



## D7.4 DIDY-RELATED POLICY RECOMMENDATIONS

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## Disclaimer

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## Executive summary

Deliverable D7.4, DIDY-related policy recommendations, reports on the general and specific recommendations that have come out of the DiDIY Project, except those that have already been described in D7.2 (on the social adoption of DiDIY) and D7.3 (on DIDY-related education processes). The specific recommendations are in the form of possible solutions to specific issues or problems, as “policy patterns”. These are intended as the seed of an ongoing community resource. The general recommendations are in normal narrative format. There are ten policy patterns listed in here. These are the ones that have matured sufficiently for them to be included in a public deliverable. The general recommendations cover a lot more ground. They talk about the potential for DiDIY in terms of economic, personal, and social development, but also the cultural and systemic shifts that might be necessary to realise this. They recommend changes in IP, insurance, and regulatory frameworks to allow DiDIY to flourish. They recognise there are some risks, but cautions against an over-reaction to these. In particular they suggest that whilst physical manufacture/creation may need some regulation in specific cases that information sharing should not be targeted.

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## 1. Introduction

This deliverable summarises the recommendations that have come out of the DiDIY Project. It complements two of the other deliverables in this Work Package: D7.2, on the proposed guidelines for social adoption of DiDIY, and D7.3, on the proposed guidelines for DIDY-related education processes. This document contains both general recommendations and those that are not already covered in D7.2 and D7.3.

These will be described in two different ways, for two different kinds of recommendation: those that are more akin to context-specific solutions for particular kinds of problems, and more general recommendations that are expressed in a general discursive manner. The former are expressed as “policy patterns”, a way of encapsulating and semi-formalising particular solutions, that will be explained in Section 2. Section 3 will discuss the phenomenon of Digital DIY in preparation for these policy patterns in Section 4 and the general conclusions and recommendations in Section 5.



## 2. Patterns and “Pattern Languages”

One of the key distinguishing features of DiDIY is its decentralised bottom-up flavour, where designs and ideas are freely developed and shared within a community. This way of working does not make much use of central authorities due to its democratic way of working. In a real sense there are no “experts” or generic authority figures but rather a range of recognised expertise – there is no discernible barrier between people, no professionals and amateurs but rather a continuum of different levels of skill and knowledge. Furthermore, there is no single discipline but a fractal landscape of different skills and areas, each with its own sub-skills and areas and each with its own, extremely specialised experts.

We thus found ourselves in somewhat of a quandary: we did not want to act as a central authority, making expert recommendations, since that goes against how DiDIY works. For this reason we decided instead to express and develop a set of possible context-specific solutions. These are not prescriptions but rather merely offer up solutions to a particular problem which the reader can adapt as appropriate to their context, or simply ignore. Thus these are not recommendations in the usual sense, but more of a resource. In the spirit of DiDIY we sought to make these open to the critique and development by the community. We hope that these will be added to, critiqued, refined and edited to become a truly democratic resource.

The format we chose for these partial solutions was that of a “pattern”, which we will now describe. The term “pattern” was coined by architect Christopher Alexander and popularized by his book “*A Pattern Language*” (APL) in 1977.

*“At the core [...] is the idea that people should design for themselves their own houses, streets and communities. This idea [...] comes simply from the observation that most of the wonderful places of the world were not made by architects but by the people.”*

The idea of pattern as proposed by Alexander has been especially influential in software engineering where design patterns have been used to document collective knowledge in the field. In this sense, a pattern is a general reusable solution to a commonly occurring problem within a given context – not a finished design but a template for how to solve a problem that can be used in, and adapted to, in different situations.

*“[...] each pattern represents our current best guess as to what arrangement [...] will work to solve the problem presented. The empirical questions center on the problem—does it occur and is it felt in the way we have described it?—and the solution—does the arrangement we propose in fact resolve the problem [...] the patterns are still hypotheses [...] free to evolve under the impact of new experience”.*

In this document, our aim is to make recommendations without being overly prescriptive. We provide a “menu” of solution recipes that will work for different kinds of problems and circumstances. These should be concrete enough so that how to apply them in any particular



situation should be clear but, at the same time, abstract enough so to be flexibly relevant to a range of circumstances/problems.

We develop a core of “policy patterns” as a result of the project expertise and results. Policy actors and other activists can browse the patterns online, selecting those that might be relevant to their situation then using their local knowledge in choosing, adapting and applying them. The patterns are available online (see [didiy.eu/patterns](http://didiy.eu/patterns)), on an open wiki-like server, where the wider community can continue to discuss, add to these and refine them, providing a longer-term, sustainable resource.

## 2.1 The pattern template

The standard pattern template employed in the realms of software or architecture were not ideal for our purposes, so we have developed a similar one that suits the needs here. This format emerged as the result of trying, as a project, to write patterns that encapsulated solutions relevant to the DiDIY world. We do not claim this format as the best possible, but simply one that seemed to cover what we needed.

Each of the following policy patterns has been structured following a template. The table below provides the building elements of a pattern and a brief description of them. The first four “slots” describe the core of the pattern: what the problem is, when the solution might apply, what the solution is and what the outcome should be. This is followed by auxiliary information, that gives extra background and information, such as: the rationale behind the solution, the significant influencing factors that might impinge, and evidence or examples of the solution, and any of the other patterns that relate to this one.

Title	Word/short phrase for rapid retrieval
The problem is...	Definition of a problem, including its intent or a desired outcome, and symptoms that would indicate that this problem exists
The proposed solution might apply when...	Preconditions which must exist in order for that problem to occur; this is often a kind of situation
The solution proposed is...	Instructions, possibly including variants described in any appropriate way
The expected outcome is...	Result after the pattern has been applied, including side effects. It might include new problems that might result from using this pattern
Other Information	
Rationale	The thought processes that go into selecting this pattern, including an explanation of why this pattern works, and how forces and constraints are resolved to construct the outcome
Significant influencing factors	The various forces or constraints that impinge on the situation and how they interact. Some of the forces may be contradictory
Evidence/Example	Sample applications, solutions and known uses can help user understand the pattern
Related Patterns	Other patterns that relate to this pattern, for example patterns that propose alternative solutions to the same problems, and patterns that might be needed before or after this pattern
Links to further resources	Where, relevant this includes references and pointers to other information that exists on the subject



### 3. About the phenomenon of Digital DIY

Digital DIY is a complex phenomenon. It involves an interacting mixture of different kinds of element: the attitude and knowledge of individuals, the sub-culture of DIY communities, tools for sharing designs, help and ideas, the social norms developed and noticed by DIY communities, technology that allows individuals to design and make their own artefacts, and physical spaces and institutions where DiDIYers meet and socially interact. In this it is similar to many social cultures and institutions, composed of the individual and the social and the technological. It includes emergent aspects where the interaction of many individuals combine to produce something new at the societal level and “downwards” immersion where the culture subtly impinges upon the individual.

For this reason it is hard to point to “*the*” phenomenon of DiDIY, but rather to a collection of DiDIY-like phenomena that have a lot of these kinds of feature in common. Although each of these has the same ‘flavour’ – a similar anarchic, self-motivated culture, they all also differ in some respects. Any attempt at a definition would always find exceptions. For this reason the project has converged on two kinds of complementary characterisations: one builds on agent-based simulations, where complex interactions similar to those observed in DiDIY phenomena can be implemented; the other consists of an encompassing “knowledge framework” which describes the various dimensions in which DiDIY can operate, using the analogy of a building.

This has consequences for our recommendations and solution patterns. The interrelatedness of the processes and structures that constitute the DiDIY complex means that it is, to a large extent, a self-propelling phenomenon, and not amenable to simple policies to promote it. Thus we take a two-pronged approach: a focus on particular problems or ‘pinch-points’ which might be braking or limiting factors slowing down its natural momentum and some general recommendations that address wider cultural and structural issues that affect the whole of society.



## 4. Policy Patterns as Concrete Recommendations

All these particular solutions, the “patterns”, are also available at the DiDIY Policy Patterns wiki, (see [didiy.eu/patterns](http://didiy.eu/patterns)). There you will see these, and other patterns as they are developing. There you can join in and edit the patterns, adding and enhancing them, or starting completely new patterns. Also it is much easier to follow the cross-referencing between patterns there and view lists of patterns categorised in many different ways.

Here we present a cleaned-up snapshot of the more mature patterns that have not been listed in D7.2 or D7.3. We start with patterns that describe ways to prevent/avoid difficulties or costs of various kinds.

### 4.1 Avoiding patent infringement

Title	Avoiding patent infringement
The problem is...	avoiding the possibility or merely the fear of being sued for patent infringement can be a barrier for creatives. This may be because they may not know whether a key component of their product design is in fact patented or that whether the IP is not open and they have not the financial means to license the technology or even to find out about it. This is particularly problematic as patent registrations can be overly broad and vaguely defined.
The proposed solution might apply when...	in the process of design one can consider existing, openly published designs or solutions and, adapt or build on top of them.
The proposed solution is....	to check the available existing designs in open design platforms and adapt those designs for one’s needs. If one creates a fully new design, that cannot be linked to any existing design (which is really hard generally), then make sure to publish it in such platform so that it becomes “prior art” and no one should be able to patent it. This is called a Defensive Publication.
The expected outcome is...	a growing body of open (source) designs that cannot be patented – or should not be able to be patented, as they constitute “prior art” – and are thus available to all of humanity.
Other Information	



<p>Rationale</p>	<p>Patents may have been created to help encourage innovation, but instead they regularly hinder it. The US Patent Office, overwhelmed and underfunded, issues questionable patents every day. “Patent trolls” buy many of these patents and then misuse the patent system to shake down companies big and small. Others still use patents to limit competition and impede access to new knowledge, tools, or other innovations. It’s no wonder that small businesses and individual inventors find it almost impossible to make the patent system work in their favour, often leaving them without any defense against competitors with giant patent arsenals and litigation budgets (see <a href="http://www.eff.org/patent">www.eff.org/patent</a> about patents).</p> <p>Searching patent databases to check whether patents on one’s idea or design exist is typically very hard, not the least due to the intentionally vague wordings of those patents, as the patent attorneys seek to maximise the possibilities of using their patent.</p> <ul style="list-style-type: none"> <li>– Prior art in most systems of patent law (<a href="http://en.wikipedia.org/wiki/Prior_art">en.wikipedia.org/wiki/Prior_art</a>) is constituted by all information that has been made available to the public in any form before a given date that might be relevant to a patent’s claim of originality. If an invention has been described in the prior art, a patent on that invention is not valid and can be revoked.</li> <li>– There are also patent pools, where patent holders pool their patents together to avoid legal attacks and protect their openly shared work. The Open Invention Network (<a href="http://www.openinventionnetwork.com">www.openinventionnetwork.com</a>) is such a defensive patent pool and community of patent non-aggression which enables freedom of action in the GNU/Linux ecosystem.</li> </ul> <p>Defensive publications (<a href="http://www.defensivepublications.org">www.defensivepublications.org</a>), which are endorsed by the USPTO as an IP rights management tool, are documents that provide descriptions and artwork of a product, device or method so that it enters the public domain and becomes prior art.</p>
<p>Significant influencing factors</p>	<p>The patent system is not effective for most individual designers or small and medium sized companies.</p> <p>Sharing designs collaboratively through open design platforms permits to foreclose the possibility of patenting.</p>
<p>Evidence /Examples</p>	<p>The Open Business Model case studies of the DiDIY Project (<a href="http://www.didiy.eu/blogs/introducing-didiy-d63-open-business-models">www.didiy.eu/blogs/introducing-didiy-d63-open-business-models</a>) have documented 14 cases of open source hardware technologies that demonstrate how viable economic ecosystems can thrive without patenting and with sharing knowledge openly and freely.</p>
<p>Related Patterns</p>	<p>Use Design Sharing Platforms.</p>



#### 4.2 How to promote safety of DiDIY products

Title	How to promote safety of DiDIY products
The problem is...	that in the context of DiDIY, participants in the design, making and usage of products tend to be non-professional and products may not be tested or present otherwise risks to the involved. The risks for damages and injuries can be problematic and it is typically hard to assign responsibility to one particular party.
The proposed solution might apply when...	the proposed solution applies when people join a makerspace and during their participation in the space.
The proposed solution is....	to foster a culture of responsibility within the local maker community, by: <ul style="list-style-type: none"> <li>– offering induction courses on safely using tools and materials in the makerspace;</li> <li>– using liability waivers plus warnings about potential risks in the membership terms and conditions;</li> <li>– encouraging participants to document uses of designs and products and signal potential risks (possibly with labels “fragile”, “explosive”, “poisonous”);</li> <li>– regularly addressing the “duty of care” in periodic meetings to foster a culture of caring.</li> </ul>
The expected outcome is...	that the whole community (of the makerspace) is expected to benefit as people share knowledge about risks and thereby reduce the potential safety incidents.
Other Information	
Rationale	It is desirable to promote informed decisions among participants and be aware of potential risks and limit the number of safety incidents.
Significant influencing factors	Designs can be constructed by several people in a loosely coupled chain through online sharing and collaboration. Given non-commercial nature there is typically no product liability, and it becomes hard to pinpoint a single responsible for possible damages or injuries. The fact that participants are typically non-professionals not trained in the art makes them less knowledgeable of potential risks.
Evidence /Examples	Makerspace safety guidelines. Makerspace induction courses. Experience at certain Fab Labs. Airline pilots are obliged to report dangerous situations, while not being held liable for potential incidents (see Quantus safety guidelines): this encourages the sharing of knowledge.
Related Patterns	Liability Waivers, Online Platform Safety Labels.



### 4.3 Minimise ecological impact of DIY activities

Title	Minimise ecological impact of DIY activities
The problem is...	that many DiDIY activities increase the amount of plastic, electronic products and other dangerous products which are hard, or sometimes impossible, to reuse or recycle.
The proposed solution might apply when...	to all DiDIY activities, unless there are local regulations that forbid processing of certain materials (e.g., melting plastics) or require special authorizations.
The proposed solution is....	<p>raise awareness of how polluting many DiDIY materials and techniques are. Actions of this kind include:</p> <ul style="list-style-type: none"> <li>– invitations to minimize production of DiDIY products made with non recyclable components (“3D-print responsibly!”);</li> <li>– providing information, both in online platform and in actual makerspaces and Fab Labs, about which raw materials (e.g., plastic filaments) are more polluting than others;</li> <li>– raising awareness of the many types of DiDIY that (i) do not involve at all plastic and other hazardous materials, or any form of 3D printing in the first place (examples: manufacturing of wood products, knitwear, etc), and (ii) can reduce overall ecological footprint by producing spare parts, or otherwise repairing and reusing many products;</li> <li>– supporting recycling of plastic and other materials directly in the Fab Labs;</li> <li>– promoting collection of the same types of waste from the local community, for the same purpose.</li> </ul>
The expected outcome is...	a reduction of the amount of waste caused by DiDIY, especially of the most toxic kinds. Reduction of overall pollution, minimized health risks for both DiDIYers and general population. Contribute to raise awareness of the general problems related to waste production and management.
Other Information	
Rationale	Many DiDIY products are experiments, not intended to be used for a long time. Pollution by plastic, and in general production of unnecessary waste, are huge problems for society, and DiDIY may make it even worse. On the other hand, DiDIY may give a meaningful contribution to reduce the magnitude of those problems. The solution proposed here goes in that direction, and at the same time helps to promote awareness and use of DiDIY.
Significant influencing factors	<p>Use of polluting materials, and environmental impact in general, did not receive enough consideration in the first period of large adoption of DiDIY practices.</p> <p>General negative attitude, still present in large parts of society, towards recycling, repair and reuse of “old” products.</p> <p>Increased availability of materials, tools and knowledge to practice DiDIY without using hazardous substances, or to practice it specifically for repair/reuse purposes.</p>



#### 4.4 Sharing with proper licensing

Title	Sharing with proper licensing
The problem is...	that by default, the author publishing something on the Internet has exclusive copyright. Sharing without licensing can therefore make copying/using that work illegal, even though the author might have had the intention to allow others to reuse his/her work.
The proposed solution might apply when...	there is a culture of informal sharing in Makerspaces/Fab Labs. So when someone publishes a work on a blog, they don't necessarily add a licence.
The proposed solution is....	<p>to increase the knowledge of licensing: makerspaces should adopt a policy of informing their users about licensing options / recommend particular licenses for particular types of works / recommend using established platforms like Thingiverse or Instructables that enforce the use of one of the predefined licences.</p> <p>A concrete licensing policy for a makerspace could be:</p> <ul style="list-style-type: none"> <li>– if contributing to an existing work, make sure your contribution attributes the original authors and uses the same licence (especially if it is a copyleft: <a href="http://www.gnu.org/copyleft/copyleft.html">www.gnu.org/copyleft/copyleft.html</a>);</li> <li>– for new works we recommend the following: <ul style="list-style-type: none"> <li>* for software: use the GPL (<a href="http://www.gnu.org/licenses/gpl.html">www.gnu.org/licenses/gpl.html</a>);</li> <li>* for content and general documentation: use the CC BY-SA (<a href="http://creativecommons.org/licenses/by-sa/4.0/legalcode">creativecommons.org/licenses/by-sa/4.0/legalcode</a>);</li> <li>* for design documents: use the CERN Open Hardware License (<a href="http://www.ohwr.org/licenses/cern-ohl/v1.2">www.ohwr.org/licenses/cern-ohl/v1.2</a>);</li> <li>* for databases: use the CC0 (<a href="http://creativecommons.org/publicdomain/zero/1.0/legalcode">creativecommons.org/publicdomain/zero/1.0/legalcode</a>).</li> </ul> </li> </ul>
The expected outcome is...	no more illegal sharing; empowerment with respect to licensing rights; possibility to build a business with an open business model based on shared work.
Other Information	
Rationale	DiDIY oriented spaces have the intention to share knowledge; while exclusive copyright would by default forbid sharing, a free licensing policy assures legal sharing and the possibility to build a thriving ecosystem. Such policy allows people to generate income based on the shared knowledge.
Significant influencing factors	Lack of knowledge of licensing and legal aspects of copyright in general. In addition, there might be wrong understanding of copyright, e.g., if I do not add a copyright notice, I assume everyone can freely use it (which is not true).
Evidence /Examples	The IRNAS institute uses such policy for their open source hardware projects like the GoodEnoughCNC ( <a href="http://imas.eu/license.html">imas.eu/license.html</a> ).
Related Patterns	Use Design Sharing Platforms, Legal Knowledge Sharing, All Rights Reserved.
Links to further resources	Read the Legal Report from the DiDIY Project.



#### 4.5 Use design sharing platforms

Title	Use design sharing platforms
The problem is...	that the creative designs developed by many individuals and groups are not captured in a form so it could be found and re-used by others.
The proposed solution might apply when...	people are willing to share their design contributions with others.
The proposed solution is....	to organise co-creation workshops where people get to know a range of design sharing platforms, how open/free licensing works and learn to work as part of a community, enabling others to replicate and contribute back to their project.
The expected outcome is...	that more people share their designs and become part of a networked co-creation ecosystem.
Other Information	
Rationale	<p>Sharing one's designs requires understanding the ecosystem; it requires one to see that many people make small contributions to a bigger whole, where one builds on top of the work of others, through networked collaboration; to understand how free and open licensing work to share one's work and protect authorship; to understand how to make money and the nature of open source business models.</p> <p>There are many platforms that encourage people to organise in communities and share their designs in the form of a commons. Such platforms generally provide for recognition of authorship, choosing the open or free license of one's choice, to see who or how many people download or reuse a particular design and in general they encourage collaboration.</p>
Significant influencing factors	The co-creation workshops can help to go through the various concepts, get to know the existing platforms and study cases of successful open source hardware or open design communities and products.
Evidence /Examples	The Open Business Model cases studies of the DiDIY Project ( <a href="http://www.didiy.eu/blogs/introducing-didiy-d63-open-business-models">www.didiy.eu/blogs/introducing-didiy-d63-open-business-models</a> ) have documented 14 cases of open source hardware technologies that demonstrate how viable economy ecosystems can thrive without patenting and with sharing knowledge openly and freely.
Links to further resources	The Free Knowledge Institute maintains a list of Sharing Platforms with a comparative of their main features, see <a href="http://wiki.freeknowledge.eu/index.php/Design_Sharing_Platforms">wiki.freeknowledge.eu/index.php/Design_Sharing_Platforms</a> .

The next set of patterns are about ways to facilitate DiDIY, alleviating 'pinch points'.



#### 4.6 Facilitate artisans access to DiDIY

Title	Facilitate artisans access to DiDIY
The problem is...	that many artisans could be more productive, create new kinds of unique artefacts, on demand or not, or simply stay in business, if they could rent for their work, only when they need them, the machines of a Fab Lab or makerspace. However, local laws or regulations in many places prohibit the Fab Lab/makerspace owners to offer such services to artisans and other professionals, who use them in their for-profit activity.
The proposed solution might apply when...	it is necessary to use of DiDIY machines (3D printers, CNC mills, laser cutters, etc) to automatically manufacture (very) small quantities of certain parts of her products may be the only way for an artisan to make those products economically viable, and therefore to stay in business.
The proposed solution is....	to define conditions under which it would be legal for artisans to rent space and machines in a Fab Lab to perform part of their for-profit activities there (or to send their employees to do the same).
The expected outcome is...	that more possibilities for artisans to create unique products, or small batches of products, that is more possibilities both for artisans to keep their existing activity running, or start new businesses. Another expected outcome is more possibilities for Fab Labs and makerspace to be economically viable, by widening their “customer base”.
Other Information	
Rationale	For-profit coworking spaces, that rent desks, internet access and other infrastructures to freelancers, are becoming more and more popular. In their current form, however, they are almost always limited to office workers, not to artisans who need digital manufacturing services for their for-profit work. If artisans had the same opportunities as “office” freelancers, that is the possibility to legally work, at least part time, in “shared digital manufacturing” centres, they would have more business opportunities. At the same time, work of this kind, that today may be done “in black” in certain Fab Labs, may emerge, and thus widen the tax base.
Significant influencing factors	Regulations and laws that require artisans to work always and only in a dedicated, fully certified space of which they are the only responsible maintainers, severely limit the possibilities described above
Evidence /Examples	<a href="http://www.didiy.eu/blogs/obstacles-digital-diy-and-risks-it-notes-rome">www.didiy.eu/blogs/obstacles-digital-diy-and-risks-it-notes-rome</a> Obstacles to Digital DIY (and risks from it): notes from Rome. <a href="http://www.didiy.eu/blogs/obstacles-digital-diy-notes-bruxelles">www.didiy.eu/blogs/obstacles-digital-diy-notes-bruxelles</a> Obstacles to Digital DIY: notes from Bruxelles.

#### 4.7 How to foster DiDIY through collaborative tools

Title	How to foster DiDIY through collaborative tools
The problem is...	that, although there are now many different collaborative tools available, it is difficult to use them to foster DiDIY or apply it strategically due to a lack of specific guidelines available. It is also hard to get training to use them and to find the right collaborators.



The proposed solution might apply when...	public and private organisations can apply the fundamental features of DiDIY or be inspired by the phenomenon to improve a service or a strategy, to innovate some working modality, to activate new forms of collaboration, and also to solve social, environmental and even political challenges. Collaborative tools might be used when there is a large amount of data that would be best dealt with through a structured process with a collaborative and empathic approach, or when it is necessary to gain knowledge from different specialists involved in a project.
The proposed solution is....	in the use of a specific toolkit and guidelines that can immerse people in the social and cultural context of Digital DIY by fostering collaboration both with peers and with experts. Guidelines provide inspiring scenarios as challenging areas to possibly work on that are opened by the phenomena of Digital DIY.
The expected outcome is...	to foster creativity, generate innovation and winning ideas through the use of DiDIY in different fields. Local institution (private and public), small medium enterprises, large organization, local hub, Fab Labs, makers and DiDIYers can have benefits from the toolkit.
Other Information	
Rationale	The toolkit and guidelines is a powerful means for accessing and making explicit people's (also tacit) needs, desires and aspirations for the construction of new possible futures that rely on the DiDIY fundamental features.
Evidence /Examples	Digital DIY co-design toolkit and guidelines: – Co-creation Toolkit by WAAG ( <a href="http://co-creation.waag.org/tools">co-creation.waag.org/tools</a> ); – Playbook Open Care by We Make ( <a href="http://playbook.opencare.cc">playbook.opencare.cc</a> ).
Related Patterns	Designer in DiDIY, How to help people to apply a strategic design approach to technologies.

#### ***4.8 How to make money with Digital DIY open machine designs***

Title	How to make money with Digital DIY open machine designs
The problem is...	that many people are not aware of how people can make money with Digital DIY, while there are interesting cases that show how you can do that, while still sharing he designs and project documentation even to a level that others are able to replicate it autonomously.
The proposed solution might apply when...	people are willing to do things differently and consider exploring what alternative business or sustainability models are being used by successful Digital DIY communities.



The proposed solution is...	to develop an open business model approach, where knowledge is shared (through an adequate licensing policy), revenue is not based in patents or copyright licensing, at least a considerable amount of the development work is shared by peer producers (“collaborative making”) and governance is participatory and/or allows replication. These four elements are the four pillars of an open business model approach and can be found in many commons-based open community projects. It is therefore of interest to explore existing cases and draw lessons from how these have become sustainable.
The expected outcome is...	to construct a collaborative community where people can freely contribute and have the means to sustain themselves.
Other Information	
Rationale	Using an open or free licensing policy, or at least extensively use free and openly licensed works could be considered challenging as one suffers the risk of being replicated. Instead of seeing this possibility as a threat, it can be conceived as a strength: community members often feel more inclined to contribute voluntarily to a project, where its leaders cannot exclusively exploit these voluntary contributions, but all, in principle, have the same rights. When the projects work and tools are properly documented and published under free licenses, then all members basically have the same rights. If the way a community is governed doesn’t satisfy a sufficient part of the community, this part may consider to replicate or fork the project and continue under an other name. This is usually not a desirable outcome, as the energy is split between two communities instead of one, but its mere possibility forces project leaders to carefully listen to their users and keep them happy.
Significant influencing factors	Designing an organisation along the four pillars of an open business model requires a participatory, co-creation methodology. Such model seeks to align the interests of potential participants in order to maximise the potential collaboration and contributions.
Evidence /Examples	The Open Business Model case studies of the DiDIY Project ( <a href="http://www.didiy.eu/blogs/introducing-didiy-d63-open-business-models">www.didiy.eu/blogs/introducing-didiy-d63-open-business-models</a> ) have documented 14 cases of open source hardware technologies that demonstrate how viable economy ecosystems can thrive without patenting and with sharing knowledge openly and freely.
Related Patterns	Use Design Sharing Platforms.



#### 4.9 Realistic building codes and safety requirements for DiDIY spaces

Title	Realistic building codes and safety requirements for DiDIY spaces
The problem is...	<p>that the great majority of existing norms about manufacturing as a professional activity are de-facto written (intentionally or not) and practicable only by high-volume, full time production facilities. For example, a modern DiDIY wood processing machine may be as simple and cheap to build and operate to be sustainable even if it only processes very limited quantities of wood, maybe just working a few hours per week. Existing rules, however, may acknowledge and classify it exactly as a much larger machine, used full time in the assembly line of a large factory. Occasional use of that machine in a Fab Lab, that is, would still require safety spaces, surveillance procedures, mandatory filters and exhaust pipes for toxic substances, usage exclusively by certified professionals etc... that are only really necessary, or in any case economically affordable, when processing many thousands of cubic meters of wood every year. Those volumes are much, much higher than what a DiDIY common space (e.g., Fab Lab, makerspace, etc) may ever reach, or want to reach.</p> <p>Consequently, DiDIY spaces are forced to either use certain DiDIY machines illegally, or not use them at all, because doing it legally would be too expensive or onerous (e.g., be forced to have a certified supervisor on site, every time a DiDIYer wants to use the machine), without any real safety-related reason to do it.</p>
The proposed solution might apply when...	whenever a DiDIY common space (e.g., Fab Lab, makerspace, etc) has the know-how and economical means to build, install, maintain, etc and offer to its members, any sophisticated DiDIY machine that would be too expensive for a single DiDIYer to own by herself.
The proposed solution is....	to define realistic building codes and safety requirements for DiDIY spaces, that still guarantee the safety of the machine users, but imposing more relaxed constraints, that are consistent with the actual operating conditions and production volumes of those machines, instead of those of full time, high volumes production inside large factories.
The expected outcome is...	much more possibilities of collaborative advanced DiDIY; more possibilities for DiDIY spaces to be economically self-sustainable, by renting more machines to more DiDIYers.
Other Information	
Rationale	Current laws and regulations see and create little or no intermediate space between occasional, private hobbies and professional manufacturing, which can afford, and objectively needs, very complex and expensive safety procedures. This leaves DiDIYers and common DiDIY spaces much less room to operate and innovate, without any objective need for such constraints.
Significant influencing factors	Existing norms and laws, at all levels from EU to city building codes, that do not take into account any manufacturing activity between private hobbies or, e.g., home maintenance on one side, and full time, for-profit manufacturing on the other.



Evidence /Examples	<p><a href="http://www.didiy.eu/blogs/obstacles-digital-diy-some-notes-veneto">www.didiy.eu/blogs/obstacles-digital-diy-some-notes-veneto</a> Obstacles to Digital DIY: some notes from Veneto.</p> <p><a href="http://www.didiy.eu/blogs/obstacles-digital-diy-and-risks-it-notes-rome">www.didiy.eu/blogs/obstacles-digital-diy-and-risks-it-notes-rome</a> Obstacles to Digital DIY (and risks from it): notes from Rome.</p> <p><a href="http://www.didiy.eu/blogs/obstacles-digital-diy-some-notes-greece">www.didiy.eu/blogs/obstacles-digital-diy-some-notes-greece</a> Obstacles to Digital DIY: some notes from Greece.</p>
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## 5. General Recommendations

Having listed some specific solutions or recommendations to specific parts of the DiDIY complex we now turn to some general points that touch on very general issues.

### ***5.1 DiDIY could unleash the creativity of individuals across society***

DiDIY could unleash the creativity of individuals across society, to its huge benefit. This is especially the case as a smaller percentage of people's time occurs within the formal institutions that currently encompass education and most work. Thus a cultural shift is needed to recognize DiDIY and new technologies as an opportunity to improve the (digital) culture of the society. This will happen on its own to a considerable extent but recognition at higher levels and some willingness to ease its development would aid this. As part of this we need to promote opportunities for a thriving circuit of sharing, learning and inspiration in all DiDIY cultures. This includes exploring alternate forms of creative platform – online, offline, and interlinked – which offer new opportunities to make, share, connect, include and inspire.

### ***5.2 A cultural shift is needed to recognize DiDIY***

We need to strengthen “fair use” exceptions in IPR legislations for non-commercial sharing of knowledge and for protecting unencumbered spare parts (re)production. We need policies to promote and impulse DiDIY and commons-oriented incubation and transition programmes with a focus on open knowledge and replicability in distributed networks. We need public purchasing to prioritise DiDIY and local self-fabrication and penalise exclusive control over knowledge. We need to set up and improve existing platforms for sharing knowledge freely, with commons governance models.

### ***5.3 We need a change in IP law that favours the open sharing of knowledge and a policy of public purchasing to prioritise DiDIY and local self-fabrication***

Due to its anarchic flavour, DiDIY could cause some small disruption to existing patterns of work and indeed create some new risks. We feel that these will be minor compared to the benefit that DiDIY could deliver. One threat to the development of DiDIY is a possible overreaction to the small disruption and threats in terms of government action. This might be due to isolated incidents where the power of DiDIY allows for crimes to be committed in new ways, or where there is a perception that profits from declining industries are threatened.

### ***5.4 There must not be an overreaction to the new risks and disruption caused by DiDIY by government***

Thus at the present stage, we warn against overreaction and do not yet recommend new governmental policy, but a) self-regulation in the DiDIY community, following some promising current initiatives; b) attention whether IP rights needs a cautious application in order not to stifle creative DiDIY; c) encouragement of innovative technological solutions to challenges; and d) a continued close look at the technological developments, because the potential for disruptive changes that demand regulatory intervention remains significant.



### ***5.5 DiDIY may help enable new and small companies to be economically viable***

DiDIY may help keep many small companies economically viable, or by enabling the creation of new companies. Therefore, it could be possible to leave space to such DiDIY, even if they may create more risks, in two ways. One is proper education, to increase awareness of risks and how to avoid them; the other is creation of a regulatory and insurance framework that helps to minimize the risks of DiDIY practices, at least for third parties. A situation like this presents serious challenges to insurers, but also big opportunities, if properly regulated and supported. Some insurance companies have already started to study these scenarios, but they still seems a minority, and need more support, or at least encouragement, to enter this field. Another path for the insurance sector to explore is whether individual DiDIY designers may subscribe to some form of collective liability insurance scheme, if insurance companies provided it.

### ***5.6 A new regulatory and insurance framework to minimise the risks of DiDIY should be developed***

DiDIY does increase the risk that people can self produce, without any traceability or control, lethal weapons, drugs and equally dangerous products. But punishing the mere possession of the corresponding design files seems to have too many drawbacks at all levels, from ethical concerns to practical enforceability, to produce more positive than negative effects, in practice. Punishing the (re)distribution of the same designs may also create dangerous side effects (e.g., be used as pretexts to set up or strengthen online censorship systems) and have the same practical limits of forbidding illegal file sharing. It is also worthwhile to remember that, at least with drugs, liberal approaches to their regulation have not automatically lead to any significant increase in their use. Really great prudence is needed in regulating this specific activity, and in no way it should be treated it, in and by itself, as an offence as serious as the actual DiDIY manufacturing of weapons.

### ***5.7 When regulating dangerous goods a distinction between sharing information and producing physical items should be kept***

The actual DiDIY fabrication (regardless of usage) of weapons, instead, may be covered by the same laws that already regulate or forbid such activities. The same applies to the actual usage of the same weapons. Possibly, the same laws may be extended to cover research purpose, or use of the weapons only in authorized facilities, or by registered users. This is a path of action that deserves further analysis. Due to the difficulty to prevent the actual manufacturing, and enforce prohibitions, the most feasible solutions for controlling unsafe manufacturing, and illegal uses, of DiDIY weapons, drugs etc. may be the imposition of appropriate controls over some raw materials that are necessary for their production, but cannot themselves be digitally produced. As an example, in the case of digitally made guns, the best candidate for such a component would be ammunitions. That would still not be a... bullet-proof solution, because bullets may be produced with DiDIY, and even gun powder may be produced “at home”. However, with those constraints they would be much longer and harder to produce, and securing illegal or hard to obtain components that would still be needed may help law enforcement thwart such endeavours.



### ***5.8 Regulating the production of dangerous items is feasible, that of containing the information is not***

Utilising DiDIY-related approaches within existing institutions is relatively difficult. The multiple structures of these institutions have adapted to relatively centralised models for delivery, creating multiple sources of “friction” for DiDIY-related approaches. Unless such institutions and companies can change we predict a relatively low impact there – rather we expect DiDIY-related approaches to be more productive within new companies or emerging ways of cooperating (such as makerspaces or Fab Labs). Areas where this institutional rigidity is particularly evident is in the systems for product safety, warranty, insurance and certification. These have a tendency to make new ways of working difficult because they do not match the distributed structure of DiDIY creation. Further specific research is needed to create effective solutions in these areas. These may involve collective solutions (e.g. group insurance), distributed solutions (e.g. composite warranties using blockchain technology), new centralised institutions (e.g. official clearing houses for safe DiDIY designs).

### ***5.9 Further research to develop new solutions to support the complex and distributed creativity behind DiDIY needs to be developed***

To be clear, we think the potential for DiDIY approaches has huge potential within existing companies and educational establishments; it is just that DiDIY is such a different way of working that we expect uptake in these places to be low. This is due to the profound change that adopting DiDIY approaches would entail. Decision makers inside companies and policy makers should overcome the Tayloristic view of the management and provide rewards and incentives to proactive, cross-disciplinary, tech-enabled practices.

### ***5.10 Existing institutions need a profound cultural and procedural change in order to benefit from DiDIY approaches***

Within educational establishments a similar cultural shift is needed to recognize DiDIY and new technologies as an opportunity to improve the (digital) culture of the society. Work needs to be done locally to make school deans aware of the need for school teachers and educators. Strengthen the connection of schools with the local resources, allowing students to engage in goal-oriented activities leveraging on new digital technologies to tackle real-life problems, is a key issue.

### ***5.11 However such change is possible if this is desired with the help of tools and community-shared solutions***

Despite the difficulties within companies and schools, change is possible. To facilitate this we have developed a “co-design toolkit”. This toolkit leads people inside private and public organization to apply a strategic design approach to the use of digital technologies of production and sharing which become a means to activate new innovative opportunities and ideas. It offers creative techniques, methods, tips, and worksheets that guide people through a structured design process allowing them to create and implement solutions.