

**transformative
social innovation
theory**

TSI Narrative - FabLabs



This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no 613169

About TRANSIT:

TRANSIT is an international research project that aims to develop a theory of Transformative Social Innovation that is useful to both research and practice. It is co-funded by the European Commission and runs for four years, from 2014 until 2017. The TRANSIT consortium consists of 12 partners across Europe and Latin America. For more information, please visit our website: <http://www.transitsocialinnovation.eu/>.

About this Document/ Disclaimer:

This report provides a very short summary of a full case report that includes in-depth case-studies of the FabLabs network and its local manifestations in Amersfoort, The Netherlands, and Argentina. Both, the full case reports and this summary, were guided by four empirical research questions based upon a preliminary conceptual framework of the TRANSIT-project. The four questions concern:

1. the overall development of the local cases and the transnational network(ing);
2. how they relate to different types of change and innovation (incl. social innovation, system innovation, game- changers, narratives of change and societal transformation);
3. how actors are empowered and/or disempowered in and by the local cases and the transnational network(ing), including topics such as governance, learning, resourcing and monitoring;
4. what are other relevant emergent issues with regard to understanding the dynamics of transformative social innovation.

This summary document focuses on the first three questions. It presents – in a highly reduced and generalised format – the interpretations of the researchers, and does not necessarily reflect the views and nuances of the initiatives and respondents themselves. For a full account of each transnational network and local case, including interview quotes and expressed nuances by respondents, we refer to the full case report, which is available via the contact person indicated below or via communication.transit@ihs.nl Both the full case report, as well as this summary document, are the basis for future research activities and publications.

Suggested citation:

Smith, A., Hielscher, S., Fressoli, M. (2015) *Transformative Social Innovation Narrative: FabLabs*. TRANSIT: EU SSH.2013.3.2-1 Grant agreement no: 613169 | 31st of March 2015

Date: 31st of March 2015

Authors: Adrian Smith, Sabine Hielscher, Mariano Fressoli

Contact: communication.transit@ihs.nl

Transformative social innovation narrative: FabLabs

Adrian Smith, Science Policy Research Unit (SPRU), University of Sussex, UK

Sabine Hielscher, Science Policy Research Unit (SPRU), University of Sussex, UK

Mariano Fressoli, Fundación Cenit, Argentina

2nd February 2015

As part of the European Commission FP7 research project TRANSIT (Transformative Social Innovation Theory), we have been instructed to produce a narrative account about the development of FabLabs, and to consider how this relates to themes of innovation and change and empowerment and disempowerment.

FabLabs activities cover issues wider than TRANSIT research themes. Indeed, the diversity of FabLabs globally and the varied participation of individual Labs in different networks is a key finding that makes generalising to TRANSIT research questions quite challenging. The TRANSIT research design, including limited interviews and two specific initiatives studied in depth, means analytical interpretations must be reflected upon carefully.

Selecting two local initiatives across the diversity of FabLabs was difficult. In the end, we chose a fairly established grassroots initiative (FabLab Amersfoort in the Netherlands), and a more recent initiative (FabLab Argentina) created through FabAcademy networks. Neither reflects the full variety of Labs and activities. Drawing firm conclusions is consequently difficult, and our analytical interpretations should be read with caution. The narrative produced here draws upon the synthesis section of a larger TRANSIT report about the FabLabs case study.

1: Development of FabLabs networks and two local Labs

FabLabs and their networks developed and evolved out of an initiative begun by the Centre for Bits and Atoms at the Massachusetts Institute of Technology. Prof. Neil Gershenfeld began a popular course in digital design and fabrication in 1998, and that developed into the FabLab concept. The FabLab concept is to provide spaces open to the public where people can access tools, training and designs in digital fabrication, and to base this around a global network of physical workshops with access to on-line and other support services, as well as being networked with one another.

National Science Foundation funding supported the initial implementation of the concept. The first FabLab was created in Boston in 2001, and others followed in Costa Rica, India, and Ghana in 2003. Developers in Lyngen in the north of

Norway also established a FabLab very early on. Others heard of the concept and have initiated a wide variety of FabLabs, with different funding sources, and sometimes independently of MIT. Whilst MIT's Centre for Bits and Atoms has remained involved, and Prof. Gershenfeld continues to be a key figure representing FabLab developments, the rapid growth of Labs and development of networks has taken on a life of its own, driven by demand and initiative in different locations, and the desire to network and forge links for varied purposes. Some Labs have been created by grassroots groups interested in new technologies, some have been set up by entrepreneurs wanting to run a space, and others have been created by public agencies, foundations, and charities. As one interviewee put it, the FabLab phenomenon is 'accidental'. A dynamic in the evolution of FabLab networks consists in a desire for coherence and coordination across Labs, but without hindering the experimentation flourishing in Labs around the world.

FabLabs take advantage of increasing accessibility to versatile and powerful digital design and fabrication tools. The FabLabs concept has also benefitted from a wave of social interest in making, hacking and tinkering globally. Some FabLabs connect to these wider developments, such as involvement in Maker Faires, and featuring in maker publications. Growth in FabLabs numbers has consequently been rapid. In 2014, there were more than 440 FabLabs in over 60 countries (www.fablabs.io/labs).

All FabLabs follow principles in a common charter (created in 2006), and new Labs affiliate to the network by being validated by an existing, trustworthy Lab. The Fab Charter requires Labs to: 1) regard their Lab as a community resource, and therefore must be open to the public for part of the week; 2) respect open source approaches to design and fabrication; 3) commercial activities are legitimate, but any business development beyond initial prototyping and incubation should be outside the Lab; 4) equip themselves with a common set of tools, capabilities and processes that facilitates sharing between people and Labs; and 5) identify with the wider network of FabLabs.

The initial MIT model, still upheld by the Fab Foundation, provides a blueprint of equipment that cost around \$100,000 (more in countries with import tariffs). Equipment vendors are increasingly interested in promoting into the Labs. As a peak association, the Fab Foundation can negotiate deals for Labs. So, for example, Solidworks are promoting their CAD package to all Labs, and Chevron has donated \$10 million to help the Foundation promote and establish more FabLabs in the US. However, not all Labs follow MIT equipment specifications, and there has been experimentation in ways of meeting the basic charter aims through organising and equipping Labs in different ways. In practice, for example, some Labs are more 'open' to the public than others.

The Fab Foundation was established formally in 2009 as the node for coordinating activity. A parallel attempt from the Netherlands to form a FabLab International Association does not seem to have lasted. Nevertheless, regional networks are emerging as well as connections between Labs nationally and locally. In addition, some Labs and groups have created web platforms for sharing designs and projects; and there has been some networking between Labs interested in specific topics, such as grassroots activity, or linking to education in

schools, or other topics and projects. So, networks come and go, spread and specialise, all initiated by demands and ideas amongst the FabLabs.

The Foundation helps some of these activities, as well as providing support for those FabLabs that wish to take part. Recent supportive platforms include a FabEconomy initiative, which seeks to network and promote a new economic paradigm based on globally distributed peer design with customization and production locally. FabConnections is a web-based platform for linking business ideas incubated in FabLabs to development services including crowd-funding, enterprise advice, and attaining sponsorship. FabShare tries to make it easier for collaborative projects and sharing between FabLabs. The latter initiative is an example of individuals in some Labs trying to make the FabLab concept work better. Whilst the potential for global collaboration is possible in principle, FabShare want to make it work better in practice, since the technical possibilities have not been taken up very often.

A more established network initiative is the Fab Academy for training people in digital fabrication. The Academy was launched in 2009, and provides 5 month, part-time courses at a cost of \$5000. Students are based at one of 40 or so affiliated FabLabs, where they are helped by the local manager in a series of project-based tasks that complement on-line instructions and video-conferencing classes involving students at other Labs around the world. The course is intense, and a strong esprit de corps develops. Alumni from earlier Fab Academies have been a driving force in the creation of later FabLabs.

One of our local initiatives, FabLab Argentina, is an example of this expansion through a cadre of Fab 'gurus'. One of FabLab Argentina's founders was a student at the Institute for Advanced Architecture in Catalunya (IAAC) and where the Barcelona FabLab was established in 2007. At FabLab Barcelona, the Fab Argentina founder met other students from Latin America, including Benito Juarez and Andres Briceño from Chile. Benito returned to Peru to help establish FabLab Lima, and Andres similarly at a FabLab in Santiago de Chile. FabLab Argentina was able to start running properly in July 2014 with the provision of workshop space at the Central Society of Architects in Buenos Aires.

FabLab Barcelona rapidly became a prominent Lab and has helped others to become established, e.g. with development aid from the Spanish government, which helped create FabLab Lima. Indeed, the founder of IAAC, Vicente Guallart, became City Architect for Barcelona, and with Deputy Mayor Tony Vives, has been pushing a FabCity vision through the gradual opening of publicly-funded Ateneus de Fabricación Digital in each of Barcelona's neighbourhoods. The network of Ateneus is envisaged as becoming part of the public infrastructure of a sustainable city that, within 40 years, it is hoped will manufacture over half of its material needs locally.

Personal connections through and beyond FabLab Barcelona have assisted in FabLab Argentina becoming established within a network of Labs in Latin America. A FabLat regional network is collaborating in the FabLab Flotante project. The project uses FabLab facilities to build a floating FabLab designed to travel through the rivers of the Amazon region and serve communities by working with biodiversity, digital handicrafts, and eco-production. Each participating FabLab is developing a module for the project. FabLab Flotante is

one in a handful of high-profile joint projects that have come to symbolise the international collaborative spirit between FabLabs, and the vision for globally-connected, locally-fabricated development of peer-to-peer solutions. Earlier projects included design and fabrication of a low-cost, open wifi network (involving FabLabs in Norway, Afghanistan, Greece and South Africa), and an eco-house (involving FabLabs in Spain, Lebanon and Ethiopia). Though, as noted earlier with FabShare, these remain exceptional possibilities rather than general practice in the network.

FabLab Amersfoort in the Netherlands is a contrasting case because it comes from outside the more organised FabLab networks of the Academy and Foundation. Amersfoort was a grassroots initiative that went about providing a community-based workshop very differently. They presented their experience to the FabLab community at the 6th international meeting of FabLabs in Amsterdam in 2010. Amersfoort's approach has influenced others to create FabLabs similarly.

FabLab Amersfoort opened officially in 2010. It was created to support a group of activities under the De War collective based in an old factory in Amersfoort. FabLabs were an interesting idea introduced to De War by a participant in one of their workshops. It was an extension of some of the making activities they were already doing, but they also liked the idea of encouraging people to become more familiar with technologies, and creating networks of makers empowered to shape their own lives and environments. However, De War did not like the \$100,000 price tag for the MIT-style FabLab, nor were they able to get funding. And so, with a few friends, De War went about creating a FabLab in a week and with about €5000. This provided initial equipment, added to over time by self-built machines and other purchases. But what enabled this was the prior existence of a group of people wanting to do it and work at it. An ethos of just getting on and doing projects with the resources available to the group, and without seeking permission or funds, and encouraging others to do so similarly, was a key motivation.

FabLab Amersfoort has shared their experiences with others interested in setting up FabLabs. They also organise a FabFuse event each year for people interested in grassroots digital fabrication, and which has attracted around 140 people. However, much of FabLab Amersfoort's networking is through De War and operates locally. There are the regular open days, and people using the workshop for personal projects, as at many other FabLabs globally. FabLab Amersfoort has also connected with local Transition Town initiatives and citizen science activity and broadened ideas about what a FabLab is for (in this case, sustainability transitions, and projects for promoting green ideas).

Figures 1, 2 and 3 provide time-lines for FabLabs networks, FabLab Argentina and FabLab Amersfoort respectively.

Figure 1: time-line for FabLab networks

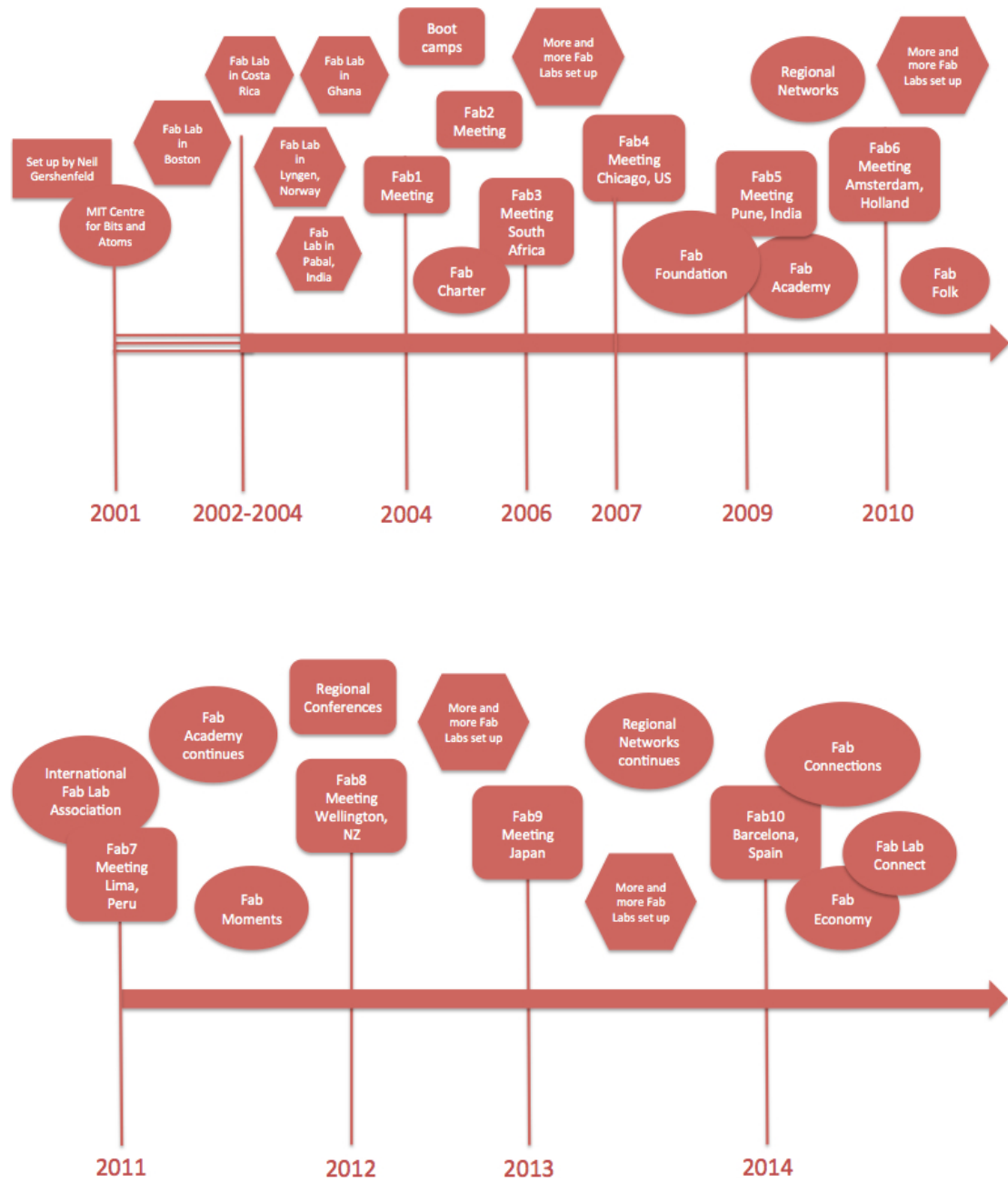


Figure 2: time-line for FabLab Argentina

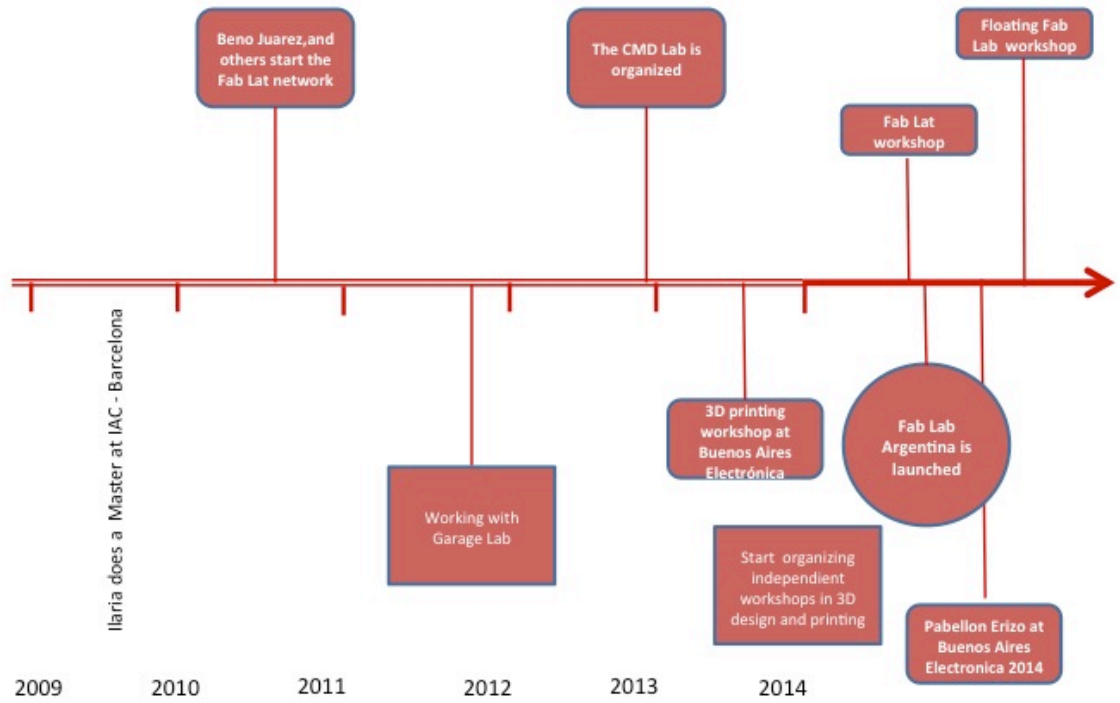
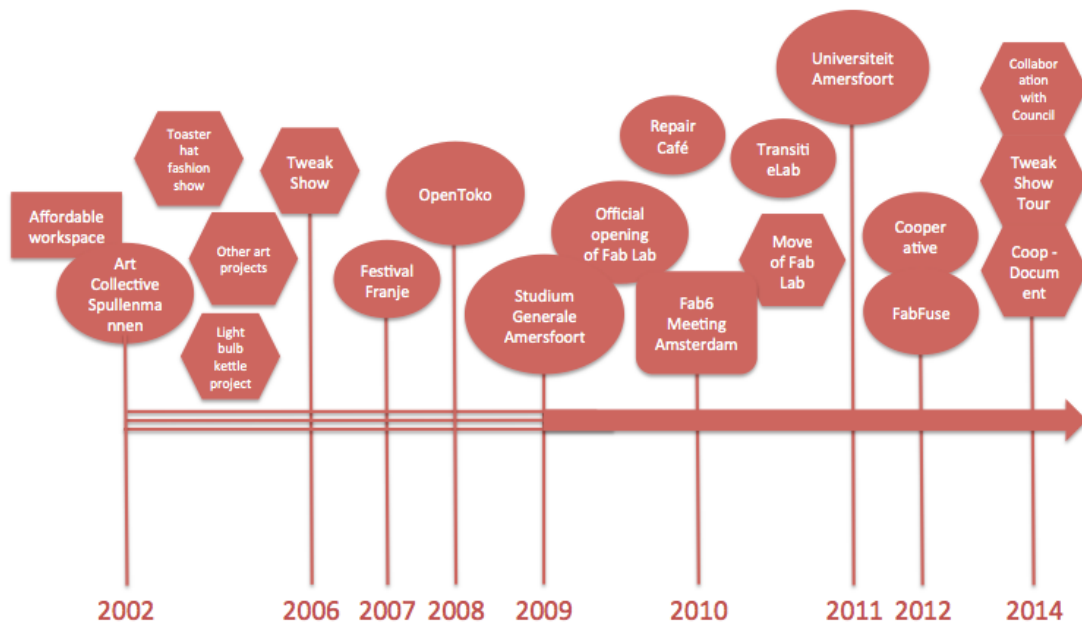


Figure 3: time-line for FabLab Amersfoort



2: Aspects of innovation and change

All FabLabs share a commitment in giving tools to people and helping creativity to flourish. However, what people then do with those tools is an open question. Whilst issues like sustainability or social inclusion might get mentioned sometimes, there appears little appetite in the networks to channel FabLab activities in certain directions. Indeed, this would seem to be imposing structures that contradict the basic FabLab idea, which is to give people tools that can potentially empower and even liberate them. In practice, many people want to have fun with the tools and work on cool devices and personal projects. Whilst ideas about social transformation are prevalent, these are ill-defined, and often related to ideas about a new economic paradigm arising from entrepreneurial 'fabbers'. In our view, and from the perspective of TRANSIT research interests (cf. FabLab aims), there is either a limited notion of or reluctance to engage with programmes to transform wider structures beyond the Lab implied by new economic paradigms or cultures of production and consumption.

FabLabs are emerging into a world that is already structured in complex ways, and which will have some bearing upon the future development of FabLabs. Many FabLabs experience this already in trying to navigate the different worlds of serving local communities, providing education services, and incubating business. Each places different demands on Labs, and has different implications for financing and running the Labs. So, for example, as outside interest translate into funding and growth opportunities for Labs, so it also introduces expectations and criteria that will influence patterns of activity, priorities and culture in the Labs. This presents an uneasy zone between the open and experimental spirit amongst the various Labs and their networks, and a more structured and coordinated set of sponsored activities that align with partnering institutions.

Whilst both our local initiatives are connected to projects with sustainability as a focus, the topic has a low profile generally. Having grown rapidly, FabLabs are exploring different ways of using the facilities they provide. Many are turning to the education possibilities of FabLabs, for instance. Other Labs are promoting design skills and entrepreneurship. There are other exciting possibilities being glimpsed through experiments in the promotion of everyday access to open, collaborative principles and digital fabrication tools. In our view, FabLabs might become a potentially transformative social innovation through their development of strategies to exploit structural changes in society favourably and on their own terms. So, for example, situating FabLabs favourably in activities that are already changing institutions in education (e.g. more hands-on, practice-based learning in schools), investment (e.g. crowd-funding and alternative finance), consumption (e.g. post-consumerist interest in how things are made), knowledge production (e.g. free culture), and other key areas of social life.

At FabLab Amersfoort, and particularly in the projects of De War, the emphasis is in using the tools of the Lab for the purposes of social change. The facilities are used to make objects such as monitoring systems and beehives. But really it is the organisation of these activities, and how they connect to bigger ideas and community building that is important. De War at FabLab Amersfoort is seeking

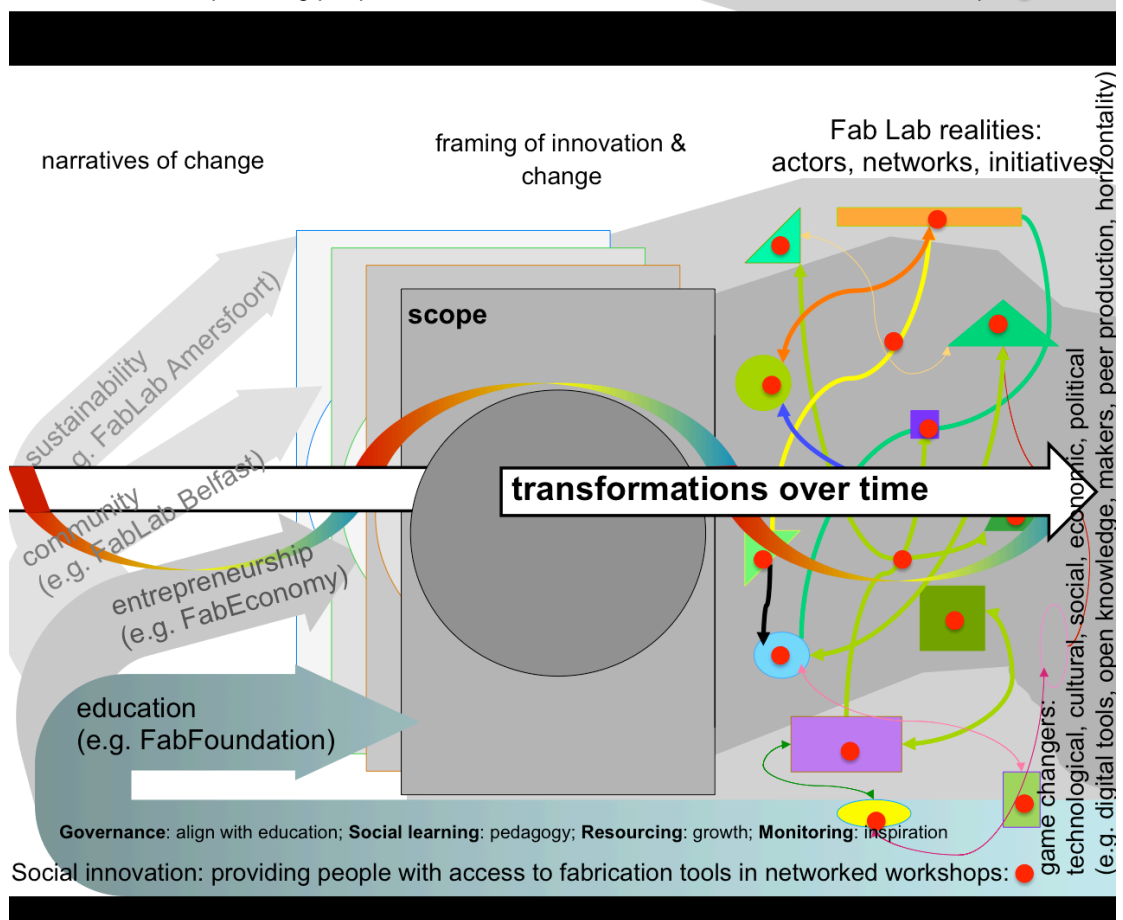
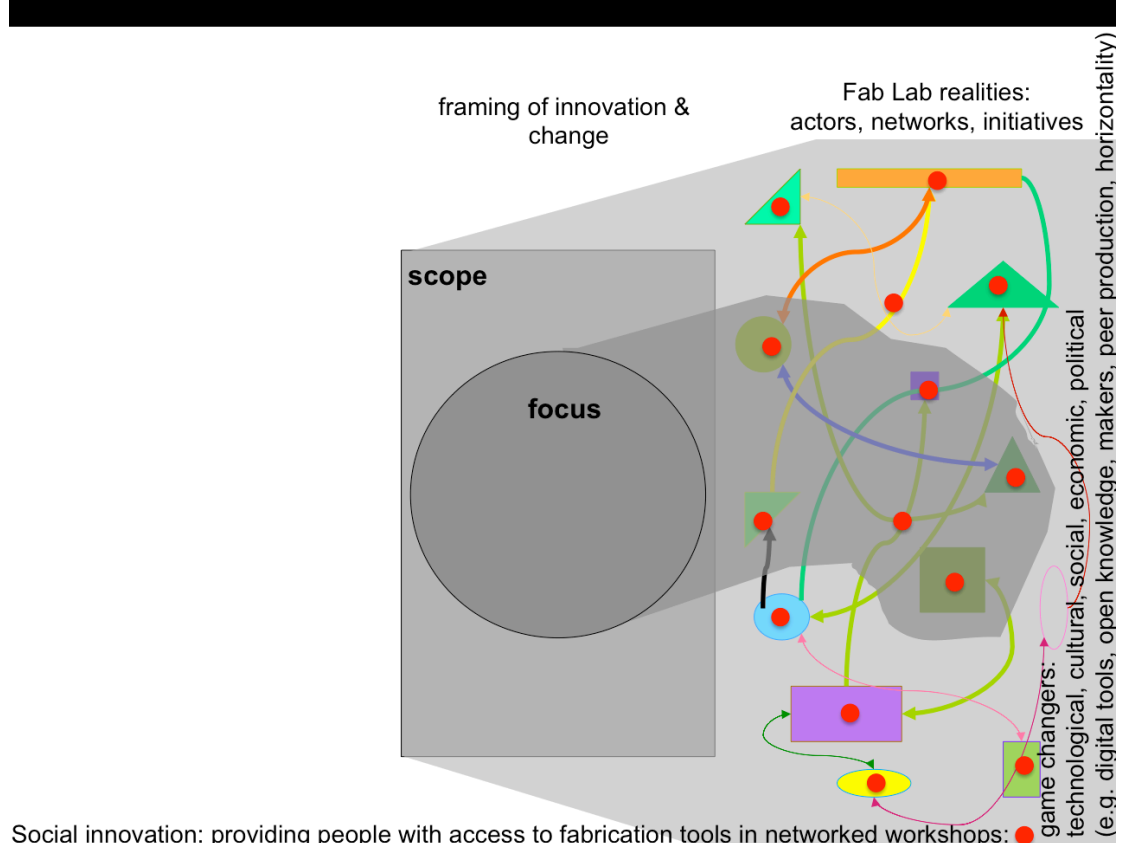
to put into practice ideas about open design, peer-to-peer production, and local sustainability. They want to expand the old factory site, including the FabLab, into a hub for local social change networks, and that they are involved in and helping to build. So for FabLab Amersfoort, the way they are trying to insert the innovative possibilities of FabLabs into Transition Town activities and in other directions of change they seek (such as citizen science, and an open, collaborative and sustainable society generally) is by embedding the Lab into networks of local activity that are working in similar directions. Transformation rests in the new relationships built through these networking activities.

FabLab Argentina, in contrast, is involved in more conventional FabLab activities that seek to popularise and train people in digital fabrication. They are providing facilities for people and students. However, FabLab Argentina is also involved in the FabLab Flotante international project, and which does have a strong social vision. That vision is an extension of the FabLab vision, in the sense that the project wishes to bring the tools of digital fabrication to the communities of the Amazonas for the purposes of biodiverse and community-sensitive sustainable development. Work in collaborative projects such as FabLab Flotante may help develop and improve new forms of knowledge sharing and skills swapping between different FabLabs internationally (provided one understands Spanish, English, and local languages of the Amazonas), and which interviewees from FabLab networks say is still short of its potential. Some innovative effort is still needed at developing the global knowledge sharing claimed for FabLabs.

The other transformational claim is for using that global knowledge in locally produced solutions. This too is relevant to FabLab Flotante, and also to Amersfoort. Indeed, for all FabLabs ultimately. Connections with communities locally will be an important test of whether and how the facilities designed and developed by FabLab networks address local needs and priorities amidst which FabLabs are set up (needs which can include international trade and investment). So, quite apart from innovations in the design of modular floating structures, bio-mimesis, beehive designs, and use of local materials, the transformational affects of FabLabs on the basis of our analysis is likely to work through the articulation of ideas underpinning the FabLab concept with networks for social change at two scales: locally, around the Labs; and regionally/globally, through the possibilities for sharing knowledge and design solutions from a diversity of localities.

In Figure 4 we attempt to visualise the complex realities of FabLab actors, networks and initiatives. FabLabs as a social innovation is a way of providing tools to people. The possibilities this brings to people and societies are framed differently (figure 4 – top). Each framing has its own narrative of change – whether in education, entrepreneurship, community or some other – and brings its own particular approaches and emphasis to governance, social learning, resource requirements, and indicators of success (monitoring).

Figure 4: visualisation of FabLabs as social innovation and transformation



(after STEPS pathways approach)

Moreover, activities under each framing interact with one another, and with structural 'game changers' that are generative for the FabLab phenomena, and upon which FabLabs are acting and contributing. All these interactions operate reflexively upon the framings, and prompt reflection and, sometimes, reoriented action on the part of actors committed to the different framings (figure 4 – bottom). Social transformation is the result of these complex interactions over time.

3: Aspects of dis/empowerment

As FabLabs have grown rapidly in number, and waves of networking initiatives have multiplied, so questions of direction, focus and identity have arisen. Prof. Gershenfeld and other people key to the early development of the network, and still very prominent, have been generous in allowing FabLabs to flourish and people to experiment. The broad parameters of the Fab Charter are the only requirement that is sought: apart from this, people can try different initiatives if they are able to garner interest. So on the one hand, the networks are quite open.

However, we have observed through our research that certain initiatives attract more approval and support from key individuals in FabLabs than do others. And as Fab Foundation attracts increasing funds from different agencies, such as corporations and international donors wishing to contribute to FabLabs, and seeing in the Fab Foundation a convenient 'representative' with whom to negotiate, so the Foundation's role may become more material and influential. We found no evidence of any desire from the Foundation to control or micro-manage the development of FabLabs, but what they do will nevertheless have a big impact on the FabLab community, and especially how it becomes perceived by different publics.

Decisions to accept support from different organisations (e.g. Chevron), the priority given to some agendas over others (e.g. biohacking), the kinds of future people and culture implied in FabLab promotional visions (e.g. a kind of Silicon Valley entrepreneurialism endorsed by the US President), and so forth, will affect the ethical associations and identifications different people have with FabLabs. Others in the networks might seek different associations, such as in commons-based peer production and sustainability, and might try to forge that through different networks. In our view, despite an apparently non-ideological commitment to give tools to people, the governance of FabLabs is likely to become increasingly entangled in the politics of technology (e.g. tools for what?), as well as pressures to become more structured and organised.

FabLab Argentina is still new and preoccupied with getting equipped and established. Decisions are discussed by the core group and tasks divided accordingly. The Lab arose out of difficulties experienced by the founding team at another FabLab in the city, and where leadership and organisation difficulties arose. The FabLab Argentina group are taking care not to be side-lined again, and are trying to ensure they retain a say in the way the Lab develops. However, some interdependencies are already shaping the way the workshop operates. For example, providing training for students associated with the Centre that hosts the workshop as a condition for having the space. And negotiations to host

technology from a company in return for allowing local businesses access to that technology in the space. If bids to the government for funds to equip the space are successful, then the Lab will be less dependent on informal arrangements such as these.

Amersfoort was luckier in the sense of already having space for its activities. It addressed similar challenges of getting established by building machines themselves and adapting cheap equipment to their needs (such as a second-hand laser cutter). They retain a DIY ethos and resourcefulness towards the acquisition and use of tools and materials. The commitment to openness and autonomy in De War influences the way the FabLab is governed. People are encouraged to get involved and can earn free access by helping out in the management of the space. It is recognised that people bring different motivations and commitments to the space. Some share the ideas and orientation towards peer production and collaborative effort of De War, whereas others are more interested in pursuing personal projects.

Some participants find the relatively open format at Labs like Amersfoort to be quite empowering, whilst others find it harder to know how to fit in with the apparent absence of structured positions and incentives (see Hackerspaces report also).

Knowledge about design and fabrication, and the cultivation of skills to practice digital fabrication, are the primary sources of empowerment sought by the FabLab concept. As such, processes for the acquisition and sharing of learning are an important part of the Labs and networks. Whether through the provision of web platforms, on-line tutorials, videos, events, workshops, training programmes, helping one another informally in Labs, and so on, there is a strong commitment to learning. There are a variety of mechanisms for supporting learning processes: 1) the Fab Academy course and alumni networks; 2) Fab Foundation support for creating new FabLabs around the globe; 3) through regional and international meetings; 4) through the provision of documentation via web-portals and organisations that support those platforms; 5) within collaborative projects between FabLabs; 6) through the nurturing of a culture that celebrates the sharing of ideas, skills and enthusiasm for learning.

The wealth of materials and activity is impressive. However, the documentation of projects is patchy. FabLab managers can encourage workshop users to document their projects, but there can be little enthusiasm amongst people eager to move on and make the next thing, and the Lab staff can be simply too busy running the workshop to chase any documentation requirements.

There are also limits to the extent to which knowledge can be codified and shared over digital media. Surprisingly to us, the importance of tacit knowledge in making things did not seem to be something widely discussed in the FabLabs and network events that we observed (although neither did we explore it with our TRANSIT-themed interviews). We witnessed the sharing of tacit knowledge in action in Labs, as people showed each other how to do things with their hands, and interacting with the various tools in practice. Whilst videos and commentary can try to convey this knowledge at a distance, there is always at least a residual 'knack' that needs face-to-face collaboration and closely guided experience building through a shared task. The access people have to this in FabLabs, in

combination with on-line resources, is part of the strength of the workshop-network model.

Another aspect of social learning that takes place in FabLabs yet seems to receive little explicit and critical reflection, relates to the positioning of FabLabs within community and social development. Understandably, emphasis rests in learning how to use tools, and how to go about developing projects. There is much less space within the networks for learning about different theories and evidence for how communities build, change and develop, and particularly what roles technologies play in processes of social change. As pointed out above, theories of change implied by many FabLab discussions and enthusiasm is for a kind of Silicon Valley start-up entrepreneurialism. In our view, it would be useful to debate how the FabLab concept sits within other theories of social change and widen praxis to other possibilities. We think it would be interesting to explore this more, and how opening the technical focus to social emphasis affects participation in FabLabs.

Having noted that, Amersfoort is a FabLab where there is reflection on social change, and a commitment to grassroots forms of change that informs their organisation of activities. Indeed, there is discussion of sharing the insights they have gained through the production of a 'peer lab' course for other FabLabs and people. When discussing lessons with local initiatives then a lot of the learning involved relates to keeping the FabLab running and building and maintaining a community. Learning about community building can be even more demanding than the acquisition of technical skills. FabLab Argentina is on a different trajectory to Amersfoort. It is not yet fully open to the public. The core members are still getting the space established. Here they bring lessons over from earlier experiences. They are also training others in digital fabrication, so any community building is limited to people seeking technical experience.

In the majority of cases, the initial funding for FabLabs has come from an outside source, be it through a funding agency or institutional affiliation. FabLab Argentina, for instance, benefits from being hosted by the Central Society of Architects in Buenos Aires on the basis that the FabLab will attract innovative young people to architecture. However, after initial pump priming, there is an expectation for many FabLabs that they will become financially self-sufficient after a period. Having found resources to provide the space and furnish it with tools, so on-going funding is needed for expanding the staffing required to fully realise FabLab potentials, and rely less on voluntary efforts. A number of overlapping business models are developing: 1) Access: gaining income through making the lab available for an hourly rate and charge for local production; 2) Education: conducting training courses and workshops within labs; 3) Enabler: supporting others to set up their own lab and in the process provide services to them; 4) Incubator: creating a hub for innovation and business creation; 5) Network: making use of the Fab Lab network by creating innovations across labs; 6) Attraction: becoming a 'tourist' attraction; 7) Human resource: people using and running the lab become consultants for the outside world.

Amersfoort provides a quite different approach, which is to situate the Lab within a wider range of grassroots activity, and seeking to retain a self-funded operational basis. However, it is at risk from another kind of precariousness. De

War that host the FabLab occupy an abandoned factory site that is attracting attention from developers. A proposal by De War to buy the site, and to create a hub for citizen sustainability initiatives linking arts, science and technology, was rejected by the municipality. De War find themselves in a campaign against the established political economies of development.

The space FabLabs devote to 'transformational' activities will, in our view, depend upon the extent to which efforts required to raise resources can align with social change activities. Even public funding without immediate or narrow economic returns may nevertheless require performance criteria that may come to shape the operation and direction of FabLabs. Given the multi-purpose and flexible advantages of FabLab facilities, then there may be a variety of accounting goals pushing and pulling activities in different directions. At the moment, monitoring and reporting is in its infancy. A few Labs have tried to estimate their added economic value, or the jobs and products spinning off from their workshops. Other FabLabs are wary of indicators, preferring to present inspiring narratives about varied success stories.

Finally, of course, FabLabs must have the interest and will to engage in social rather than personal transformational activities, which is not always the case. This is not a criticism. Rather it reflects TRANSIT interests. FabLabs are primarily a social innovation in the provision of tools for people, and the social transformations that ensue are incidental.