Fab City OS

Giving designers the infrastructure needed to flip the power relations of our current productive model.

Contributions from Benedikt Seidel, Fab City Hamburg & Denis 'Jaromil' Roio, Dyne.Org, edited by Kate Armstrong, from Fab Lab Barcelona at IAAC

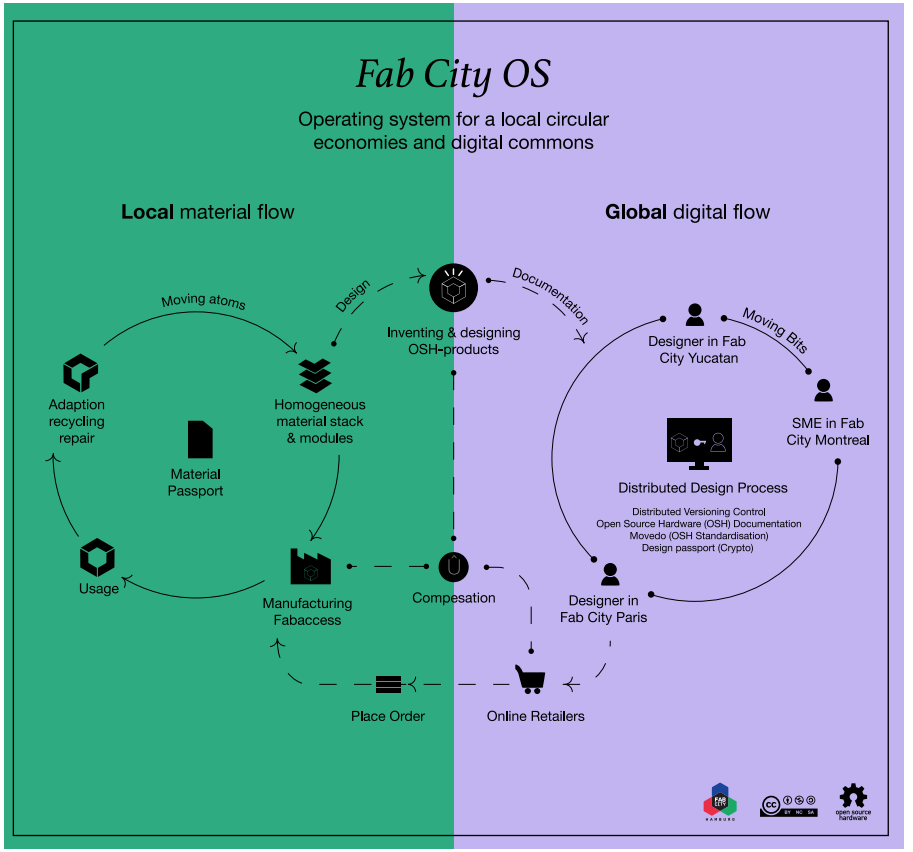
Fab City's mission is to scale up the potential of digital fabrication to reconfigure our current model of production and consumption, in order to reduce its impact in the biosphere and in society. For Fab City to be able to increase the impact of the open hardware and maker communities, it needs a platform to enable creators to engage with the reality around them. Distributed design gives makers and designers a framework to practice design for the real, digital world. Shared values guide design decisions to favour open, decentralized processes; local and situated solutions and material regeneration. A prefigurative design approach is emerging that is more ecologically sound, democratic and accessible. To actualise such alternatives, infrastructure is vital. The global spread of fab labs, makerspaces and distributed small-to-medium production facilities provides the basis for globally situated hardware infrastructure. And Fab City OS is aiming to develop the necessary operating system for it.

An operating system, or OS, is the software interface between the user and hardware. It facilitates basic operations of a computer from managing internal hardware like memory and processing; to establishing a user interface; to managing peripheral devices such as printers. An operating system designed for Fab City would also support the basic logic of Distributed Design. That is, it facilitates design and collaboration at a global scale in a distributed manner, while enabling local production.

A globally distributed infrastructure

Fab City is aiming to bring production back to cities by 2054, following a forty-year roadmap which was launched by the City of Barcelona in 2014. The global movement envisions a paradigm shift from the industrial model of Product-In, Trash-Out (PITO) to Data-In, Data-Out (DIDO) where "atoms" stay local and "data" moves globally. Fab City OS is being developed as the digital infrastructure to facilitate this transition. The roadmap for its Alpha and Beta release until March 2023 is being led by Fab City Hamburg Association, supported by the project INTERFACER, funded by the European Commission REACT-EU (Recovery Assistance for Cohesion and the Territories of Europe) recovery plan following the COVID-19 pandemic.

At the core of the Fab City OS software is an adaption of Reflow OS, a cryptographic design and material passport based on "smart contracting" technology. This core technology is combined with open-source software such as Fab Access, Git or FreeCAD to managae the movement of "data" including digital designs and respective finances, licences and documentation. Powered by a secure central signature-scheme and a plug-and-play software stack, Fab City OS aims to make distributed production secure, efficient and competitive.



21.07.2021, Hamburg, CCBYSA 4.0, Fab City Hamburg e.V.

The idea-to-product pipeline

´The design system favours products that allow for repair, reuse, adaptability or design for disassembly.´

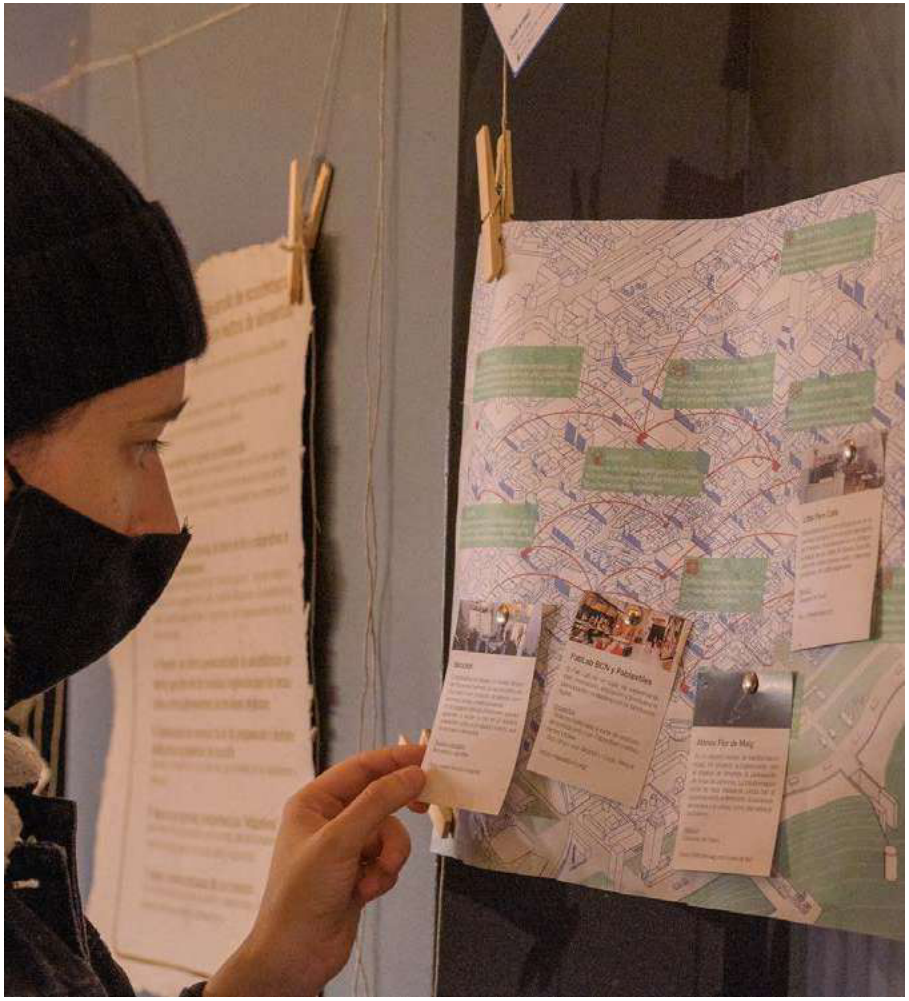
A design is developed by a maker or designer in a makerspace, SME or Fab Lab. The 3D-model is uploaded in FreeCAD to a public repository. Using MoVeDo the design can be standardised including all manufacturing specifications like build instructions or bill of materials. Anyone, anywhere, can suggest improvements to this design. If the original author accepts the changes, each successful contribution is stored in the design passport. The design is then offered, with all necessary instructions on an E-Commerce store that is local or familiar to the designer or their target audience.

Fab City OS gives financial incentives to product designers and manufacturers - in the distributed mode of production. Each time a customer buys a product in the online store, all designers involved receive a share of the price according to their individual contribution stored in the design passport. When a purchase is made, manufacturing information is sent to local manufacturers located near the customer. On completion, the product is delivered to the customer and a physical extension of the design passport is included with the purchase. It can communicate manufacturing, material, repair and reuse details via a unique identifier on the physical product such as an RFID-chip or a QR-code. The design system favours products that allow for repair, reuse, adaptability or design for disassembly. The passport facilitates maker and user feedback to control the level to which these values are reflected when the product is in manufacture or use. Designers can receive financial reward for successful integration of such distributed design principles, or be reviewed, and in some cases sanctioned, if their design does not reflect these principles. So designers have a financial incentive to design according to values of distributed design.

Operationalisation of values

Operationalising the values of Distributed Design in an OS aims to in-turn support designers and makers with a digital infrastructure that can help them to operationalise their values and importantly, ensure everyone along the value chain benefits.

In addition to designers and makers, Fab City OS has different kinds of users along the value chain of distributed production, such as small and medium enterprises, corporations, makerspaces, public administration, hobbyists and tinkerers, innovators, fab labs, even public waste departments, or e-commerce stores. The end-customer's user experience does not differ from any existing product purchase on an e-commerce store. And, they can be assured that their purchase was manufactured locally, supporting their local economy and lessening their global impact.



Remix El Barri Exhibition, Mapping the city.

It is clear that our mainstream economic model has created wealth but has also caused huge ecological and social consequences that are haunting us. The solution for these problems must be as radical as these consequences are. Fab City OS will provide an effective solution by flipping the power relations of the current economic mode of production upside down. Fab City OS will enable designers to sell and distribute their designs globally without relying on intermediaries of physical supply chains and their business model logic.