

How Distributed Design might drive the circular transition

*Eight potentials for how Distributed Design can
contribute to the transition to a circular society*



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Introduction

Welcome to the high-quality resource DDC - Danish Design Center developed as part of the Distributed Design Platform.

This resource presents the key insights from a study investigating the cross-section of Distributed Design and Circular Economy. The study is based on previously conducted academic research in the field. It highlights the main obstacles and potentials related to how Distributed Design can help the transition to a circular economy.

A circular economy is about circulating and extending the lifetime of our existing resources by decoupling value creation from resource consumption. This is crucial to reduce and minimise carbon emissions and fight resource scarcity and overconsumption.

Distributed Design can help democratise design and manufacturing, which can contribute to the circular agenda. Furthermore, a distributed approach to design can help set designers free from centralised manufacturing and globalised (non-resilient) supply chains by working in shorter ones. Distributed Design can extend the longevity of products and materials, e.g., by applying digital manufacturing techniques to produce new spare parts for products. And finally, Distributed Design allows makers and designers to open up processes, enabling other makers and designers or even manufacturers to produce locally, thereby minimising transportation.

This resource will give you a better overview and understanding of the potential and challenges to make makerspaces and fab labs contributors to the circular transition. It should enable you to choose one or more focus areas as possibilities for change in your project, organisation, and/or business.



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Fab labs can potentially be places that encourage sustainable design, where people can produce products locally and think about the various implications on the environment and society of their design.

- Fleischmann et al. 2016 [4]

The Obstacles

We know that more needs to be done to harness the potential of fab labs and makerspaces toward sustainability and circularity (Fleischmann et al. 2016, 4).

But some of our core findings show the following obstacles:

- 1. Lack of communication**
- 2. Lack of focus/priority**
- 3. Lack of knowledge**



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1. LACK OF COMMUNICATION

- Sustainable and circular developments in makerspaces and fab labs are rarely promoted in their own right.^[5]
- Fab labs are recognised as centres/ meeting places for distributed production and design but are not necessary spaces for promoting environmental sustainability as a core principle or value.^[9]

2. LACK OF FOCUS/PRIORITY

- There is a gap between the claimed transformative possibilities of fab labs and the realities we see.^[4]
- The fab labs tend to be directed towards other ideological concerns than the ones concerning circularity and sustainability.
- The labs usually take care of day-to-day work in their spaces.^[7] They, therefore, risk reproducing unsustainable practices unless tangible strategies for sustainability and circularity come into place.^[6]

3. LACK OF KNOWLEDGE

- Maker communities tend to be divided in their sustainability capacity and knowledge.^[5]
- Makers need more information on products and raw materials. This knowledge is crucial to know how circular or green the product or material is - especially if they are to communicate it to potential future customers.^[8]

At DDC, we have identified eight potentials for how distributed design can contribute to increased circularity in society. Each should be regarded as a subject on its own. Yet they intertwine with the others, acknowledging each subject's complexity.

The Eight Potentials

THE MAKER

THE MAKERSPACE

**THE MAKER
SKILLSET**

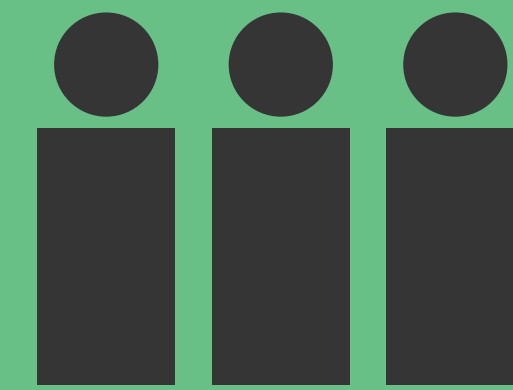
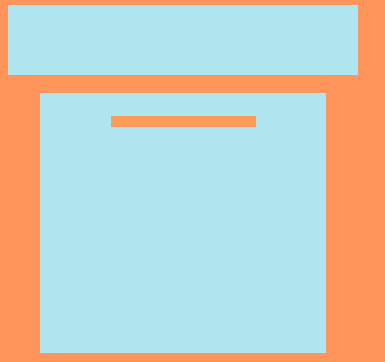
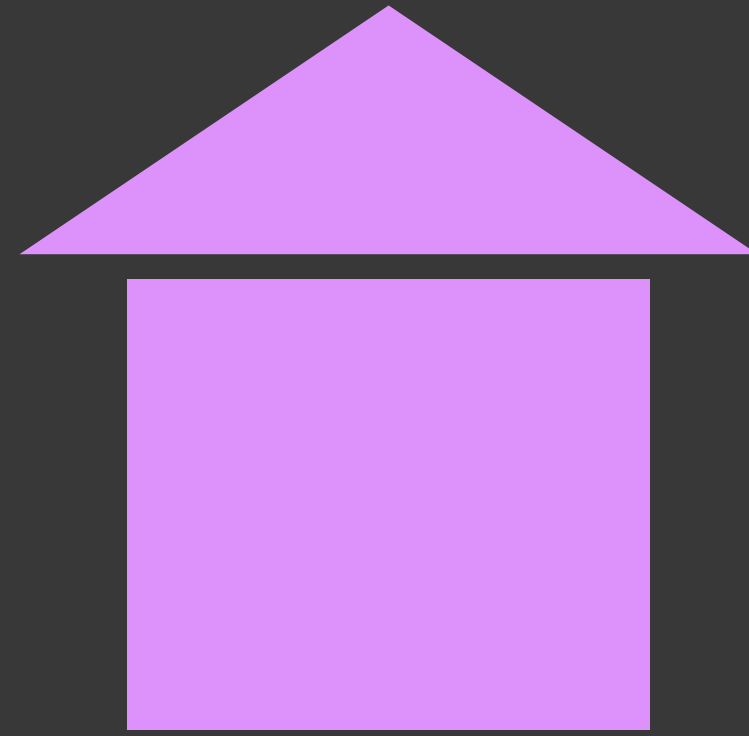
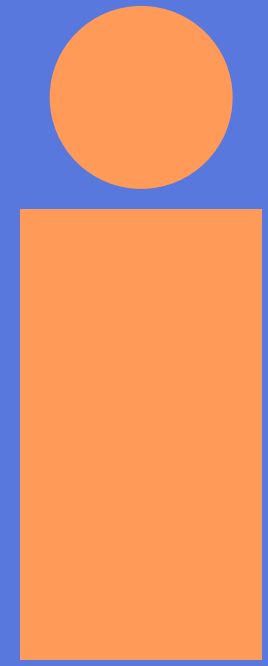
**THE MAKER
PRODUCTS**

**THE MAKER
MOVEMENT**

MAKERS IN MARKET

**MAKERS
IN SOCIETY**

**MAKERS
FOR POLICY**





How might we actively work on shifting the makers' mindset in makerspaces to be prompted by sustainability and circularity?

Working with sustainability and circularity certainly requires the individual maker to be confident to challenge current design practices and norms.^[7]

Ultimately, makers should find a way to be motivated around sustainability and circularity - this helps if it is fun, exciting, and fulfilling. For this to happen, the relevant tools, resources, and activities should be accessible to the makers and designers using the spaces.^[6]

Designers have a crucial role as they can help facilitate the necessary transformation in human interactions, mindsets, and relationships^[1]. One can ask how much of the undirected creativity in the makerspaces is currently being managed.

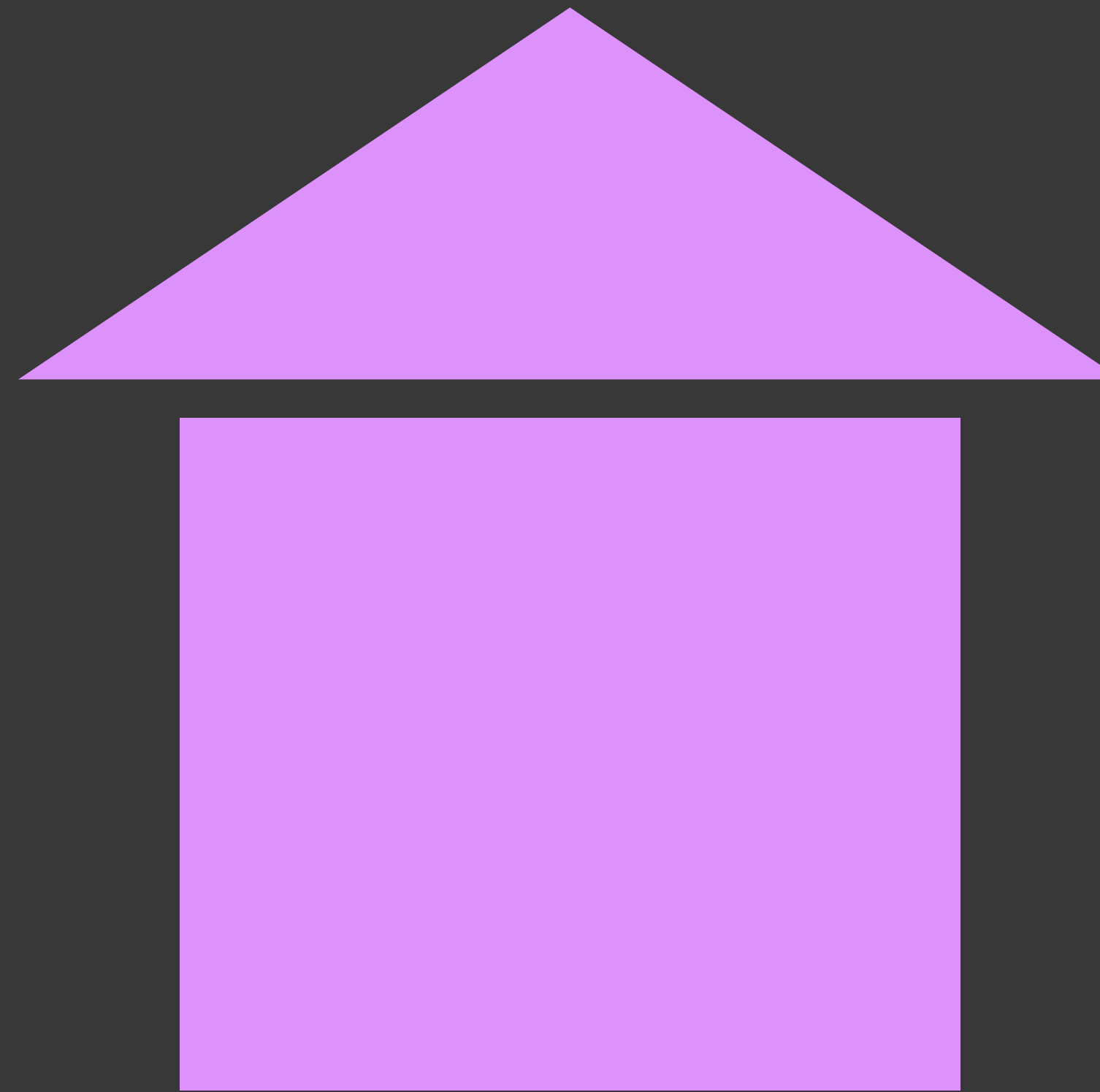
THE MAKERSPACE

A dominant design of makerspaces and fab labs has yet to exist.^[2] This makes it possible, to a certain extent, to influence and direct the design in a more circular direction - if decided. Managers of makerspaces can drive the approaches to sustainability and circularity from within.^[4] What the fab labs consciously promote usually pays off - e.g., offering workshops, hosting entrepreneurship events, etc.^[2]

“If it is desired that environmental issues are closer to the core, they need to be moved further up the agenda via strategies for visibility and conscious practice.”

- Cindy Kohtala, 2016^[9]

Fab labs and makerspaces can help foster highly demanded skills of the 21st century^[2]- one of them indeed being sustainable and circular thinking and implementation. Though, it requires that the management team in the spaces is determined to work on this agenda actively.



How might makerspaces, fab labs, and all their users have access to the proper training and knowledge on circularity?

The spaces must consciously work with a product's entire lifecycle and circular business models. This will create a more significant positive impact on the environment.

Fab labs and makerspaces are key interfaces through which designers can come to understand their future profession [9]. Different activities and training sessions can be beneficial for working with increased sustainability and circularity implementation and awareness in the spaces - like masterclasses on the circular economy, mapping of local maker ecosystems, and sharing legislation experiences.[12]

"[...] without devaluing the building of conceptual skills, is key to facilitating activities within Fab Labs that are reflective towards sustainability issues and co-creational processes."

- Katja Fleischmann, 2016 [4]

Makerspaces have the potential to play a role in a future circular economy. They can do that by functioning as educational spaces for developing creative solutions. And they can take it further by educating young people to a high level early in circular design into the mainstream for prototyping and, possibly, as places for manufacturing.



THE MAKER SKILLSET

THE MAKER PRODUCTS

How might we scale the production and know-how of maker products?

We have seen how makers attach great value to their creations. This is a crucial driver for caring, maintaining, and repairing their creations to extend the lifespan of the products [5]. The open-source approach applied to a certain number of maker products creates better opportunities and incentives for end users to continuously repair and maintain the product.

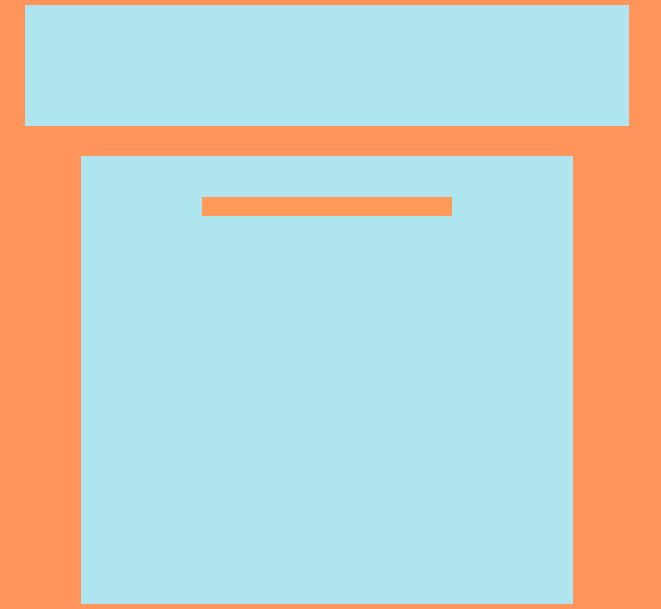
Fab labs and Makerspaces can also use activities like product tear-downs to explore how things get made as

well as their social and environmental implications.[6]

“It requires the development of dynamic and flexible products, which implies designing for variability, product attachment, and preparing the product for future repair and upgrading.”

- Katja Fleischmann 2020 [1]

We need to gather general learnings about how makers produce their products and see whether this provides insights for product design in a more scalable fashion - for makers and on a more widespread basis.



How might makerspaces be an opportunity to introduce local and small batch production on a larger scale having a closer connection to mass production?

If you think of, e.g., a production pipeline from a prototype, to a small batch, to larger orders, to mass production; how might this be carried out in a more sustainable and circular manner than is currently the case?

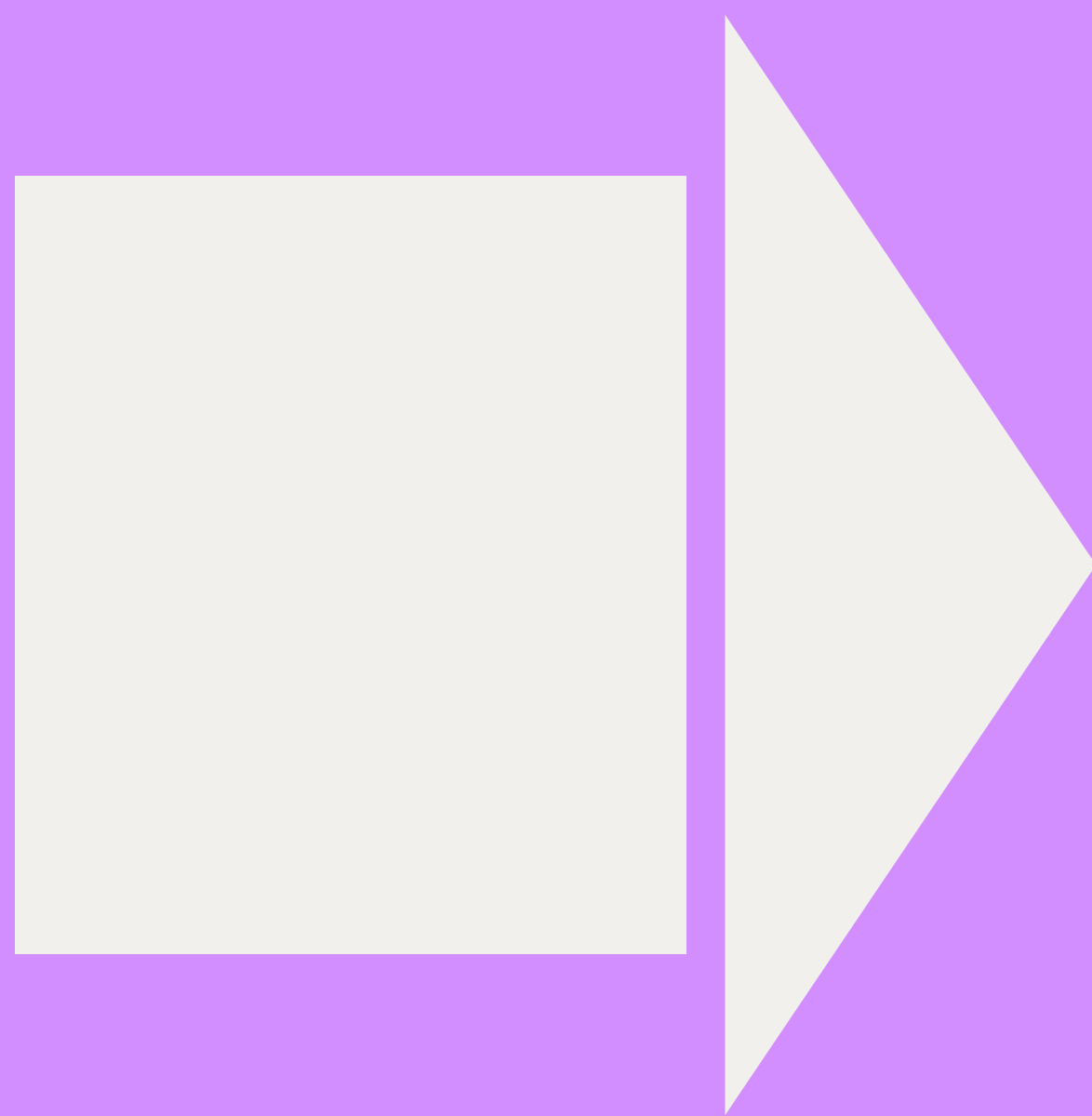
With the aid of Distributed Design approaches, we see how production can be drawn back into the cities closer to the consumer. The maker movement, fab labs, and makerspaces can help strengthen local production, decrease mass production, and focus more on customisation and on-demand production.^[8] Furthermore, fab labs offer a relatively risk-free platform for exploring open and distributed design, which benefits sustainability and circularity.^[9]

If the supply chains and production systems are to be more resilient, they should be reshaped towards more effectively integrated production by smaller entities. The focus should move toward more individualised solutions for society and moving away from mass production.^[8]

MAKERS IN THE MARKET



THE MAKER MOVEMENT



How might the bottom-up, democratic, and collaborative processes and approaches of the maker movement hold the potential to address making and manufacturing in new ways that open up a socially inclusive innovation space, which is necessary for a transition to a circular economy?

The maker movement encourages so-called ‘master makers’ to transfer their knowledge of production techniques to less experienced makers. The expertise and apprenticeship created in makerspaces are shared among the network physically and through digital platforms to people of different backgrounds, allowing for comments and improvement suggestions that will enrich the value of the projects.^[3]

“[...] making can prompt reflections about our material culture and can remind us of the diversity of motivations, conditions and moments of activation under which radical creativity and collaboration emerges”

- BayBrooke & Smith, 2018 ^[3]

The maker movement has an active position in producing tangible artifacts while simultaneously using and experimenting with new processes, materials, and technologies - therefore, social and environmental sustainability aspects are likely to count as some of their essential concerns.^[9]

How might we deploy the activism approaches and social values in the makerspaces to increase sustainability?

Institutions committed to social development could potentially do more to recognise and support the democratising capacity of makerspaces. This involves the culture of activism in makerspaces which can aid in pushing for these crucial transformations.

It is vital to continually acknowledge and appreciate the social value the activist communities produce.^[10]

There's a potential for the spaces to increase sustainability and circularity through collaboration with stakeholders outside the spaces. The partnerships could work more with, e.g., citizens' engagement, practice-based science, inclusion, and democratic cooperation.

MAKERS IN SOCIETY



How might incentivising policies help support the collaborations that could contribute to solving some of these policy-related issues? And how might closer cooperation among makerspaces and policy actors actively support the bottom-up movement and the scalability of learnings, effects, and processes from makerspaces and fab labs?

Since the Maker Movement emerged not long ago, policies related to maker practices tend to either need to be revised or blocked the way to circularity. Suppose a system of policy measures were to be established to incentivise, e.g., repairing household objects. In that case, this could be an essential driver for a circular economy. Another ample opportunity is to enhance collaborations between makers and industries, aiming to extend the lifespan of products.^[8]

"There are still formidable policy and economic obstacles blocking the path of this radical transition to a circular way of doing business. Designers and citizen designers as change agents can help remove those obstacles and accelerate the transition to a Circular Economy."

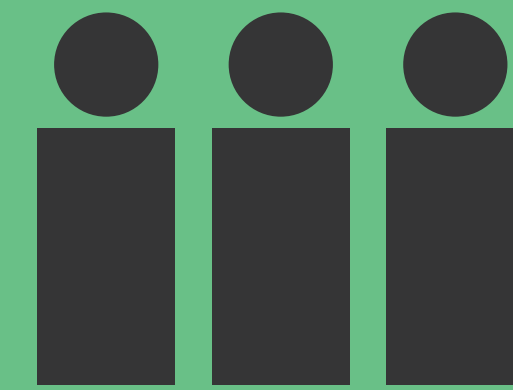
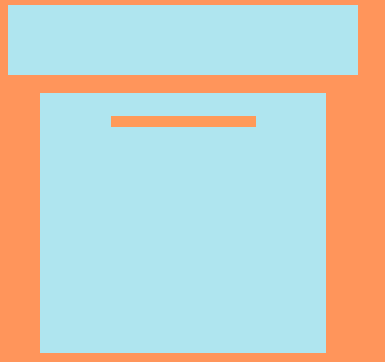
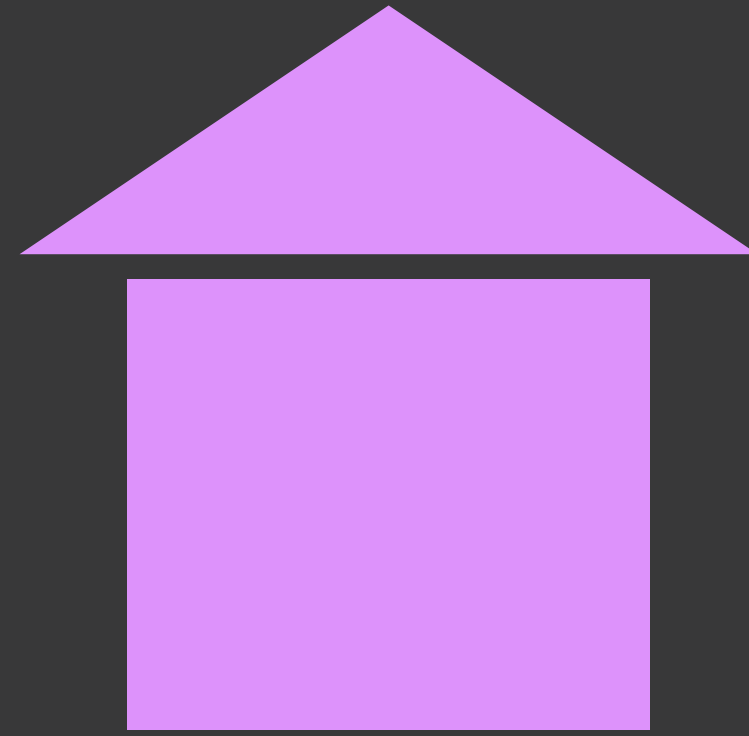
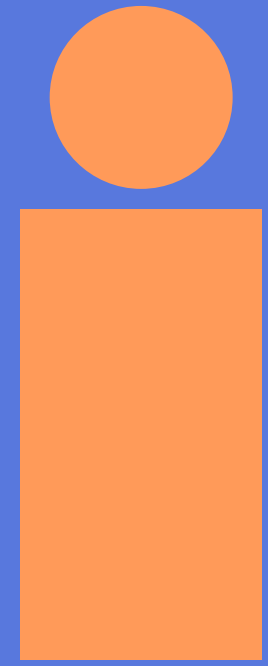
- Katja Fleischmann 2020, 1

Large businesses tend to be concerned with, e.g., invalidation of warranties and safety issues when letting citizens perform repairing activities themselves.^[8]

MAKERS FOR POLICY







Call to action

If you would like to know more about Distributed Design Platform member, DDC's, work on circular economy, you can read about the mission, 'Designing Our Irresistible Circular Society', [here](#).

You can also start diving into our toolkit, 'Designing Your Circular Transition'. This can help get you started on identifying circular initiatives in organisations, businesses, maker projects etc.

You can access the tool on ddc.dk, [here](#), or use the virtual Miro template version of the tool [here](#).

Always feel free to reach out to us if you have any questions, inquiries or insights you would like to share with us!

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