p>HOW The facilitator, the conciliator and all the group members read the case study presented in the booklet. Additional information can be found on the back page. After reading, the all groups analyze the case study using the gameboard and the related cards. The facilitator picks one card, flips it and reads the questions proposed. There are 3 topic of questions: people, key components and impacts. All the group answer each single question writing their thoughts on post-its. The facilitator stimulates the conversation and makes sure people are talking one at a time. To get a useful result, it is important to write a single thought on each post-it, in order not to confuse them afterwards. Each member writing a thought on post-its places it on the board, in the related topic area. The same process is repeated for the cards. When the conversation gets stuck in talks that are not useful for the sake of the analysis, the conciliator understands it and proposes to stop it and get back to more meaningful considerations.</p> 	<p>ACTIVITY CARD - CLUSTERING</p> <p>WHAT The material gathered with the use of the gameboard is analyzed and classified, in order to identify the fundamental factors of Digital DIY. This factors are confronted with given ones.</p> <p>WHY This activity helps the group members to identify the fundamental factors of Digital DIY extrapolated from the case study, in order to build a group's understanding of the topic and to collect some reference points for the further steps of the process.</p> <p>WHO The facilitator together with all the group's members.</p> <p>HOW The facilitator prepares the working session hanging the "star" template on the wall. The facilitator suggests to take a step back and look holistically at the gameboard's results. Helped by the group members, he moves and replaces the post-its containing similar thoughts in the rays of the star in order to form some clusters. The clusters are made of thoughts that are similar one to the other and express the same concept. Every ray of the star contains a different cluster. In case the clusters emerged are more than 5, the group members can decide to add additional rays to the star. Once the clusters are formed, a title is given to each cluster. The title represents a fundamental factor of Digital DIY. To be more specific, the facilitator and all the group members give a definition to each single cluster, in order to identify the meaning that the factors have for the group. Afterwards the facilitator picks the "fundamental factors" template and, together with the group, confronts the emerged clusters with the given ones. The confrontation is useful to either change some clusters or add additional ones. The group can even decide not to pick any of the proposed fundamental factors but to keep the initial ones.</p> 	<p>ACTIVITY CARD - WISFUL THINKING</p> <p>WHAT Starting from the inputs gathered during the analysis phase, each group member envisions a scenario that could be interesting to investigate in the Digital DIY field. Afterwards the group agrees on a single scenario.</p> <p>WHY This activity helps to envision different scenarios that could interesting to investigate.</p> <p>WHO The facilitator together with all the group's members.</p> <p>HOW The facilitator distributes to all the group member the "wishful thinking" template. Each team member envisions a scenario, taking inspiration from the material collected and the discussions that went on during the analysis phase. In order to help the envisioning process, the members can decide to either write in words or to sketch the scenario. The visualization of the scenario can also be done by a collage of pictures. At the end of the activity, each group member shares with the others its own scenario. Once everybody has shared, the facilitator moderates a conversation about the most interesting ones. The aim of the conversation is to get to the identification of a single scenario, that could be either the election of one of the available ones or a mix of more scenarios. In case of a mix, the facilitator makes sure the scenario is not too wide but keeps on being quite specific and fills it in an addition "wishful thinking" template.</p> 	<p>ACTIVITY CARD - KNOWLEDGE SHARING</p> <p>WHAT All the group members share among them the useful information or the interesting case study they know that can enrich the chosen scenario.</p> <p>WHY This activity helps to explore what is already existing, gather additional material and get more in deep in the understanding of the scenario.</p> <p>WHO The facilitator together with all the group's members.</p> <p>HOW The facilitator distributes post-its to each group member and tells out loud the scenario. Each team member shares with the others additional information, such as data, facts, emotions, risks or added values. At the same time all the interesting case studies that could be related to the scenario are gathered and shared. All this inputs are written by the participants on post-its and further given to the facilitator. The facilitator sticks the post-its in the related area of the template "Knowledge sharing". The facilitator makes sure that each single information or case study is written in a single post-it.</p> 
<p>ACTIVITY CARD - CHALLENGE IDENTIFICATION</p> <p>WHAT Identification of a clear and concise challenge statement, shared among the group. The further steps of the process will concentrate on the specific challenge statement identified.</p> <p>WHY This activity helps to agree on a single challenge statement and narrow down on a specific issue of the wide topic of Digital DIY.</p> <p>WHO The facilitator together with all the group's members.</p> <p>HOW The facilitator, helped by the group members, points out the following elements: subject, action and object using the "challenge identification". These elements are the ingredients of the scenario matched together with the useful inputs gathered in the knowledge sharing. Once the elements are identified, the group members combine them, forming a question that begins with: How might ... *How do...?/In what ways...?.</p> 	<p>ACTIVITY CARD - INSPIRATIONS</p> <p>WHAT Fill in the inspiration cards to be used during the brainstorming.</p> <p>WHY Inspiration cards are stimulus to be used when the group gets stuck in the generation of ideas.</p> <p>WHO The facilitator together with all the group's members.</p> <p>HOW Three different inspiration card's typologies exist: Character, Innovation pill and Anecdote. The facilitator distributes to each group's member one card for each typology, in order to be filled in following the instructions written on the card. At the end of the activity the facilitator collects the cards of all the participants and puts them aside, in order to be eventually used in the brainstorming phase.</p> 	<p>ACTIVITY CARD - BRAINSTORMING</p> <p>WHAT Generate as much ideas as possible to overcome the given challenge.</p> <p>WHY The divergent phase of ideas generation is useful to gather a lot of different inputs and stimulus to later on get to the definition of a concrete and meaningful idea for all the group. In this phase the goal is indeed to go for the generation of a big quantity of ideas, regardless of any kind of limitation.</p> <p>WHO The facilitator together with all the group's members.</p> <p>HOW The facilitator prepares the working session, hanging a white poster on the wall and distributing post-its and markers to each group member. All the group gathers around the poster in a half circle. The facilitator suggests each group member to write one idea at a time and to write just a single idea every single post-it. Each group member reads out loud his idea and gives the post-it to the facilitator, who sticks it on the poster. All the group members do so, until all the ideas are shared and new ones arise. Every time the facilitator realizes that the group is stuck and is lacking inputs, he uses the inspiration cards filled in beforehand. The facilitator indeed picks up a card and in case it is a "Character card" asks the group to generate ideas putting themselves in the shoes of the character. In case the cards are "Innovations Pill" or "Anecdote" ones, he asks the group to generate ideas getting inspired by the proposed content.</p> 	<p>ACTIVITY CARD - IDEAS CLUSTERING</p> <p>WHAT The emerged ideas are clustered according to their typology and affinity. A title is given to each cluster of ideas. The title is an evocative one, in order to quickly communicate the meaning of the idea.</p> <p>WHY This activity allows the clustering of the emerged ideas in concrete and defined solutions.</p> <p>WHO The facilitator together with all the group's members.</p> <p>HOW The facilitator, helped by the group members, moves and replaces the post-its containing similar ideas in order to form some clusters. The clusters are made of ideas that are affine to each other or of inputs that are not proper ideas but could add specifications to the cluster itself. Once the clusters are formed, a title is given to each cluster and written in a post-it of greatest dimension. The title should be evocative and meaningful, in order to identify the cluster in a unique way.</p> 
<p>ACTIVITY CARD - IDEAS SELECTION</p> <p>WHAT The best ideas are selected through a voting system. The voting system is based on 3 parameters used to analyze the clusters emerged during the divergent phase. The 3 parameters are the technological feasibility, the business efficacy and the desirability for the user.</p> <p>WHY This activity helps the group concentrate on the further design of a single idea (or a single cluster).</p> <p>WHO The facilitator together with all the group's members.</p> <p>HOW The facilitator distributes to each group member 3 markers of 3 different colors. Each color represents a different voting parameter (for example one color represents the technological feasibility, another one the business efficacy and a third one the desirability for the user). The vote is individual and each member can assign 3 votes for each color. Starting from a parameter, the member decides whether to assign 3 votes to a single cluster or to distribute them to different clusters. The same process is repeated for all the 3 parameters, using the reference colors. Each group member indeed has in place 3 votes, 3 for each parameter. At the end of the vote the facilitator selects the most voted cluster, considering also the distribution of the parameters (for example a cluster with 2 votes for the technological feasibility, 2 votes for the business efficacy and 2 votes for the desirability for the user will be better considered than an idea with 4 votes for the business efficacy).</p> 	<p>ACTIVITY CARD - PROTOTYPING</p> <p>WHAT The selected idea is made tangible through the building of a conceptual prototype with simple and easy to manipulate materials.</p> <p>WHY Prototyping is a way of thinking and designing through the physical building and the visualization of an idea, in order to help the discussion among the group members, the comprehension of the idea itself and its further development.</p> <p>WHO All the group members.</p> <p>HOW The facilitator and all the group members start conceptually building their ideas using the given materials. To prototype at best it is important to keep an open and free of prejudices mindset. Some best practices are: - Start building something; even it is not perfect or complete, just pick up something and imagine what it could represent and how it could be used to envision even just a part of the idea. - Don't be afraid of the aesthetic quality of the result, just concentrate on using the prototype as a design mean that helps making the idea tangible. - Feel free to use all the given materials as you prefer: a pen could turn into a magic wand, a straw with some colored stickers could turn into a traffic light, etc. After an initial prototyping phase the group members further design the idea through the fundamental factors identified in the exploration phase. The facilitator picks up one by one the star's rays that identify the fundamental factors and reads the definition and the related questions. All the group members answer to the questions or get inspired by the descriptions, going on building the prototype by adding details or by redesign some aspects.</p> 	<p>ACTIVITY CARD - FUNDAMENTAL FACTORS</p> <p>WHAT The key elements of the fundamental factors are identified and crystallized.</p> <p>WHY This activity fixes the fundamental factors of Digital DIY as a guide line and a continuous reference point for all the group members.</p> <p>WHO The facilitator together with all the group's members.</p> <p>HOW The facilitator goes through the template's areas containing the fundamental factors. Together with all the group members, writes inside each area some keywords or some short sentences that summarize how the fundamental factors are expressed in the idea.</p> 	

Figure 8 – Facilitator cards.

*Input

Not all the cards were used. Each card should explain, in a simple and effective way, what is the activity and how to conduct it. The card should report also tips to help facilitator during the session. The deck of facilitator cards represent the flow of the workshop session.



Wishful thinking + Poster Challenge

A new activity was added at the workshop flow for the challenge identification. The tool used are Wishful thinking card and the Writing challenge poster already used in the 1st Workshop Pilot in Barcelona.

WISHFUL THINKING



ENVISION A SCENARIO

WOULDN'T IT BE NICE IF...



Figure 9 – Wishful thinking template.



CHALLENGE IDENTIFICATION

IDENTIFY THE INGREDIENTS OF THE CHALLENGE

<p>SUBJECT INDIVIDUAL OR GROUP RESPONSIBLE FOR THE CHALLENGE</p>	<p>ACTION VERB THAT SPECIFIES THE KEY ACTION TO BE CARRIED OUT IN THE CHALLENGE</p>	<p>OBJECT SPECIFIC FOCUS OF THE CHALLENGE</p>
---	--	--

WRITE THE CHALLENGE STATEMENT

HOW MIGHT ... ? _____

HOW DO...? _____

IN WHAT WAYS...? _____



Figure 10 – Challenge identification template.

***Input**

The activity lasts more than expected because the background of the people involved was very different and they had difficulties to work on a common challenge.

Summary reflections

- I. 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.
- II. Unlike the previous workshops, in this workshop the context of using the Toolkit was reproduced, putting the participants in the condition of actively contribute to the management of the creative session. The research group indeed gave clear instructions for the facilitation of each activity through the “Facilitator cards”. The cards were given in turn to different participants at the beginning of each activity. Each participant was given a short moment to read the card, understand how to manage the group to than play the facilitator role during the activity, supported by the research group. The participants facilitated the



activities with different modalities and abilities, obtaining in this way different results. In particular it was noticed how a participant with experience as an innovation consultant was more able than others in the management of the group and in the reworking of the reflections proposed by the participants during the activity.

- III. The clustering and the individuation of the fundamental factors activities were carried out in a different way from the other workshops. The participants were asked to integrate the reflections emerged during the analysis with the fundamental factors presented through the tool “Factors star”. In this way the participants could both amplify and enrich the definition of the factors, and identify new factors not yet present.
- IV. The clustering activity was facilitated by one of the participants that, after reading the specific “Facilitator Card”, led and managed the group defining the modalities of conducting the activity. The facilitator started to select some post-its from the gameboard and move them on the ray of the factor to be implemented. This led to an accumulation of post-its in the different rays making it more difficult to read and understand the reflections done before. This brings to the consideration that it is fundamental to give precise instructions about how to carry out the activities, not only indicating what to do, but also indicating how to do it.
- V. In this session of the workshop a new activity of the identification of the challenges was experimented, using the Wishful Thinking technique. Each participant wrote a wishful thinking on a specific card and then shared it with the other participants in order to define some common challenges. The choice of a common seed idea was difficult for two main reasons: on the one hand the activity was done after the lunch break and so the flow and the continuity with the clustering was interrupted; on the other hand the different background and the interests of the participants made it difficult to find a common challenge.
- VI. 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.
- VII. The prototyping phase and the project-building with the fundamental factors of DiDIY was skipped. The research group decided to emphasize the previous clustering and wishful thinking activities because of the richness of the content of discussion.

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.

- In terms of number of participants, the optimal number for the complete session of co-design (exploratory and generative) is 5-6 people.
- 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.

- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- For the success of the workshop it is fundamental that the participants share a common goal, so that it becomes easier and more meaningful to find an agreement among the participants in the brainstorming, idea selection and further development phases. To have a common goal also enhances the engagement level and the diligence of each participant.
- After the experimentations and the experience gained during the workshops, the use of the fundamental factors as a tool is considered meaningful. Through the Toolkit the participants will be able to use these factors as a guide line for the design and the implementation of the idea. They will have a supporting tool that they can modify, where they can add elements or take some off according to the results of the gameboard. The Factors star becomes indeed a flexible and not static tool. Given the wideness and the speed of evolution of the DiDIY phenomena the use of flexible factors is indeed fundamental.



6. Workshop in DiDIY and Creative Society Experience

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

6.1 Workshop general aims

The contribution of the research is to detect change of the creative process enabled by digital technologies in the four areas of the project, including “creative society”, and develop new tools to support the process itself. To this purpose, co-design workshops have been planned as a promising means to both understand DiDIYers’ creative process and create tools fostering creativity, which is considered the most relevant key competence of the next century for the research group. In other words, the co-design workshops aim at exploring how digital technologies for production (e.g., additive manufacturing and coding) and sharing (e.g., open source) may influence and modify creativity. The POLIMI expertise on co-design approaches and tools has been applied for the identification of the dynamics underpinning creativity through participatory activities and the production of tools which can be used to foster the creative process.

Other key competences will be considered, including critical thinking, collaboration and communication, as they resulted to be evident in the contemporary phenomenon of digital making.

Specific aims are:

- I. identify how digital technology, motivation and commitment, and collaboration may affect the creative process of workshop participants;
- II. verify the efficacy of digital technologies when applied to both the investigation and the development of creativity and other selected key competences;
- III. infer and argue about how the role of design changes in the era when everybody design, highlighting the potential of co-design.

Specific topics to be addressed

The specific topics is understanding how creativity (involving divergent/convergent thinking and association of ideas from different realms) is affected by three factors (i.e., digital technology, motivations and collaboration) and how to implement these dynamics with codesign tools. The interpretation of the three factors is briefly described below.

Technology includes digital devices for production and sharing. The evolution toward digital technology facilitates both the connection of people and the accessibility to tools with appreciable results in a relatively short-term substantially.

The **motivational aspects** of DIY practice widely intended are believed to be crucial for sustaining the practice over time. The practitioner is supposed to persevere (or being strongly motivated) in overcoming the difficulties related to self-organization and the use of spare time on the one hand, and on the other social interactions when collaborating and participating.

Collaboration, both with peers (i.e., other DiDIYers) and with facilitators (who are acknowledged as so by the DiDIYers) is believed to be possibly the most significant element characterising the latter evolution of conventional DIY towards the digital one. Collaborating is an opportunity to acquire knowledge and develop skills through other peers, to strengthen social bonds and to make



an impact on a wider level than the individual one, which are less likely to happen in conventional individualistic DIY.

1. Creativity

The workshop investigates how technology can unlock people's creative potential through design thinking and cross-collaboration, giving them a structured design process; how society is influenced by a diffuse creativity and what are the future trends. As mentioned above, the main interests is understanding how creativity is affected by different factors and how to implement these dynamics with co-design tools.

2. Creative Process

The workshop identifies how digital technology, motivation and commitment, and collaboration may affect the creative process of workshop participants. Technology includes digital devices for production and sharing. The evolution toward digital technology facilitates both the connection of people and the accessibility to tools with appreciable results in a relatively short term substantially. The motivational aspects of DIY practice widely intended are believed to be crucial for sustaining the practice over time. The practitioner is supposed to preserve (or being strongly motivated) in overcoming the difficulties related to self-organization and the use of spare time on the one hand, and on the social interactions when collaborating and participating. Collaboration, both with peers (i.e., other DiDIYers) and with facilitators (who are acknowledged as so by the DiDIYers) is believed to be possibly the most significant element characterising the latter evolution of conventional DIY towards the digital one. Collaborating is an opportunity to acquire knowledge and develop skills through other peers, to strengthen social bonds and to make an impact on a wider level than the individual one, which are less likely to happen in conventional individualist DIY.

3. Role of design

The workshop can infer and argue about how the role of design changes in the era when everybody design, highlighting the potential of co-design.

What does it mean to design in a world characterized by a diffuse creativity?

What is the role and the identity of design (and designers) in relation to digital DIY emerging practices?

How does the designer's role and professional expertise fit into this new landscape?

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&Creative Society – Milan

The explorative workshop on DiDIY&Creative Society was held in Milan on 23th September 2016. In this workshop the DiDIY&Creative Society topic and the DiDIY&Legal System one are worked out together.



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. Makers and designer who work in FabLabs, Fablab manager, Expert in digital innovation, start upper that create business by using open source method or digital tech, students who work with new technologies, tinkering's expert.

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, “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. Since inside the same workshop the DiDIY&Creative Society and the DiDIY&Legal System topics are treated together, 2 groups of 4 participants each are formed for the DiDIY&Creative Society one, while 1 group of 6 participants is formed for the DiDIY&Legal System topic. 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 the 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 facilitator writes down in two different posters hang on the wall the challenges of the two different topics (DiDIY&Creative Society e DiDIY&Legal System).

The challenge are 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 11 – Scenes from the workshop.



Figure 12 – Scenes from the workshop.

6.2.2 Generative workshop on DiDIY&Creative Society – 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: just one single participant 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. Students who work with new technologies, Makers, Designer who work in the digital field, a representative from a company interested in this thematic, people running co-working spaces or start up incubators.

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 first 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 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 2 working groups, 5 participants each.

To give an overview, 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.

To deep dive in details, 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. Due to absence of time, the best idea is selected base on the personal feelings of the participants. After a break, the idea is talked about and then the participants 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 13 – Scenes from the workshop.



Figure 14 – Scenes from the workshop.

6.2.3 Integrated explorative + generative workshop on DiDIY&Creative Society – Barcelona

The integrated workshop on DiDIY&Creative Society was held in Barcelona on 1st 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. – 7.00 p.m. (6 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. Designers, creativity consultant, digital artists, museum education supervisor, innovation consultant 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

Unlike the previous workshop, in this session the flow of activities is structured in such a way that reproduces the structure proposed inside the Toolkit and the guidelines in development. Each activity is explained through a “Facilitator Card” that is given in turn to a different participant at the beginning of each activity. Each participant had some time at the beginning of the activity to read the card, understand how to manage the group to then play the role of the facilitator during the activities, support by the research group.

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 a work group.

The first activity started and the first facilitator, randomly chose among the participants, assigned some roles inside the group: the conciliator and the notekeepers.

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 group clustering activity which was conducted with a different modality compared with the previous workshop. First of all a new facilitator was elected among the participants to lead the new activity, trained by a specific “Facilitator card”. The participants did a clustering integrating the different reflections emerged from the analysis with the fundamental factors presented through the Factors star. Then the participants had the possibility to amplify and enrich the definition of some factors and at the same time identify new factors not yet present. The workshop continued in the afternoon with the activities leading to the challenge identification.

Firstly, the wishful thinking activities in which each participant wrote on a specific card a desired challenge to share with other colleagues. The participant discussed the different desires in order to arrive to a common final challenge to bring to the next step.

The activity was facilitated by the research group as so the next brainstorming activity. During brainstorming multiple ideas were generated and one was selected to be explored and deepen.

The next prototyping phase and the project-building with the fundamental factors of DiDIY was skipped. The research group decided to emphasize the previous clustering and wishful thinking activities because of the richness of the content of discussion.

The workshop ends with a debrief in a plenary session to collect feedback about the workshop flow, activities and tools.



Figure 15 – Scenes from the workshop.



Figure 16 – 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&Creative Society, 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 WP5 on Creative Society. The section presents the data collected at the explorative and generative workshops on DiDIY&Creative Society 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 7.3 reports the results that 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 WP5 on Creative Society.

7.1 Results of the explorative workshop on DiDIY&Creative Society – 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 elements

Fundamental elements from “Open source ecology”

(Cluster linked to the specific case study)

This classification and implementation was carried out by the reflections resulting from the Open Source Ecology case study. The group, after having analysed and discussed the project, as shown in the project-building section, identified the main concepts that emerged with the help of the facilitator.

Participants: Makers who work in FabLabs, professionals in the digital field, students of industrial design.

Elements that emerged

Sharing that creates community and knowledge. The sharing of knowledge allows the creation of a community of people similar to each other who share the same life style. Through the sharing of production processes the collective knowledge grows and gets enriched.



Trust others and the self. The community can exist if there's mutual trust and attention among the components. Moreover it is fundamental to trust the others and himself/herself and his/her capabilities. When an individual builds up a product using open source instructions he/she needs indeed to trust other individuals and mostly to trust the information that are shared and the testing process done collectively. In the end the individual needs also to trust himself/herself and his/her capabilities in building up complex objects.

Self-learning and loss of intrinsic knowledge. The sharing of knowledge allows the individual to use the information, access to knowledge and independently learn. At the same time there is some intrinsic knowledge of specific fields that cannot be transmitted through an online sharing of information.

Review of work related roles. The possibility given to individuals to independently learn and self-build also complex objects carries the risk that the role of some traditional professionals gets discredited (for example the job of architects or engineers). As a consequence this professional roles could need to review their professional roles and the service they offer, in order to reinvent on the basis of the changes brought by DIDIY (for example an architect could become a certificatory of self-built houses). At the same time the individual who acts in a DIDIY perspective needs to develop not only digital and building competences, but also the capability of selecting among the many information available online what are the most relevant.

Long term planning and slow production of life. In order to act in a DIDIY perspective the individual needs to develop the capability to plan what he/she needs in a long term, in order to have the needed time to start a self-production which means a slower production then the traditional one. This means that the individual must want to give up some benefits of the traditional economy that would allow him/her to buy what he/she needs in a fast and immediate way, without the need to plan the building. This kind of long term planning and slow production becomes more or less applicable according to the scope of each single individual in self-building (for work or for hobby).

New currency. The mechanisms of DIDIY open up new business modalities, that are often not based on money exchange but based on an exchange of information and knowledge, creating in this way a sort of new currency. Anyway this new currency is more difficult to quantify than the traditional one and, since many information and knowledge are shared, it gets difficult to give it an exact value. Moreover this new currency and new business modality is adopted from particular kind of people, that think in a different way than others more connected to traditional business models.



everyday situations and problems in private and professional life from a different perspective. This is valid both for the individual and the obsolete public structures that need to adopt new modalities to adapt to the change of the society (for example the fragmentation of institutions and organizations, factory+fablab).

Accessibility. Possibility for the individual to access to personal resources in order to grow and to have the freedom to reinvent himself/herself. Digital technologies allow indeed to develop both specific technological competences and soft/life skills that enable the individual to follow his/her own interests and to experiment new capacities in order to reinvent himself/herself both at a professional and private level.

Activator. Figure that supports the activation of the participation and the relationships inside the community. The figure of the activator is indeed necessary for the creation of a local and a global community, hold together by a common need. The activator is the one that keeps the motivation to participate to the community high and builds up and strengthens the relationships inside of it. An example of this figure is the community manager.

Translation of the language. An enabling factor to participate to DiDIY activities is the simplification of technological and scientific languages to give to all the citizens the possibility to get closer to this sector and take advantage of the potentialities of digital technologies. The FabLabs are indeed translators, as well as all the people working for similar organizations (e.g., tinkering laboratories). Also some physical and digital tools are considered translators (such as Little Bits, Scratch, ...) because they are specifically designed to translate complex languages (such as coding languages) in “learning by doing” tools to develop competences and enable the learning of that languages.

Do It Together. Collaborative processes that enable the activation of citizens and the sharing/democratization of knowledge. The creation of a community dealing with local needs enables the citizens to work and create together, learning from each other and with the others, and sharing experiences and knowledge that can empower the individual. Enabling factors for the sharing of knowledge are the documentation thought videos, tutorials, pictures and the availability of both online and offline sharing moments.

Low cost technology. Thanks to digital production technologies it is possible to create artefacts, even very important for the life of the individual, with low costs and avoiding many production steps. Furthermore the technology gives the possibility to personalize and readapt the artefacts according to the specific needs of the individual.



Figure 18 – Fundamental elements from “Public Lab”.

Common DiDIY fundamental elements

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

1. Economy of DiDIY – DiDIY applies to different business modalities, some related to traditional business logics (e.g., Fab Academy) and some related to the use of new exchange currencies that are not driven by an immediate economic gain but rather on other forms of remuneration (such as share of knowledge, enhancement of the reputation, personal satisfaction, sense of belonging to a community, etc.). This can both express the values and the ideals of the individuals who put actions in place, both generate for some of them a proper economic gain.

2. Sharing of competences – The sharing action is a fundamental factor since knowledge and competences should be shared and accessible to everybody in the DiDIY scenario. To make it happen it is necessary a careful documentation process, in order to let the community self-learn starting from shared information. In this way the individual has the possibility to gain competences

to be used in his/her own professional sphere and at the same time gets the chance to reinvent himself/herself in the personal sphere.

3. Do It Together – Do it together is a fundamental factor since the creation of a community enables the individuals to share and create together. It also gives the possibility to confront with similar people, who share the same lifestyle and the same ethic. However it is necessary that the sharing practice happens not only online but also offline through local meetings.

4. Sense of trust – To realize DiDIY artefacts it is necessary that the individual trusts his/her own capacities. Furthermore the individual should be able to trust the knowledge shared by the community that not always had the time to be tested and controlled. Anyway a general sense of responsibility is necessary, as well as a supporting legal system.

5. Low cost technology – Low cost technologies enable to create artefacts, even very important for the life of the individual, with low costs and avoiding many production steps. Furthermore the technology gives the possibility to personalize and readapt the artefacts according to the specific needs of the individual.

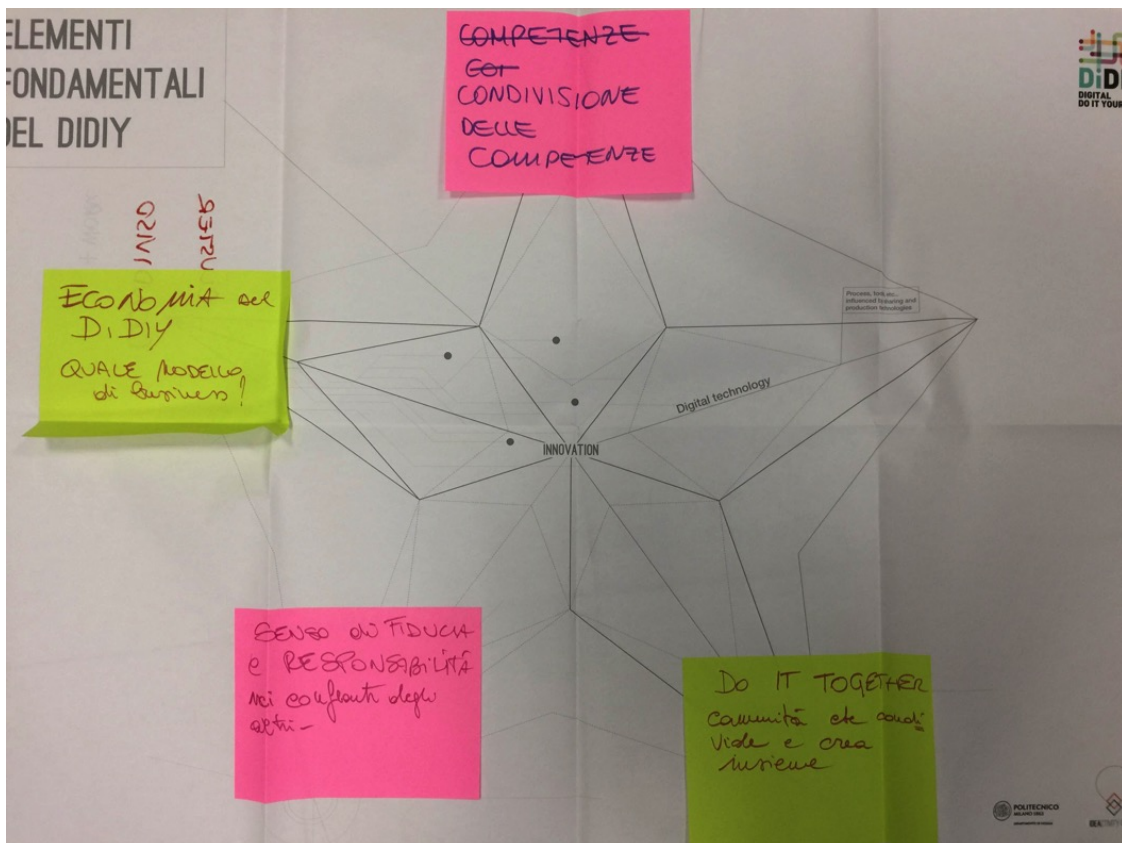


Figure 19 – Common DiDIY fundamental element.



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 might we...?”

Challenges

- I. How might we design an effective mean to enhance the quality of the designed products?
- II. How might we identify some roles to ensure the quality of projects?
- III. How might we help the medium user to select the project that best suits him/her?
- IV. How might we design tools to facilitate the meeting between demand and offer?
- V. How might we help makers to realize the innovative factors of their projects?
- VI. How might we create a balance between the democratization of DiDIY and the fact that it is somehow a niche practice?
- VII. How might we spread the potentials and the limits of DiDIY to a wider public?
- VIII. How might we enhance the DiDIY as a self-learning tool that places side by side practice and theory?

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 did a clustering, integrating the reflections emerged in the analysis phase with the fundamental elements presented through the tool Factors star. The participants had the possibility to amplify and enrich the definition of some factors and at the same time to identify new factors not yet present.

7.2.1 DiDIY fundamental elements

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 identified the main concepts that emerged and integrated them with the DiDIY fundamental factors on the star tool.

Participants

Designers, Creativity consultant, Digital artists, Museum education supervisor, Innovation consultant.

Elements that emerged

New factors



Implications of your project: in a DiDIY project, during the realization of a products, is it important to think about how much your project is going to affect people and machine emotions, taking into consideration sensibility, aesthetics, ethics, politics. The sensibility means how we perceive the objects and how the object perceive us. The human is displaced from the centre of our thinking. The ethics and aesthetics of a product affect the sensibility.

Integrated factors

System economy: A fundamental factor of DiDIY is the presence of business models based on new earning logics that rely on open knowledge and active participation of the community that creates this knowledge (e.g., open source). This leads to the rise of a new exchange currency that correspond to values, information, visibility and knowledge.

The concept of Psychopolitics has been added at the System Economy factor as an important aspect when thinking about the future. This concept reflects on the idea that the huge possibility of connections and information, the active participation and the sharing of ideas, wishes, opinions increase the spread of a psychopolitical control. Are we free? Through big data, our psyche is quantified and mapped.

How can society can participate at control/self-control?

During the workshop the participant raised creativity as a tool to put under question the present and to find different perspective to rethink society.

Another concept added at the System Economy factor is the idea of fighting consumerism and programmed obsolescence through DiDIY. People buy less objects because through digital technologies is possible to repair and reuse products. This will positively reflect on the environment.

Do it for yourself: A fundamental factor of DiDIY is the motivation, intrinsic or extrinsic, that is given to the people that are participating to the project, in order to trigger their actions.

The concept of happiness has been identified as important to increase the motivation of people to active participation. People are happy for building new things, make ideas real and for collaborate with others.

Do It Together: A fundamental factor of DiDIY is the presence of a community of individuals, who share the same interests and ethic, that actively participate in the shaping of an ecosystem, characterized by the active sharing of knowledge, competences, spaces and tools.

Participants add the reflections about the importance of being physically together during collaboration in order to achieve better results.

Different perspective: A fundamental element of DiDIY is the need for people to look at the society with a new perspective and to identify their own active role in generating change.



Participants added the idea that it is important to build up new models based on the model of the past (i.e., artisan dimension).

7.2.2 Design Challenges

The definition of the design challenges starts from the Wishful thinking activity described in Section 3.5. Each participant write a wishful thinking on a specific card and then share it with the other participant in order to define some common challenges.

Wishful thinking

- Wouldn't it be nice if we could connect with Experts or "Gurus" that can help us/guide our projects or creation process?
- Wouldn't it be nice if technology could learn to recycle itself? Find ways to have technology closer to natural flow (Everything recycled).
- Wouldn't it be nice if through Internet of things we can create a device that can help invalid people to control home appliances?
- Wouldn't it be nice if we can make points of information about new technologies in the street for everybody to give all the people the know-how?
- Wouldn't it be nice if we can create a platform to buy things, products, food, clothes with it manufacturer close to you?
- Wouldn't it be nice if we can create a new ecology of technology library in order to create a common heritage?

Challenges

- How might we help people to control their home with the help of their creativity?
- How might we help people to create a creative common language or code in order to filter, collect and cross information in the same way all over the world?
- How can we translate emotions through the internet?
- In what ways can we create green access of the knowledge?
- How might we guide people to find information with a specific point of view/filter?
- How can we use the creativity of people in order to build a bridge through the virtual and real life?
- How can we help people to balance virtual information with real problems?
- How can we create a database of expert information that can lead people to solve their project?
- How can we create an aesthetic and emotional culture in DiDIY?

7.3 Results of the generative workshop on DiDIY&Creative Society – 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. Lastly, the participants planned this idea in the details, considering the fundamental factors identified in the exploration phase.



Participants

Group 1 – Makers who work in FabLab, small businessmen, students who work with new technologies, design consultants

Group 2 – Students who work with new technologies, makers who work in FabLab, designers who work in digital contexts.

Challenge

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

How might we spread the potentials and the limits of DiDIY to a wider public?

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.

Scenario – Group 1

Digital technologies are spreading more and more in environments like FabLabs or Maker Spaces where they are used by people particularly interested in the topic. However they are not yet getting closer to people that are into other topics and therefore do not enter in daily contact with the possibilities offered by these new production modalities. To fill this gap it is therefore fundamental that new technologies get closer to the daily life of people that are not used to this topic and that don't own or don't want to own these technologies, in order to involve them in the acquirement of knowledge and in the acquisition of a digital mindset. People do not have indeed to get closer to technologies, but instead technologies have to get closer to people.

Scenario – Group 2

The generation of the Millennials and the generation of the Pre-Millennials are very different from each other because of their different perception of personal growth, company's hierarchies, human relationships and concept of belonging. At the same time their level of adoption and use of digital technologies is very different both in the private and the professional sphere. Filling this gap becomes therefore fundamental, in order to spread the use of digital technologies even within the Pre-Millennials generations and let them perceive the potentialities of the digital making.

7.3.1 Brainstorming

Brainstorming ideas

After having constructed the scenario, the participants took part in a brainstorming session to find concrete ideas in the scenario described. Lastly, a single idea was selected.



Brainstorming – GROUP 1

- **Supermarkets:** Installation of are in supermarkets where children, together with parents, can 3D print food (e.g., chocolates, biscuits, ...), in order to get closer to the possibilities offered by digital technologies.
- **Spare parts:** Installation in supermarkets or in technology specialized shops of areas where to 3D print the spare parts of the technological products already bought., in order to transform these shops not only in places where to buy, but also in places where to fix, taking advantage of digital technologies.
- **Waste sharing:** Network of companies that share among each other the production wastes, in order to recycle them and give them a new life, also through their adoption in other production environment. Furthermore companies can “fuse” the waste material and make it a material to be used for the 3D printers.
- **Creative museums:** Interactive areas in museum where everybody can create his/her art piece using digital production technologies. The art pieces are then exposed in the museum.
- **Sweets:** Restaurant where it is possible to self-print own sweets (e.g., chocolate). The sweets can be both standardized and personalized by the users. The personalized sweets can afterwards be shared among a community.
- **Christmas gifts:** Initiative to be done in Christmas time that consists on bringing in different companies 3D printers and involve the employees in printing the Christmas gadget to be given to their clients or to their families.
- **Locator:** Mobile application that gives the possibility to geolocalize the places inside a specific city where digital technologies are present and are made available to everybody. These technologies could be both in specialized spaces (such as FabLabs or Maker spaces) and in houses of common people who bought the technology and want to share it with others (also to amortize the investment).
- **Fashion:** 3D printers in fashion shops that gives people the possibility to print in real time the accessories for the clothes they just bought. The accessories can furthermore be personalized and shared with the fashion community. In this way the fashion brands have the possibility yo anticipate trends proposed by people.

Brainstorming – GROUP 2

- **Technological buddy:** Social project that assigns a Millennial (a student or an unoccupied young guy) to a Pre-Millennial with the goal of supporting him/her in the adoption of digital technologies. Possibility to have a special recognition tag for these people.
- **Help desk:** Help desk placed in different neighborhoods where Pre-Millennials can request a dedicate consultation on the use of digital technologies.
- **A help for a help:** Service for the mutual help between Millennials and Pre-Millennials. The Millennials help in the adoption of new technologies, while the Pre-Millennials help in the professional and personal growth.
- **Spread FabLabs:** Opening of small FabLabs in each neighborhood, in order to get closer to Pre-Millennials and create meeting points with the Millennials.
- **School as a sharing place:** Creation inside the schools of spaces where Millennials and Pre-Millennials can meet and share experiences and knowledge.



- **Over 35 – Hackathon:** Organization of a Hackathon dedicated to over 35 people in order to strongly communicate the possibility also for Pre-Millennials to participate in this kind of activities.

Selection

Selected idea – Group 1: Sweets

Selected idea – Group 2: Technological buddy

7.3.2 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.

Project building – Group 1

Idea – Willy Wonka Lab

Willy Wonka Lab is a network of places and people where it is possible to ideate, share and eat own chocolate creations. Thanks to a mobile application users can access a library of shapes and figures that, through simple manual interactions such as drag and drop or pinch and zoom, can be added with each other, subtracted or scaled according to personal taste, in order for the user to create his/her own chocolate praline. It is furthermore possible to choose the taste and the color of the praline, while all the realization limits are shown in real time by the application.

Once the virtual chocolate praline is created, it can be sent to be printed. The printing takes place in the Willy Wonka Labs, that are gathering places distributed in the city and equipped with 3D printers. It is therefore possible to go in these places, use the pleasant spaces and withdraw the own chocolate creations. In the Willy Wonka Labs there's also an interactive screen where it is possible to design in place chocolate pralines, without using the mobile application. Where the space isn't enough to build a proper Willy Wonka Lab, withdraw totems are built. For people who live far from a Willy Wonka Lab there's the possibility to get the chocolate delivered at home.

The personal chocolate creations can be shared through the mobile application or through the interactive screens with the community. Each creation can be voted and shared in user's personal social profiles. If the design of a user is downloaded, the user gets some credits with which he/she can print his/her own creations for free.

In the end the Willy Wonka Lab organizes each month an event and rewards the most voted chocolate pralines. Furthermore Willy Wonka proposes each month come thematic pralines, connected to the trends of the market and the hot topics (e.g., during Christmas time Willy Wonka proposes chocolate in the shape of a reindeer).



Figure 20 – “Willy Wonka Lab” idea prototyping.

Project building – Group 2

Idea – Buddy

Buddy is an association that put in contact Millennials and Pre-Millennials, starting from the resolution of local needs. The association indeed gathers the needs of the community and selects them according to feasibility criteria and according to the possibility that the resolution of these needs creates a meeting point between generations. Once the problems to be solved are selected, these are taken in charge by the Millennials together with the Pre-Millennials. For example if the problem is to repair community’s bicycles, the Pre-Millennial gets supported by the Millennial in the DIDIY practice, assessing online tutorials, using digital fabrication tools and getting in touch with places like the FabLabs.

All the common projects between Millennials and Pre-Millennials are uploaded on an online platform, where it is possible to keep track of the collaborations, tell their stories and share experience and best practices between different communities, creating in this way synergy between the different associations.

The relationship between the association and the institutions is very important. For example the municipality must remain constantly updated on what is going on, in order to support the initiative at best. Every year some contests are organized inside the community and the most interesting projects are rewarded. The contests and the rewarding ceremony are organized as a proper event, where Pre-Millennials and Millennials receive an identification badge and can share knowledge and opinions.



Figure 21 – “Buddy” idea prototyping.

7.4 Results generative workshop on DiDIY&Creative Society – Barcelona

In the generative section of the workshop on DiDIY&Creative Society in Barcelona, the participants generated ideas through a brainstorming session to answer the challenge. The ideas were then clustered and each cluster was given a title. The participants chose the best one to be further developed taking into consideration the fundamental factors which had emerged in the first part of the workshop. The prototyping activity was not started so the results will not report the development of the idea through the factors.

7.4.1 Brainstorming ideas

During the generative workshop, the participants started from a challenge launched in the previous steps and subsequently generated different ideas through a brainstorming session. The ideas were then clustered and each cluster was given a title.

Participants

Designers, Creativity consultant, Digital artists, Museum education supervisor, Innovation consultant



Challenge

The most relevant challenge taken as a starting point for brainstorming is:

How can we translate/describe/transmit emotional sensitivity virtually through DiDIY?

Ideas

- **Scent printing:** device that can print the scent related to emotions, memories or things in the real world. People can send the scent through internet, smartphone or computers.
- **Chip in the brain:** DIY Arduino device implanted in the body that can collect our emotions and get known better to others.
- **Emotional pill:** learning emotions or emotional effects by assuming pills.
- **Coding emotions:** Traducing emotions in concrete sensorial stirring such as sound, images, colours. Create combination of personal emotion through sound and a codification that associate colours and sounds.
- **3D emoticons:** create 3d emoticons by using 3D printing machines. People can send emotions through the internet that can be translated and printed in a physical object. For example a mouth can stands for a kiss or for a shout.

7.4.2 Idea-building

The idea selected was not developed through rapid prototyping. The participants focus the brainstorming on the idea that preferred among all and continue the project-building of their idea.

Augmented emotional information

Through the use of digital technologies is possible to make the emotion tangible. A 3D printing indeed can allow the concrete representation of an intangible feeling. A specific 3D printing connected to the computer or smartphone can register and identify emotions traducing them in physical objects that can represent that emotion. The resulting 3D emotional sculpture can in turn reproduce emotions through sound, scent and images by using augmented reality such as 3D sculpture reader. In this way people can reproduce their feelings and there is a continuous contamination between real and virtual.



8. Conclusions

8.1 Fundamental factors resulting from the Explorative Workshops

A critical piece of the explorative 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 the digital Do It Yourself 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 chapter of 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. Some aspects recognized by many participants and that are indispensable for the current movement linked to digital technologies in DIY are here explained but they don't represent the fundamental factors explained in the next sub section. These aspects were not transformed into fundamental factors as they cannot be planned as elements in itself. The mindset, the process of learning and the idea leader will be underlined and described in the guidelines of the toolkit as positive attitude and approach to deal with a project in this context.

Maker mindset/Open Attitude

The current movement of DiDIY sees the change of mindset from individualist to collaborative. The DIY mindset defined also as a Geek Mindset is the intrinsic strength that bring people to be self-driven, passionate about technology and proactive creator of executable results and being able to be perseverant applying a learning by doing approach. The DIY mindset imply also an open



attitude that is the need to create the project with an open ended mindset. It is not the final result that means but the process itself.

P2P Dynamic Learning

Reflections about the process also emerged during DiDIY workshops, in particular the concept of P2P Dynamic Learning. Rather than a linear, isolated way of learning, the new way of learning enabled by the DiDIY takes place exponentially by activating learnings from each project carried out by the community (and the other way around).

Idea leader

An important feature of DiDIY is the necessary presence of an idea leader, i.e., a driving force, that 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.

8.1.1 Fundamental common factors of DiDIY

The fundamental common factors of DiDIY are fully described also in D5.5. In order to fully understand this important section and the generative workshop results, we decided to replicate it also in D6.6. The factors came from the integration of the explorative workshops held in Italy and Barcelona in the 4 project areas. Paragraph 8.1.2 reports the fundamental specific factor of DiDIY for Creative Society.

Do It for Yourself – personal motivation

One fundamental factor of DiDIY is the personal motivation of the people involved. Motivation is indeed 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: 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. DiDIY gives the possibility to play, act and experience multiple identities and to express the self in different identities influenced by cultural and social aspects.
- Long term vision: people who participate in the initiative feel the need of investing in themselves for the construction of a future career or a company. The participation provides indeed the achievement of an institutional approval.



- 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. People have the possibility to get to know other like-minded people and build up a network.
- Hedonism/Reputation: people take part to be recognized by a community that is considered 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 as the 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.

Inside the community 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 individuals and communities who share problems and issues and grow together.

In this sense sometimes the concept of Do It Together can switch in the Solve It Together (SIT) that is the attitude of facing a challenge through the use of collective knowledge and an active and dynamic participation of the community.

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 relations within the community. One example is the Fab Lab or the figure of the community manager.

Moreover, in order to create a network of communities there is the need of a *digital* and a *physical* hub that connects, facilitates and feeds existing networks of communities and individuals. The network shares knowledge and solutions.

Accessibility

One fundamental factor of the DIY is the possibility of easily accessing technology, knowledge and skills, both online in the virtual world and offline in the real one. Accessibility is understood both as the physical possibility of reaching points of access to technology but also the need to translate the technical and scientific 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.



Accessibility means also the need of understanding what to do with the resources available, by applying a strategic approach to accessibility.

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.

Even if the information are available online and everybody has access to them, the initiative remains an elitist one, because it is limited only to a certain kind of people, since it is linked to the actual accessibility to facilities and economical resources.

Glocality

One fundamental factor of DiDIY has been defined Glocality. This glocal factor refers to the interrelation between local demands, resources, actions and flows of global skills. The motto is “Think global, act local”. The reflection originates mainly from the idea that a problem or a need come into being at the level of local community, encouraging the creation and increasing of itself. 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 and 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 a local level and resume the needs and the requirements identified locally. These contents are then shared 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 business approaches: 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 a 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 currency of exchange which corresponds to values, information, visibility and knowledge.

Digital technology

Digital technology allows the access to production technologies, in order to make the manufacturing process easier and cheaper. Thanks to digital technology is possible to realize artefacts, also valuable for the human being life, lowering the price and skipping different production steps. Technology allows to customize products based on human needs.

Digital technology is a mean that allows breaking down frontiers and allowing the spread of an idea or a project to the different local communities spread around the world to solve their local needs, readapting the solutions according to their culture and geographical area of reference

Digital technologies are intended also as social process facilitators. Digital skills are spreading in our society and they need to be guided in order to proper answer to the modernity.

8.1.2 Fundamental specific factor of DiDIY for Creative Society

Different perspective

A fundamental element of DiDIY is the need for people to look at the society with a new perspective and to identify their own active role in generating change. It's important to build up new models based on the model of the past.

8.2 Workshop outcomes for Creative Society

The huge mass of information we have collected during the workshops in the DiDIY&Creative Society area brought us to identifying concrete outcomes. The outcomes will be described in relationship to the main objectives to be investigated.

1. Creativity

During the workshops the exploration of the potential of unlocking people's creative through the DiDIY practice has been investigated. The workshops highlighted how the access to resources allows the individual to develop both specific technological competences and soft/life skills that enable him/her to follow his/her own interests and to experiment new capacities. This can support the individual in a process of self-reinvention both at a professional and private level. The self-reinvention is supported by an environment that triggers the development of creative and lateral thinking. The creation of this environment is strictly connected to the DiDIY practice, since it is based on an explorative atmosphere, where the individual is able to experiment, make mistakes, and learn through a trial and error approach. In the DiDIY obstacles are indeed not perceived as unsolvable problems, but as inputs and stimulus to find creative solutions.

2. Creative process

During the workshops the exploration how digital technology, motivation and commitment, and collaboration may affect the creative process have been investigated. The workshops highlighted that in the DiDIY scenario it is fundamental to encourage the practice of working and creating together, learning from each other and with the others, and sharing experiences and knowledge.



Collaboration must indeed be fostered through both online and offline tools and facilities and at the same time must be supported by a responsible and ethical environment.

These new mechanisms allow new business modalities, that are often not based on money exchange but rather based on the exchange of information and knowledge, creating in this way a sort of new currency. At the same time, charismatic individuals get the possibility of increasing their reputation and recognition by the community, that is also intended as a sort of new currency.

In order to keep the motivation to participate high and to build up and strengthen the relationships inside of DiDIY communities, it is important to identify and encourage the figure of an activator who fosters and supports motivation and participation.

To conclude, in the DiDIY scenario the society is not aligning anymore to the classic lifestyle in which the economic power and the consumerism define the position and role of the individuals. The new society puts the human at the centre, it takes care of his/her needs and is based on the resourceful attitude of the collective to generate change. In order to act in this scenario the individual needs to plan what he/she needs in a long term, in order to have the needed time to start a self-production which means a slower production than the traditional one.

3. Role of design

During the workshops the role and the identity of design (and designers) in relation to DiDIY emerging practices has been investigated. In the DiDIY scenario everybody can use knowledge generated by other people. Therefore the design of environments that help and support the medium users in distinguishing good and qualitative contents from less qualitative ones becomes fundamental. At the same time since people are sharing self-generated content without boundaries or limitations it is important to trigger a sense of responsibility in people, and encourage them to share valuable and high quality contents.

Another perspective of the new role of design is highlighted as the support on the identification of innovation potentials. In the DiDIY practice indeed often makers are building up valuable projects, without realizing their innovative potential and need therefore to be encourage and supported by some kind of facilitation. Moreover the DiDIY practice allows individuals in the creation of a sort of personal branding, based on the creation and on the appreciation of DiDIY products. Also in this case the role of a facilitator who support individuals in the definition of the self-aesthetic is highlighted. In the end the role of a facilitator is needed in filling the gaps between generations (such as Millennials and Pre-Millennials) and in spreading the DiDIY mindset and culture of a wide range of people.



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Annex I – Design Tool Collection

See http://www.didiy.eu/public/codesign-workshops/annex_i_desig_tool_collection.pdf.



Annex II – Creative rules

See [http://www.didiy.eu/public/codesign-workshops/regole della giornata en 2-min.pdf](http://www.didiy.eu/public/codesign-workshops/regole_della_giornata_en_2-min.pdf).



Annex III – Digital Content

Flickr Photo Album: <https://www.flickr.com/photos/147342500@N04/albums>.

- Co-design Explorative Workshop on DiDIY – Pilot – Barcelona
- Co-design Explorative Workshop on DiDIY&Education – Milan
- Co-design Generative Workshop on DiDIY&Education – Milan
- Co-design Explorative+Generative Workshop on DiDIY&Education – Barcelona
- Co-design Explorative Workshop on DiDIY&Work&Creative Society – Milan
- Co-design Generative Workshop on DiDIY&Work – Milan
- Co-design Explorative+Generative Workshop on DiDIY&Work – Barcelona
- Co-design Generative Workshop on DiDIY&Creative Society – Milan
- Co-design Explorative+Generative Workshop on DiDIY&Creative Society – Barcelona
- Co-design Explorative Workshop on DiDIY&Law System – Milan
- Co-design Generative Workshop on DiDIY&Law System – Milan