

VALUES & RESOURCES REPORT

DT143 - Report on Proposed Values and
Pooled resources

Version 2
05 2019





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Introduction

This document collects the known contributions each partner FabLab can give to the sustainability of the FabLabNet.

It is based on previous study visits, thematic meetings, drafted and completed deliverables, such as:

- DT133, Exchange on FabLabNet Value Proposition
- DT134, FabLab Management Practices and Tools
- DT135, FabLab Management Platform
- DT141, Lessons learned report from Fab14+ visit
- DT142, Lessons learnt report from Fab Lab Barcelona visit
- DT144, Joint SWOT Analysis to explore network synergies
- DT145, Joint Mission Statement of the FABLABNET Network

It is structured in 3 main parts, the value proposition of the FabLabNET, the pooled resources that makes the network sustainable and attractive and the outcomes of study visits, presented as attachment.



1. Proposed values for the FabLabNet

During the preliminary studies (DT133 Value proposition) and meetings, the FabLabNet partnership agreed on the fact that all networks are a very good pool to get in touch with new initiatives or persons from various fields of interest. Partners can feed the network with their own skills and competences, therefore one of the main advantages of the network is the knowledge exchange between the partners. Partners want to learn from each other’s best practices and adapt them to their local structures. Being a part of the network itself, making new contacts and having good relations with other FabLabs on a transnational level is also a fundamental benefit as well as cooperation in future projects.

Diverse partners with different backgrounds can encourage each other to address new target groups and new stakeholders. Legal and economic risks can be reduced as well, by helping partners choosing the right legal structure and rules for sharing of tools, or selecting the most appropriate licence for sharing outputs. On general level the network can help to pursue common interests of partners and increase public awareness of the role and the mission of fablabs in society... Sharing is not dividing: it is multiplying.

In addition, partners benefit the increasing of visibility of their FabLabs within the society by shared transnational communication of their activities.

Making new contacts	Carry risks together and reduce costs	Working together to create change
Build new knowledge together and exchange experiences	Introduce your own skills and competences	Benefit from others’ know-how
Higher visibility for Fab Labs in the society	Open up to and address new target groups	Pursue common interests

Advantages of being a network, as stated in the Value proposition



Network	Knowledge exchange	Project realisation	Public awareness
Networking contacts	Learn how to reach higher ranking stakeholders.	Collaboration on complex projects.	Create a new common ground where Fab Labs meet entrepreneurs & business in a new way.
Create a European Fab Lab and Maker Platform.	NGO, academic, business filed knowhow of how running their Fab Lab	Make high quality peer to peer collaboration research process.	Learn how to reach higher ranking stakeholders.
Approach and/or include people into our activities.	Learn how to become more financially viable.		
Establishing links to new institutions and communities.	Access a new set of tools that helps to foster innovation.		
	New activities for makers.		
	Machine experience.		
	Original ideas.		
	Use of machines.		
	How to engage communities.		

Benefits that the partners would like to gain from the network



The analysis of internal strengths and weaknesses, opportunities and threats (SWOT, DT144) revealed the following key points.

Strengths:

EXCHANGE POTENTIAL

- Knowledge and Know-How exchange: best practices on management tools, experience, etc. → gaining greater strategic and technical knowledge → efficiency
- Creation of Infrastructure Grid: access to the infrastructure of other members of the network (machinery, trainings, workshops, etc.)
- FabLabs as service providers for other FabLabs
- User/Member exchange: starting projects between different network nodes

COMMUNITY/INSPIRATION

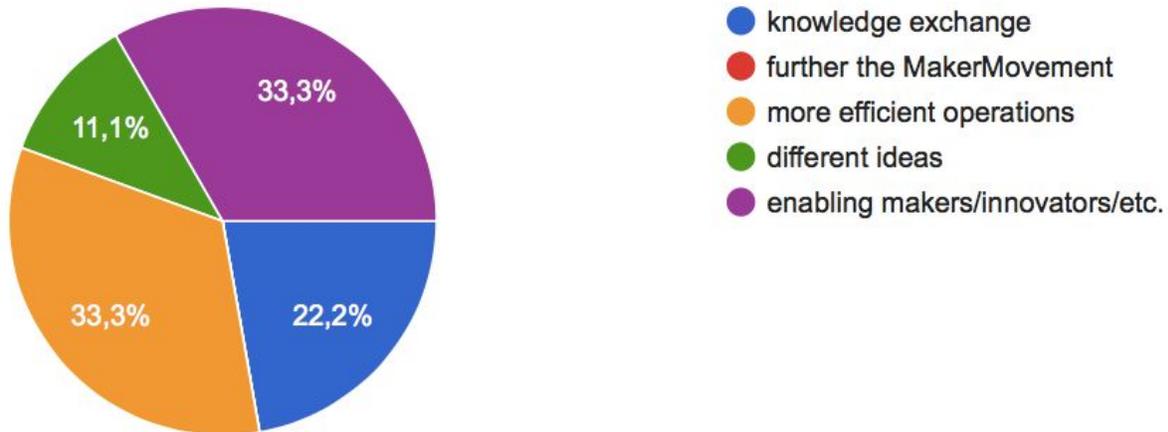
- Many of the participants see the network's strengths in building a community aimed at providing inspiration and sustainability
- Better armed to be sustainable (exchange of best practices)
- Inspiration and motivation
- Incubator for creative ideas
- International joint ventures

EDUCATION/RESEARCH

- Activity to engage schools and education
- Open Innovation Laboratories: leveraging external ideas and technology to reduce costs and time spent in research and, more crucially, from inside out, making unused innovations more accessible to external users
- Joint Research Projects
- Educational Programs

STAKEHOLDERS AND SOCIETY

- Better visibility to users and stakeholders
- Greater Lobbying Potential
- Rising common awareness of the FabLab idea → more relevance at a national level → improved capacity and understanding of the FabLab role in society à support
- Stronger position in negotiations with machine suppliers
- Improved attractiveness for companies



The most important strength a FabLab community would provide

The major opportunities found during the SWOT analysis were turning ideas into actions, involvement of stakeholders and a greater audience, establishing a common European membership, fundings and knowledge exchange. In detail:

- Knowledge/technology transfer exchange: best practices and worries
- Promotional videos and video tutorials
- Inspiration for using or buying new machines
- Bringing Ideas into action
- Recognition of different
- Finding common interests
- New ideas
- Improved impact and relevance in defining local policy and general connection
- Impact on local and national policy makers
- Business to new countries
- Involve more conservative stakeholders
- Fundraising projects
- Possibility of applying to new EU fundings
- Common Platform or membership system
- European School of Makers, access to all equipment and knowledge in network, new partners in foreign markets
- Having a wider audience
- Local contacts for spreading businesses to new countries
- Growth through high visibility: making new contacts for joint projects, funding opportunities etc.
- Production capabilities; for big scale and broader audience, for project development chain.



2. Pooled resources in the FabLabNet

Each of the FabLab member of the FabLabNet is a pool of sharing machines, spaces, tools, knowhow, programmes, community, competences.

Each FabLab is specialized in certain domains, where it can give a relevant contribution to the network. On the other side each of the FabLab has weaknesses, which can be covered by other FabLabs expert in that specific field. In this sense the wider the FabLabNet network, the more probability that certain domain is mastered.

During the Pilot Actions the partnership demonstrated an extraordinary capability for involving stakeholders and participants and for addressing a very wide audience of people.

In Pilot 1 the partners involved the local communities, from university students to makers, from general public to business oriented associations (SME, artisans etc.).

In Pilot 2 the project allowed involving start-ups and other business related stakeholders, such as SME and industrial and artisan associations.

During Pilot 3 the PPS gathered together 174 possible training courses, 41 advanced and 133 basic. Main subjects were fabrication (119), design (47) and business management (8).

The major outcome was the establishment of deep mutual connections with the Education stakeholders: from local primary schools to universities and academia.

The resources FabLabNet members can contribute to the sustainability and attractiveness of the network are schematized in the following chapters. In those lists are included the topics not only partners are good in now, but also what they would like to specialize in the short future.

2.1. Management domain: the FabLabNet Management Platform

Discussions, research and the survey results show that the application of a combined/ modular management tool-set seems to be fitting the requirements by the FabLab participants. The modular approach will consist of a combination of various reinforced “best-practices” by the participating FabLabs and various tools which can be adopted freely.

This said, the concept of the FabLabNet Management Platform is schematized in the following table. The Platform is modular with each FL being able to participate in the parts/modules they are interested in.



	Tool	Example	Purpose	Target
<input checked="" type="checkbox"/>	Web-based FabLab door and machine interlocks, reservation and billing system	FabMan or other managing tool	Member Management, billing, Lab & Machine booking, access & Security	FLN Network members
<input checked="" type="checkbox"/>	Online repository on repair, hack, fix, mod, coding	Instructables, GitHub, IFixit	Sharing ideas and knowledge	Wide public & FLN network
<input checked="" type="checkbox"/>	Conference call software	Skype	Discussing and planning	FLN network
<input checked="" type="checkbox"/>	Online workspace and cloud-based archive	GDrive suite	Working together and sharing documents	FLN network
<input checked="" type="checkbox"/>	Online PM software	Asana	Working together and sharing deadlines, tasks	FLN network
<input checked="" type="checkbox"/>	Newsletter	Mailchimp	Sharing relevant information	Wide public & FLN network
<input checked="" type="checkbox"/>	Mailing list	Googlegroup or Mailchimp	Sharing relevant information and communication	FLN network
<input checked="" type="checkbox"/>	Social Media	Facebook, YouTube, Twitter...	Promoting events and informing	Wide public & FLN network
<input checked="" type="checkbox"/>	Online depository website	FabLabNet library	Sharing relevant documents	Wide public & FLN network
<input checked="" type="checkbox"/>	Low cost accomodation exchange	Home exchange / guest2guest	Human mobility	FabLab staff (mentors)
<input checked="" type="checkbox"/>	Low cost accomodation exchange	workaway wwoofing vulca.eu	Human mobility	FabLab users
<input checked="" type="checkbox"/>	Chat channel	Mattermost, Slack	Fast information exchange, community involvement	FLN network
<input checked="" type="checkbox"/>	Trading tool/Counting /motivating exchanges	<i>new</i>	FabCoin: own crypto value or Smart Contract - blockchain technology	FLN network

FabLabNet Modular Management Platform (from DT135)



2.2. Domains of competences and Lab Capabilities

The competences of the partner FabLabs are a strong part of the future FabLabNet network strength. The FabLabs usually addresses fields in manufacturing, electronic, engineering, programming domains. However the application of the prototypes realized in a FabLab can interest extremely heterogeneous fields, spacing from medicine to philosophy, from astronomy to pedagogy. In this sense a database has been built, which gathers each FabLab expertise. This collection includes both theoretical knowledge and practical ones, included the equipment eventually needed for manufacturing.

Major Contents	specific	detail	MUSE FabLab	HappyLab Wien	FabLab Budapest	Brno University of Technology	FabLab Bielsko-Biala	RogLab	Fablab Slovenko	FabLab Zagreb	UnternehmerTUM MakerSpace
Theoretical knowledge	1.1Arts										
	1.2History										
	1.3Languages and literature										
	1.4Philosophy										
	1.5Theology										
	2Social sciences										
	2.1Anthropology										
	2.2Economics										
	2.3Human geography										
	2.4Law										
	2.5Political science										
	2.6Psychology										
	2.7Sociology										
	3Natural sciences										
	3.1Biology										
	3.2Chemistry										
	3.3Earth sciences										



	3.4Space sciences																		
	3.5Physics																		
	4Formal sciences																		
	4.1Computer Sciences																		
	4.2Mathematics																		
	4.3Statistics																		
	5Applied sciences																		
	5.1Engineering and technology																		
	5.2Medicine and health																		
Hardware	Laser cutter																		
	3D printer	PLA Filament																	
		resin																	
		ABS Filament																	
	Electronic	etching of PCB																	
		milling of PCB																	
	Soldering	SMD soldering																	
		THT soldering																	
		desoldering																	
	CNC milling	metal																	
		wood																	
	Lathe	metal																	
		wood																	
	Vinyl cutting																		
	Wood working																		
	Metal working																		
	Ceramics working																		
	Plastic working																		
	Molding																		
	Textiles																		
	Manuality																		



	Reverse engineering																		
	Repairing																		
	Upgrading																		
	Hacking																		
Software	Electronics	design of PCB																	
	Drawing	3D modeling																	
	Coding	Arduino																	
		scratch																	
		Python																	
		C++																	
		Java																	
Public Involvement	Education	Primary schools																	
		secondary schools																	
		lyceum																	
		technical high schools																	
		high schools																	
		Bachelor degree students																	
		Master degree students																	
		PhD Students																	
		post docs																	
		professors																	
	Communities	student association																	
		Local makers																	
		international makers																	
		association																	
Communication	Event organization	public events >1000 persons																	
		major events 150-1000 persons																	



		medium events 50-150 persons										
		small events 20-50 persons										
		meetings 2-20 persons										
	Media work	production of photo										
		production of video										
		production of graphics										
		production of animations										
	Press	press releases										
		articles										
	Social Media	-										

Types of competences and lab capabilities which can contribute to the network - proposed matrix.



2.3. Domains of knowhow

The knowhow that the partners can contribute to the network has been assessed during the first year of the project. The result is presented in the following table.

Network	Knowledge exchange	Project realisation	Public awareness
Cooperation with professional communities (IoT, robotika.sk,...)	scientific and statistical approach to technology	product development	General public, curiosity towards Fab Lab
Cooperation with research institutes	educational programs approved by government (local) authority	experience on building new products (physical goods) companies	
Providing SME's collaboration & perspective to Fab Lab strategy	knowledge about financial management of a self-sustainable Fab Lab	production capacity	
Working in a community of opportunities	finding a balance between companies, supporters, communities	matching SME's needs for innovation with maker's solutions	
	social impact experience		
	peer to peer education on 3D scanning		
	knowledge on how to create a makerton		
	educational example		
	contribution with training and education projects		
	experience with machines		
	contribution with socially engaged projects		
	providing SME's collaboration & perspective to Fab Lab strategy		
	sharing of high tech practices and facilities		
	experience		
	best practices		
	instructions		
	inspiration		
	experience in building a community		

Knowhow that the partners can contribute to the network (DT133)



2.4. Training courses resources

In preparation for the Pilot 3, partners have shared their capabilities for providing training courses. The result of this survey resulted in an impressive training and teaching capacity with more than 150 courses and with almost 2000 hours of total duration. This database is ready for gathering the information from other FabLabs accessing the FabLabNet.

The current (August 2018) database is reported in the following table.

Course Title	Domain	Level	Partner
2D-Design - Print your Bag	Fabrication	basic	PP2 - AT
3D algorithmic modeling: Rhinoceros 3D Grasshopper	Fabrication	advanced	PP5 - CZ
3D carnival masks	Fabrication	basic	PP7 - SI
3D for kids with Tinkercad	Design	basic	PP9 - HR
3D metal printing - Additive technologies in mechanical engineering	Fabrication	basic	PP5 - CZ
3D metal printing - Additive technologies in mechanical engineering	Fabrication	advanced	PP5 - CZ
3D Modeling (Blender)	Design	basic	PP8 - SK
3D Modeling (FreeCAD)	Design	basic	PP8 - SK
3D Modeling (OpenSCAD)	Design	basic	PP8 - SK
3D Modeling 2 (Blender)	Design	advanced	PP8 - SK
3D Modeling 2 (FreeCAD)	Design	advanced	PP8 - SK
3D Modeling 2 (OpenSCAD)	Design	advanced	PP8 - SK
3D optical digitizing: quality control in engineering	Fabrication	advanced	PP5 - CZ
3D printer	Fabrication	basic	LP - IT
3D printer	Fabrication	basic	PP2 - AT
3D printer	Fabrication	basic	PP8 - SK
3D printing	Fabrication	basic	PP5 - CZ
3D printing	Fabrication	basic	PP7 - SI
3D printing	Fabrication	basic	PP9 - HR
3D printing	Fabrication	basic	PP3 - HU
3D printing - for secondary schools	Design	basic	PP5 - CZ
3d printing laboratory	Design	advanced	LP - IT
3D Scan - make a RGB colored human model	Fabrication	basic	PP6 - PL
3D Scan & base operations	Fabrication	basic	PP6 - PL
3D Scan & prepare to print	Fabrication	basic	PP6 - PL
3D Scanning	Design	basic	PP8 - SK
3D scanning techniques	Design	basic	PP9 - HR
3D scanning with structured light	Design	advanced	PP3 - HU
3D with Sketchup	Design	basic	PP9 - HR
3D-Drucker - Make your thing	Fabrication	basic	PP2 - AT
3D-Printing	Fabrication	basic	PP10 - DE
3D-Printing	Fabrication	basic	PP10 - DE
3D-Scanning	Fabrication	basic	PP10 - DE
3DP in business - from idea 2 prototype	Business & Mgmt.	advanced	PP6 - PL



3DP in business - from idea through prototype 2 product	Business & Mgmt.	advanced	PP6 - PL
3DP in medicine	Design	advanced	PP6 - PL
3DP, Tinkercad, 123Design, Vectary	Fabrication	basic	PP6 - PL
3DP, Vectary & Rhino 5	Fabrication	basic	PP6 - PL
About Drones - how to build 250 class drone frame	Fabrication	advanced	PP6 - PL
Adobe Illustrator	Design	basic	PP10 - DE
Advanced 3D modeling	Design	advanced	PP9 - HR
Advanced fabrication for molding	Fabrication	advanced	PP9 - HR
Advanced paste extrusion	Fabrication	advanced	PP9 - HR
Advanced slicing and demanded 3D printing	Fabrication	advanced	PP9 - HR
Advanced Training - 3D printing	Fabrication	advanced	PP5 - CZ
Advanced vinyl cutting and embossing	Fabrication	advanced	PP9 - HR
Application of Electric Drives - Arduino	Design	basic	PP5 - CZ
Arduino	Fabrication	basic	LP - IT
Arduino	Fabrication	basic	PP8 - SK
Arduino	Fabrication	basic	PP10 - DE
Arduino	Fabrication	basic	PP9 - HR
Arduino laboratory	Fabrication	advanced	LP - IT
Arduino Programming	Fabrication	basic	PP10 - DE
Autodesk Fusion 360 for 3D Printing	Design	basic	PP10 - DE
Autodesk Fusion 360 for 3D Printing	Design	basic	PP10 - DE
Autodesk Fusion 360 for CNC	Design	basic	PP10 - DE
AVR - make some?	Fabrication	advanced	PP6 - PL
Biosensor design	Design	basic	PP9 - HR
Build a 3d printer	Fabrication	basic	PP2 - AT
CAM for HAAS VF2	Design	advanced	PP10 - DE
cartoon decoration	Fabrication	basic	PP7 - SI
Ciak! Robot in scena	Fabrication	basic	LP - IT
Circuit making	Fabrication	basic	LP - IT
CNC	Fabrication	basic	PP8 - SK
CNC milling	Fabrication	basic	PP3 - HU
CNC milling	Fabrication	basic	PP9 - HR
CNC milling machine	Fabrication	basic	PP7 - SI
CNC Milling with HAAS Vf2	Fabrication	basic	PP10 - DE
CNC Wood Milling ShopBot and Introduction to VCarve Software	Fabrication	basic	PP10 - DE
CNC- Milling Machine	Fabrication	basic	PP2 - AT
CorelDraw - my first vector design	Design	basic	PP6 - PL
Course System Thinking in IT	Fabrication	basic	PP8 - SK
Dancing-drawing robot	Fabrication	basic	PP7 - SI
Deep Drawing	Fabrication	basic	PP10 - DE
Design full control 12V led lamp with 3DP shade	Fabrication	advanced	PP6 - PL
Design Thinking Process	Design	basic	PP9 - HR
Designathon / ideas	Design	basic	PP9 - HR



Designation / prototype	Fabrication	basic	PP9 - HR
Digital Crafting	Fabrication	basic	PP3 - HU
Digital technologies and textile design	Fabrication	advanced	PP3 - HU
Electronic and Clay	Fabrication	basic	PP7 - SI
Electronics - Build a Drawdio	Fabrication	basic	PP2 - AT
Electronics Production	Fabrication	advanced	PP10 - DE
Electronics workshop	Fabrication	basic	PP10 - DE
Embroider Caps with a Tilting Frame	Fabrication	basic	PP10 - DE
Embroidery	Fabrication	basic	PP8 - SK
Embroidery Machine	Fabrication	basic	PP7 - SI
Embroidery Machine	Fabrication	basic	PP10 - DE
Fab Academy	Fabrication	advanced	PP2 - AT
Fab Lab Bootcamp	Fabrication	basic	PP2 - AT
FabLab Camp - make your thing	Fabrication	advanced	PP6 - PL
Freeform 3D modeling course Rhinoceros	Design	advanced	PP9 - HR
Generative 3D modeling course Grasshopper	Design	advanced	PP9 - HR
Hardware Startup Coaching	Business & Mgmt.	advanced	PP2 - AT
Ideas to Products	Business & Mgmt.	basic	PP2 - AT
Industrial Sewing Machine	Fabrication	basic	PP10 - DE
Initial Training : AVR Microcontrollers	Fabrication	basic	PP6 - PL
Jigsaws were Yesterday!	Fabrication	basic	PP2 - AT
KUKA PRC	Design	advanced	PP3 - HU
Laser cutter machine	Fabrication	basic	PP7 - SI
Laser Cutter	Fabrication	basic	LP - IT
Laser Cutter	Fabrication	basic	PP2 - AT
Laser Cutter	Fabrication	basic	PP8 - SK
Laser Cutter & 3DP - make a rubber stamp	Fabrication	basic	PP6 - PL
Laser Cutter laboratory	Design	advanced	LP - IT
laser cutting	Fabrication	basic	PP3 - HU
Laser Cutting & Vinyl Cutting	Fabrication	basic	PP6 - PL
laser cutting and engraving	Fabrication	basic	PP9 - HR
Laser cutting and engraving	Fabrication	basic	PP10 - DE
Laser cutting and engraving	Fabrication	basic	PP10 - DE
Laser cutting and engraving	Fabrication	advanced	PP10 - DE
Laser engraving with circular engravings	Fabrication	basic	PP10 - DE
Leather Processing	Fabrication	basic	PP10 - DE
Make a Dod	Design	basic	LP - IT
Make a Smartphone stand	Design	basic	LP - IT
Make a Clock	Design	basic	LP - IT
Make a Chocolate cookie	Design	basic	LP - IT
Make a scribbling machines	Design	basic	LP - IT
Make a Stamp	Design	basic	LP - IT
Make you personal T-shirt	Design	basic	LP - IT



Make your own puzzle	Fabrication	basic	PP7 - SI
Maker Birthday Party for Kids	Fabrication	basic	PP2 - AT
Metal Lathe Machine	Fabrication	basic	PP10 - DE
Metal Milling and Drilling Machine	Fabrication	basic	PP10 - DE
Metal Workshop - Cutting, Drilling, Grinding	Fabrication	basic	PP10 - DE
Metal Workshop - Cutting, Drilling, Grinding	Fabrication	basic	PP10 - DE
MicroPython na NodeMCU	Design	basic	PP8 - SK
MIG/MAG Gas-Shielded Welding	Fabrication	basic	PP10 - DE
Ninja flex - rubber printing	Fabrication	basic	PP6 - PL
one chord electric guitar	Fabrication	basic	PP7 - SI
Parametric modeling in Grasshopper	Design	advanced	PP9 - HR
PCB design (Eagle CAD)	Design	basic	PP8 - SK
PCB Design with Eagle CAD	Fabrication	basic	PP10 - DE
PCB Manufacturing	Fabrication	basic	PP10 - DE
PCB Prototyping	Fabrication	basic	PP2 - AT
Planning and Milling	Fabrication	basic	PP10 - DE
Post processing - form creation for gypseous mold	Fabrication	basic	PP6 - PL
Post-production: packaging design, online sales	Design	advanced	PP2 - AT
Post-production: Product photography, Self Marketing	Design	advanced	PP2 - AT
Powder Coating	Fabrication	advanced	PP10 - DE
Pre-production: User Centered Design, target market analysis, sales calculation	Business & Mgmt.	advanced	PP2 - AT
Product development: 3D modeling, prototyping, making	Fabrication	advanced	PP6 - PL
Projektmanagement and Production planning	Business & Mgmt.	advanced	PP2 - AT
Recycle and upcycle projects	Design	basic	PP9 - HR
Rhino	Design	basic	PP9 - HR
robotic	Fabrication	basic	LP - IT
Robotic workshop	Fabrication	advanced	PP5 - CZ
Sandblasting and Powder Coating	Fabrication	basic	PP10 - DE
Sheet Metal Forming	Fabrication	basic	PP10 - DE
Simple photo modeling	Design	basic	PP9 - HR
Small school of fashion	Fabrication	basic	PP7 - SI
soldering	Fabrication	basic	PP9 - HR
Startup - Do Local Go Global	Business & Mgmt.	basic	PP9 - HR
Structured light scanning	Design	advanced	PP9 - HR
Technical Drawing (Sketch) - 123Design technical drawing	Design	basic	PP6 - PL
Technologies of Digital Fabrication	Fabrication	basic	PP8 - SK
thermoforming	Fabrication	basic	PP9 - HR
Tools and workshop use	Fabrication	basic	PP5 - CZ
TRIZ-theory of inventive problem solving	Design	basic	PP8 - SK
Vacuum forming	Fabrication	basic	PP5 - CZ
Vinyl Cutter	Fabrication	basic	LP - IT
Vinyl Cutter	Fabrication	basic	PP2 - AT



Vinyl Cutter	Fabrication	basic	PP8 - SK
Vinyl Cutter - make a t-shirt	Fabrication	basic	PP6 - PL
vinyl cutting	Fabrication	basic	PP9 - HR
Vinyl Cutting	Fabrication	basic	PP7 - SI
Water Jet	Fabrication	basic	PP10 - DE
Wet Coating with a Cup Gun	Fabrication	basic	PP10 - DE
WIG Welding	Fabrication	basic	PP10 - DE
Wood Workshop	Fabrication	basic	PP10 - DE
Wood Workshop	Fabrication	basic	PP10 - DE
Woodturning Lathe	Fabrication	basic	PP10 - DE
woodworking	Fabrication	basic	PP3 - HU
Your own cartoon's hero on your T-shirt	Fabrication	basic	PP7 - SI
Zipper and Leather	Fabrication	advanced	PP10 - DE

Training courses which can be practiced by the network



2.5. Community involvement

The involvement of local, regional and national communities is crucial for targeting FabLab activities to the real needs of population. The first 2 years of cooperation among the FabLabNet partners showed how complex and articulated can be this involvement, and how many benefit can be brought to the network.

Stakeholder	MUSE FabLab	HappyLab Wien	FabLab Budapest	Brno University of Technology	FabLab Bielsko-Biala	RogLab	Fablab Slovenko	FabLab Zagreb	UnternehmerTUM MakerSpace
Primary schools	Excellent	Good	fair	fair	Excellent	Excellent	fair	Excellent	fair
Secondary schools	Excellent	Excellent	good	fair	Excellent	Excellent	fair	Excellent	good
High Schools	Excellent	Excellent	good	good	Excellent	Excellent	Excellent	good	good
University	good	Excellent	good	Excellent	good	good	Excellent	Fair	good
SME	good	Excellent	good	Excellent	good	good	good	good	Excellent
Makers	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent
NGO	good	good	Excellent	good	good	Excellent	good	good	good
Local Politicians	good	good	good	good	good	good	good	good	good
National Politicians	fair	fair	fair	fair	fair	fair	fair	fair	fair
EU politicians	fair	fair	fair	fair	fair	fair	fair	fair	fair
Associations	good	good	good	good	good	good	good	good	good

Types of communities which can be easily addressable by the FL activities - example of matrix.



2.6. Involvement in international organizations

The involvement of the FabLabs into local, National, International networks is very important. The international FabLab movement is aware of this strength, and during the past years many networks have been created. The FabFundation and Fablabs.io collects the following active networks¹. One possibility for the FabLabNet network is to be included in this list, as the example below.

2.6.1. Réseau Français des FabLabs



2.6.2. Rede Fab Lab Brasil



The Rede Fab Lab Brasil (Brasil Fab Lab Network) is a horizontal, non physical group of people that are have Fab Labs and are interested in Fab Labs in Brazil. It's intended to connect projects and Labs around Brazil, and does that via site (redefablabbrasil.org) email, facebook, whatsapp. Also we have a Google Drive with several documents open to everybody.

2.6.3. Fab Antipodes



Fab Antipodes was initiated at Fab10 in Barcelona by Daniel Harmsworth, Fab Lab WA, and Wendy Neale, Fab Lab Wgtn, with the intent to connect Labs in the region. We meet regularly, either virtually or in person, to inspire each other and support growth in our region.

2.6.4. Fab City Global Initiative



The FAB City is a global project to develop locally productive and globally connected self-sufficient cities. It is a decentralised and open format project. The Fab City project was launched in 2011 at the FAB7 conference in Lima by the Institut d'Arquitectura Avançada de Catalunya, the MIT Center for Bits and Atoms, the Fab Foundation and the Barcelona City Council. This initiative is open for other cities, towns or communities to join in order to collectively build a more human and inhabitable new world, and join the Barcelona pledge: a countdown for cities to become self-sufficient by 2054.

¹Content taken from fablabs.io



2.6.5. International Fab Lab Association



Membership benefits be part of the global community of Fab Lab users get an @fabfolk.com email address have access to the list of all Fab Lab users world-wide receive news that keep you on top of everything happening in the Fab Lab world regional meet-ups of Fab Lab users

2.6.6. Stichting FabLab BeNeLux (Benelux Fab Foundation)



The original mission of the Dutch Fablab Foundation was to introduce, evangelize and spread the Fablab concept in the Low Countries. The Foundation has all rights to the name 'fablab' and its logo for the Benelux. The Foundation is run by a Board of volunteers. Fablab.nl is not a franchising organization. The Foundation does not start initiatives for founding fablabs, nor can she offer financial help. What she can do is to foster the community of fablabs and initiatives. She runs the website www.fablab.nl which gives access to all fablabs. She also organizes periodically a fabtable, where labs will meet and discuss items of interest. And she provide answers to common questions from the public on fablab. A basic principle of a fablab is free access: no threshold for people, that want to make something, to familiarize themselves with digital fabrication machines. We want the to get on the learning curve. The foundation of any fablab is the Fabcharter. A makerspace, that will adhere itself to the Fabcharter, will be granted the right to name itself a fablab and to use the fablab-logo, if it pays a yearly licence fee of 60 to 100 euro per year, to cover some of the expenses of the foundation

2.6.7. Fab Foundation



Formed in 2009 to facilitate and support the growth of the international fab lab network as well as the development of regional capacity-building organizations. The Fab Foundation is a US non-profit 501(c) 3 organization that emerged from MIT's Center for Bits & Atoms Fab Lab Program. Our mission is to provide access to the tools, the knowledge and the financial means to educate, innovate and invent using technology and digital fabrication to allow anyone to make (almost) anything, and thereby creating opportunities to improve lives and livelihoods around the world. Community organizations, educational institutions and non-profit concerns are our primary beneficiaries.



2.6.8. Swiss Fab Labs



The association pursues the following goals: - Coordinate the Swiss network Fab Labs regarding the Fab Lab Charter from MIT. - Organize one meeting (or more) per year for Fab Labs Members. - Promote the transmission and exchange of expertise and knowledge. - Sharing of resources such as: * Website * Communication tools * Wiki * Equipment * Other

2.6.9. Fab Lab Hub



2.6.10. UAE FabLabs



The goal of this organization is to share knowledge and exchange experiences between FabLabs in UAE.

2.6.11. Fab Lat KIDS



We promote the learning process by the incorporation of new technologies contributing the Know How of a Latin-American Network of Laboratories of Digital Fabrication, with the goal of rethinking the education of the future. Our methodology is guided by learning through experience. We focus in educational and playful activities that develop the intelligence, creativity and imagination, stimulating thought faced to innovation. We seek to generate the children's interest in the world of the new technologies, not only like passive users but like experts and critics of the technological progress, encouraging them to continue their education so they can play an active role in these industries.

2.6.12. Fab Lat



The Latin American Network of Fab labs [FABLAT] seeks to articulate a movement of Makers, Innovators and Entrepreneurs on a regional and global scale, fostering creative and collaborative spaces where they do not exist, reinventing models with contextualization landed according to local characteristics: placing digital fabrication at a scale where, professionals, amateurs and even specialists, seeking harmony with our ancestral and contemporary culture, and above all orienting the strategies and actions of the Network to solve greater challenges through learning and collaborative work led by different groups, institutions, Organizations and people in all our countries, working in network, in a



distributed and horizontal way. FABLAT has been founded by a visionary and socially committed group of professionals, amateurs or people that who seek to positively influence in the region, to join efforts and alliances between people and / or organizations, with the main purpose of providing a technological support and networks of work P2P (peer to peer) creating from this a Collaborative Economy within a renewal and potential ecosystem of "education and emprendedurismo in the digital age for Latin America".

2.6.13. FabLabNet



The FabLabNet network is Making Central Europe more competitive by unlocking the innovation capacity of the FabLabs within an enhanced innovation ecosystem.



3. Outcomes of the study visits

The 2 visits to Barcelona FabLabs and to the Fab14+ event (the world conference of FabLab, held in France), are important contributions for the future of the FLN.

Two major points were assessed in these study visits: bringing scientific fields together and engaging people in cities via an active and proactive contribution of the FabLabs.

Attached are the reports on the 2 study visits.

4. Conclusions

The Central European FabLabs partners and funders of the FabLabNet network have completed a first fundamental project phase dedicated to capacity building and networking. They have constituted a technical, management, content framework for sharing and connecting each others. This is the basis of the upcoming Central European Network of FabLabs.

During the preliminary studies (DT133 Value proposition) and meetings, the partners faced the great variety of the constituent network, and agreed this heterogeneity is a great advantage for all as a source of knowledge. Diverse backgrounds encourage each other to address new target groups and new stakeholders, and both the framework each partner is inscribed (school, museum, university, SME...) and the target group we deal with are a source of knowledge for each other.

Partners clarified the benefits they would like to gain from the network, and with a dedicated SWOT analysis the strength of the network were clearly enlightened.

During these preliminary studies the common resources were identified and shared: The Pilot action formats, the FabLabNet Management Platform, the competences, capabilities, and know-how of each FabLab. We've also shared the capacity of involving various communities and stakeholders groups.

The partners have investigated existing networks around the world, as a source of inspiration for the constituent network. The presence of these networks was felt as a guideline also for the network promotion inside the FabLabs.io portal.

The new network benefitted from the latest information gathered in the FaLab world by participating to the Fab14 event in France. The visit to the Barcelona FabLab was also very important for better understanding the role of FabLabs in society.

All these information and studies are now part of the FabLabNet network in both its thematic and organization parts.

DT.1.4.2 BARCELONA FABLAB

Report from Barcelona FabLab Study visit
Meta Štular, Marco Fellin, Marek Rozehnal et al.

Version 1
06 2018





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1. Visit outline

Date: May 15th 2018

Venue and Host Partner:

[FabLab Barcelona](#) , Spain. Tour guided by Matias Verderau and Marco Sanalidro.

[Green FabLab](#), Valldaura, Spain. Tour guided by Jonathan Minchin.

Partners attending the visit:

LP (Marco Fellin, Giambattista Toller)

PP3 (Peter Varga, Adam Lipecz),

PP5 (David Paloušek, David Škaroupka),

PP6 (Patrycja Węgrzyn, Paulina Daczkowska)

PP7 (François Friderich, Meta Štular, Tanja Gawish, Jerneja Batič)

PP8 (Hana Kubánová, Jozef Vaško),

PP9 (Roberto Vdović, Zrinka Valetić),

PP10 (Vincent Zenkner)

Program of the visit:

10:30 Visit of the [FabLab Barcelona](#).

11:15 Questions and Answers session. Deepening on the FLN topics.

12:00 Visit and lunch in [LEKA](#).

13:45 Transfer to Valldaura - Cerdanyola del Vallès (accompanied by FabBCN).

14:30 Visit to the [Green FabLab](#).

17:15 Transfer to the town.

17:45 Arrival to FabLab Barcelona.



The FabLabNet group visiting FabLab Barcelona

FabLab Barcelona description

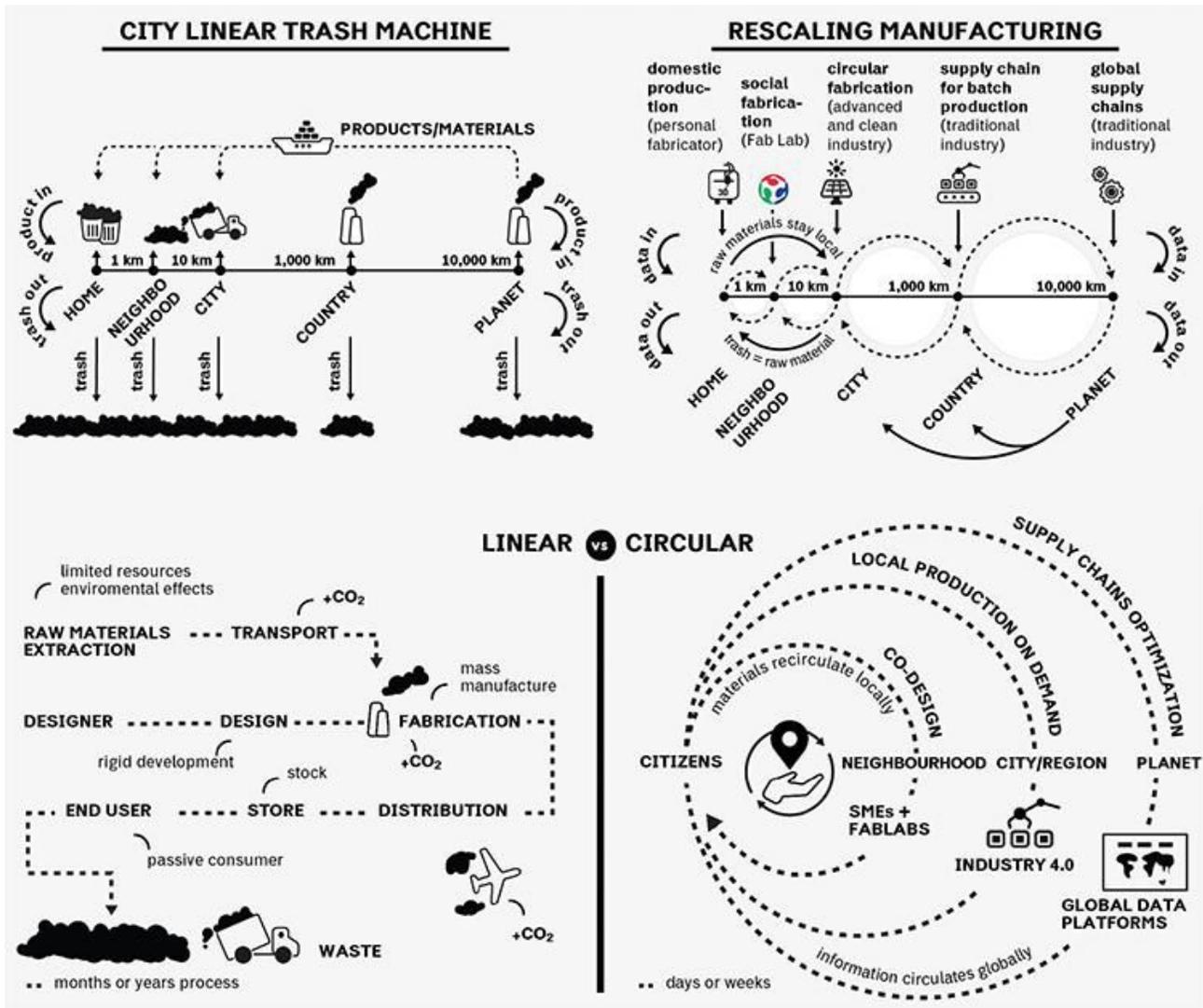
Fab Lab Barcelona (FLB) is part of the [Institute for Advanced Architecture of Catalonia](#), where it supports different educational and research programs related to the multiple aspects of human habitat. It is also the headquarters of the global coordination of the Fab Academy program in collaboration with the [Fab Foundation](#) and the [MIT's Center for Bits and Atoms](#); the Fab Academy is a distributed platform of education and research in which each Fab Labs operates as a classroom and the planet as the campus of the largest University under construction in the world, where students learn about the principles, applications and implications of digital manufacturing technology. It is one of the oldest FabLabs, founded at 2007 and directed by Tomas Diez.

The Fab Lab Barcelona has produced projects such as [Hyper habitat IAAC](#) (official selection for the Venice Biennale XXI) or the [Fab Lab House](#) (Audience Award in the first Solar Decathlon Europe in Madrid).

It is currently developing projects in different fields, from smart devices for data collection by individuals (Smart Citizen innovative project award in the Smart City Expo and World Congress in Barcelona), the development of the new generation of Fab Labs in the [Green Fab Lab](#) project, to new production models for cities with the [Fab City](#) project being implemented in Barcelona.



The mission of FLB is to provide access to tools, to knowledge and to financial resources to educate, innovate and invent. All this by using technology and digital fabrication which allow anyone to make (almost) anything and thereby creating opportunities to improve lives and livelihoods around the world.
 Community organizations, educational institutions and non-profit organisations are their primary beneficiaries¹.



the FabCity concept (Image courtesy of FabLab BCN).

¹ Text written by FabLab Barcelona, and published in <https://fablabbcn.org>.

2. Lessons learnt

FLB is located in Poblenou, former industrial neighbourhood under constant refurbishment works, which is now Barcelona's Maker District. The neighbourhood is lively and well populated for the extensive presence of both residents and offices. In the surroundings are also the IAAC, other institutes and laboratories which makes the FLB's location strategic.

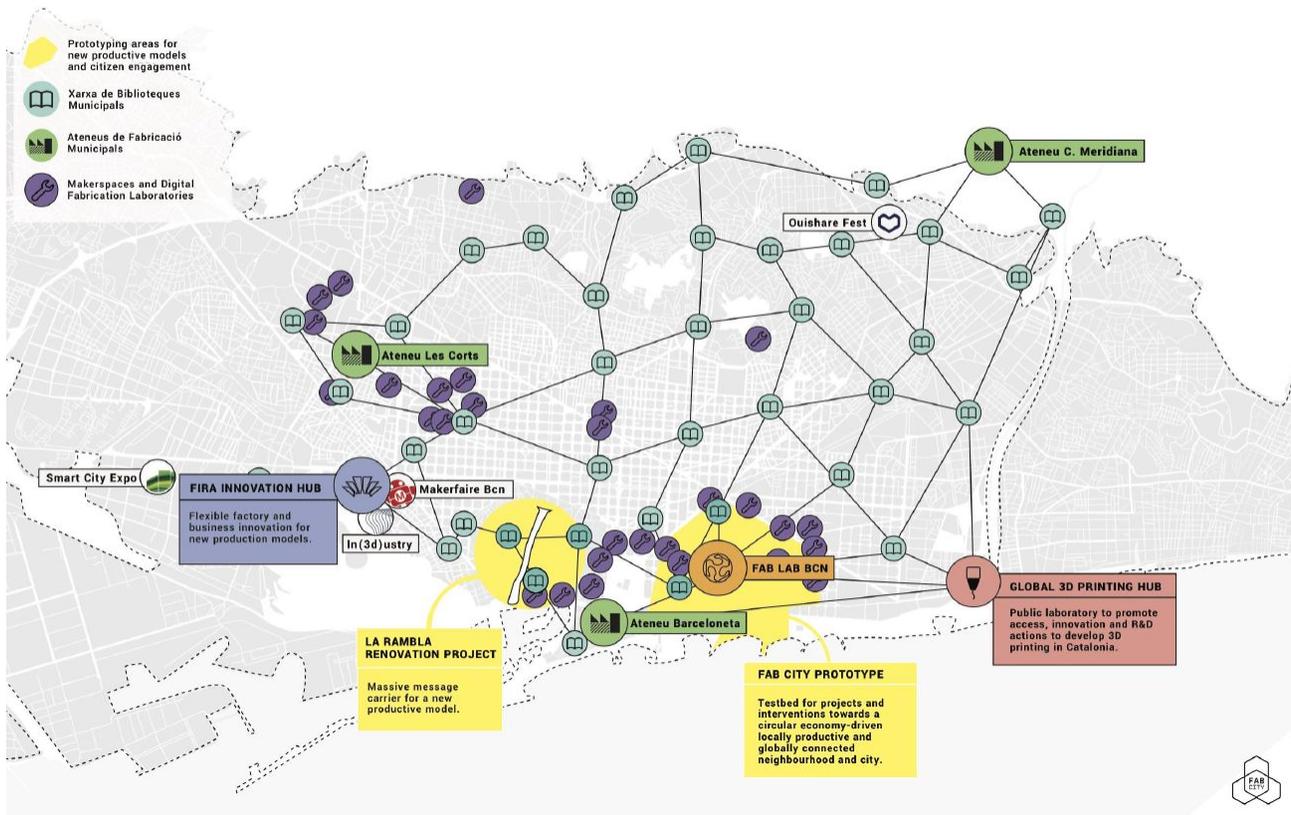
The FLB has strong connections with the local network of laboratories belonging to a wide variety of local Makerspaces and Digital Fabrication Laboratories (as represented in the following image). The FLB involves local communities by proposing various activities, such as the weekly open lecture, workshops for children from 8 years on, music, art, open shows, presentations. However, they do not offer classical fablab programme such as trainings or open hours for citizens. Those activities are offered by smaller neighborhood makerspaces and fablabs.



The main hall of FabLab BCN (Poblenou)



FAB CITY BARCELONA: TRANSITIONING TOWARDS A PRODUCTIVE CITY



FabLab Barcelona and its local network: the FabCity (Image courtesy of FLB).

Key factor for the involvement of the communities can be summarized in two mottos:

- Solve real life problems: Involving communities in solving everyday-life problems means giving them the opportunity to put in practice what they learn with a precise and useful goal.
- Involve communities in problem solving: It's crucial to allow participants to experience what they are learning, by giving them the opportunity to experiment in real situations and make errors. E.g. do not teach them how to solder, but give them a solder iron and assist them while doing the first testing.

Other important community building principles can be:

- Be open: Creativity is a great potential. No matter how an idea is bizarre, it's always worth considering it.
- Listen to the people: Co-create with the participants, integrate their suggestions and ideas.
- Give them power: Attributing responsibilities is a great way of making durable relationship, and of having satisfactions at the end of a process.



- Valorise diversity: We are an heterogeneous group of people, each with his or her own background, education, story, capacities. This is an extremely valuable pool of potential resources to be used to make our outputs legendary!

2.1. Management and Organization

The group visiting both, FLB and Green Lab, found them interesting and inspiring.

FLB performs their activity in a 1000 m² space, well organized in several labs (textiles/fashion, robotics, wood, learning, 3D printing, laser cutting etc.). This allows them to gather experts in several fields to guarantee expertise and quality.

FLB runs up to 9 European projects at a time. Their core knowledge in architecture and design, being part of the Institute of Advanced Architecture of Catalonia, allows them to be an added value as a partner in many projects. The key factor for being able to get involved in several EU funded projects seems to be the fact that FLB is part of a bigger institution (sharing human resources, having financial flow, etc.) which allows it to produce ambitious programs.

The FLB crew is very professionals and science-oriented, they almost work like "real" scientists, experimenting and creating. FLB is very interesting in terms of being a part of an innovative ecosystem of the city. It is a relevant stakeholder for innovation, well connected to the city and the university.

Its infrastructure and resources made of people, ideas, projects, spaces and tools are a flexible environment where city and community problems can be addressed in an innovative way. A smart citizen project represents a great result of such a creative environment.

They try as much as they can to not become a service lab, because in the long run it will turn a place into a regular commercial service. This is something very frequent in other FabLabs, many of them struggling with economic difficulties and accepting whatever income source is possible.

Green Lab in Valldaura offers a new field of sustainable development with focus on biolab and green development. It's a great example of self-sustainability.

Green Lab was considered by the majority of partners as the highlight of this visit. It seems the key factor of its success is the vision and the commitment of the University which bought the house and 6 hectares of surrounding land in order to tackle the global issue of green development and sustainability. We could observe again that sustainability of a fablab rises incredibly if it is part of a bigger institution. Those external conditions connected to the high level commitment of local staff seems to be a recipe for success.



Inside the FabLab Barcelona: on the left the laboratories rooms, on the right the conference space.



The FabLabNet group visiting the FL. Tour guided by Marco Sanalidro.



The robotic arm equipped with various home-made accessories



The FabLabNet group inside the FabLab Barcelona during the visit



The Smart Citizen - Urban sensor board developed by FabLab Barcelona



The Green Lab in Valldaura - inside the FabLab room.



Thanks to its very innovative projects and a great manager, it's isolated location does not impede visitors from all over the world who want to make their projects there or learn from Green lab experience.

The two labs are both inspiring for the FabLabNet partners and members, and can be considered for establishing projects seen for our wider community on national level.

2.2. Tools and equipment, technical aspects

Apart from the standard FabLab equipment, the FLB has some impressive capabilities.

Generally, the laboratories are well separated from each other, thus allowing a restricted access and limiting the interferences among projects (but limiting also the valuable occasional suggestions from other members). The spaces and machines do not strictly follow the safety normatives and law, allowing a quick and prompt hacking/improvement of the machines, a deep understanding of the functioning. This freedom has the price of a higher probability of incurring injuries.

They have developed robots for 3D printing with various materials, especially targeting architecture. Those systems rely on robot capable of moving vertically for constructing models of buildings, and also on a standard robot arm (Kuka) equipped with a clay extruder.

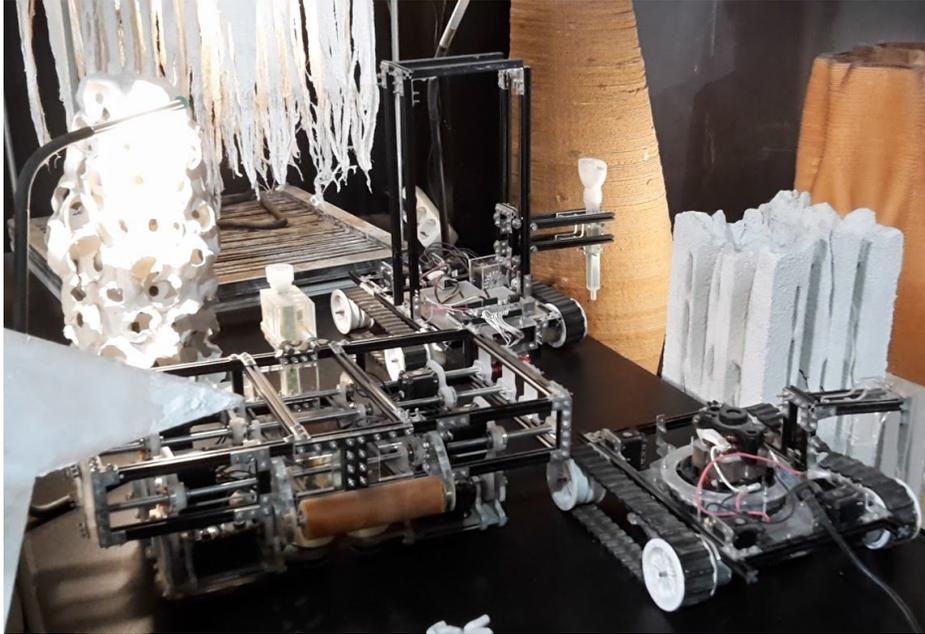
The printing of soft materials on a standard FDA 3D printer seems very promising. This technology allows realizing decoration of wearable textiles. It can be also used for testing complicated surgeries by printing realistic 3D models of human organs. These rubber organs can be realized as exact copies of the patient's organs, by acquiring the model with medical tomography, which is then modeled and printed in 3D environment.

The textile laboratory, and its integration with the 3D printed soft plastics is something pretty new and gave a deep inspiration to many of the visitors.

The Green Lab has developed very interesting low cost robots for improving robotic benefits to agriculture.

The vast outdoor available spaces, together with the hosting capabilities that makes possible residential seminars are a great potential for this lab.

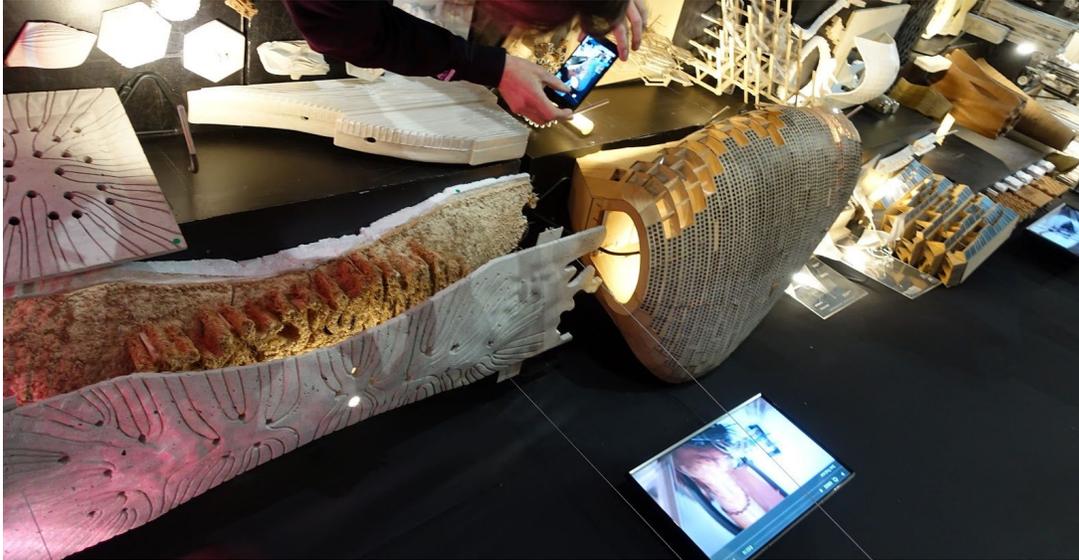
This FLB presents very well the ongoing and past projects by exhibition panels all across the main FLB room. This is a very efficient way for demonstrating the lab capabilities, stimulating future projects and raising questions during tours.



The house-building robots. They work with clay or other extrudable materials.



Some of the model-houses constructed with the robots above.



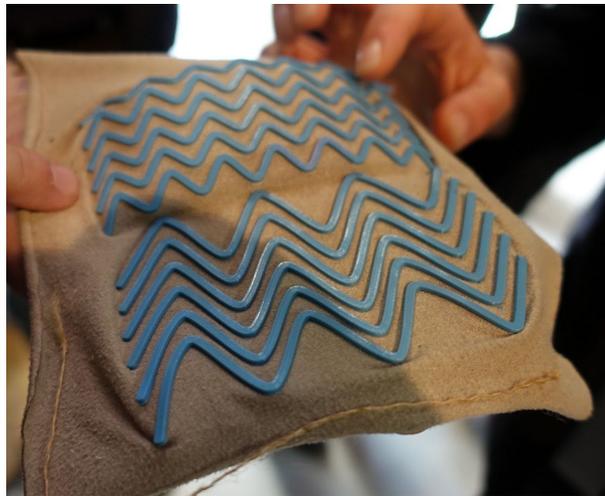
Some of the prototypes in the exhibition. FLB being part of the Architecture faculty is evident.



3D printed models of human organs. The soft-consistency helps surgeons to practice.



Soft materials printed directly on fabric. They open new possibilities in the field of textile design.



Other examples of innovation in textile design. Use of laser cutting (left) and 3D printing (right).



One of the laboratories in FLB (milling machines). They are all in a separate room.



The Green Lab location: a vast forest and land surrounds the lab (white building in center-right), just above the city of Barcelona (in the background). Image © Google.



Inside the Green Lab in Valldaura. Fungi-based architectures (left) and one of the panels presenting ongoing and past projects which surround the main FabLab room.



The bio-photovoltaic system is moss and bacteria based. One panel provides about 0,5 V and few mA.



2.3. Economics

The major income comes from EU projects, which are currently 9 with 20 persons involved. This ensures financial stability.

The FLB takes advantage of being a part of an university for the participation to these projects, since this allows pre-financing and reduction of some fixed costs (administration...). Also regarding the Green Lab this partnership is a key factor, since their own existence was possible only because of the purchase of the building and the 6 hectares of surrounding forest by the university.

The members of the FLB, which are in other FLs the major source of income, do not play a major role in the case of FLB, since the majority of them belongs to the university which provides free access to the facility.

However, courses taught outside the traditional universitarian curricula, like the FabAcademy, are to be paid, so they represent a source of income for the FLB.

There are other projects that the FLB running with private partners, such as R&D projects for SME and design workshops with companies such as IKEA.

Other sources of income are the renting of the Green Lab for events, workshops or residence seminars.

The FLN partners were surprised, at the very beginning, of the fact that the guided tour of the FLN and Green Lab was not for free. This is however an example of limiting the money exits and covering the expenses of the facility.



2.4. Community

Involvement of the community based on problem-solving.

The FLB has actively involved the local community in the process of prototyping the solutions to everyday community problems. We were shown a case study of the invention of an online monitoring system for measuring and sharing audio levels of a noisy square in Gracia neighborhood.

Smart Citizen project which grown from sensor based electronic gadget to community engagement tool is something interesting for national level because community building is an issue in different situations. The experience they conducted with their local community was very interesting. They organized several round tables / workshops with the inhabitants of Barcelona, whose aim was to found out in which way can a fablab help the local community. Each participant was requested to explain the major issue they are facing in their daily life in the city. Noise appeared to be one of the main issues. FabLab Barcelona developed an electronic sensor-based device called Smartcitizen, that allows, among other data, to measure and store the level of noise in the area. 14 families, living around the same noisy place in Barcelona, accepted to install the device in their home and at their windows. The data, collected on a period of time and compiled into a central server, allowed the inhabitants of this problematic area to engage a dialogue with the City and with the community responsible for the noise.

We loved the way they've built community with the Smart Citizen project. This project could be an inspiration for development of similar community initiatives in FLN network as well as the exemplary cooperation between FLB and Barcelona city officials. An important element of success of the Smart Citizen project was also strong communication activity which attracted the citizens to the project.

The partners have also observed the diversity of the activities offered by FLB which attract diverse audiences and partners to the FLB. The diversification of fields of interest could be a viable way to diversify audiences in FLN network members.

The visit of the Green Lab was a highlight of this visit. The FLN partners were impressed by the commitment of the local staff and the involvement of local and international communities to resolve various issues related to ecology and self-sustainability, thanks to new technologies and to a transdisciplinary approach. Again, being a part of an university with important financial resources has played an important role in being able to purchase the building with the 6 ha of surrounding forest.

Besides involving local communities it was quite impressive how laac and FLB are able to build an international network of partners focusing on similar projects.



Fab Lab Barcelona team



Tomas Diez
 Fab City Research Lab Director /
 Smart Citizen Co-founder / MeQT
 Senior Faculty



Luciana Asinari
 Fab Lab Barcelona Coordinator / Fab
 Academy Global Coordinator



Guillem Camprodon
 Smart Citizen Project Leader / MAA,
 MAI Faculty / Expert in Physical
 Computing



Santiago Fuentemilla
 Fab Academy Barcelona Instructor /
 Fab Education Coordinator



Jonathan Minchin
 Green Fab Lab Coordinator / Open
 Source Beehives Project Manager /
 MAA Senior Faculty



Marcel Tkocz
 Finance & Logistics Manager



Martin Seymour
 Fab Lab Barcelona Manager



Ingi Freyr
 Designer at Fab Lab Barcelona



Viktor Smari
 Software Developer



Anastasia Pistofidou
 Fab Textiles Project Leader / MAA,
 MAI Faculty



Mara Balestrini
 Making Sense Project Leader



Massimo Menichinelli
 Fablabs.io Project Manager / MAKE-IT
 Project Manager / Research+Design



Maria Ustarroz
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Victor Barberan
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Ferdinand Meier
 Mechanical Engineer & Fab Lab Expert



Gui Seiz
 Creative Director at Fab Lab Barcelona



Marco Sanalidro
 Communication Manager at Fab Lab
 Barcelona



Matias Verderau
 Making Sense Project Community
 Leader / Fablabs.io Network Manager



Chiara Dall'Olio
 Making Sense Project Community
 Leader / Fablabs.io Network Manager



Miguel Guerrero
 Design & Architecture Projects

Team of experts in several fields to guarantee expertise and quality.²

² Source: https://fablabbcn.org/about_us.html



3. Mutual benefit and challenges

The great examples listed above could be a reason enough for visiting FLB but amongst all things seen and learnt, there's also a really important factor which is inspiration. Seeing such a great example of what we could all be motivates us to work even harder on our goals. For project purposes, the way that FLB interconnects with other FabLabs, communities, EU and national officials is an outstanding example of building a network/community that all the members benefit from, and also provides a vision of how our own FLN network could be sustainable after the end of the EU project. It is always good to learn from more experienced colleagues. What we have learned is that a FabLab can be more sustainable if it is a part of a bigger institution such as an university and with EU funding. The academic environment offers important support - both in terms of human resources and ideas as well as in terms of financing - especially if a FabLab wishes to participate in consortiums of EU financed projects.

For many FLN partners the visit in Barcelona was an inspiring experience. Some of them are considering to start similar community engagement projects and to establish closer collaboration with municipalities regarding different city challenges and the ways of solving them. For the FLN project purpose, it was also crucial to establish personal contacts which could lead to new transnational collaborations. It is important to build a network of fablabs which are able to share best-practises, successful projects and models as well identifying areas of collaboration which could be important in the future.

4. Transferability and sustainability

The first challenge of transferring best practices would be local context. Local governments in CE are not yet aware of the important role that fablabs can play in the society and how they can offer an accessible way to enter the world of digital technologies to different communities. By learning from the example of the FLB, the FLN can first transfer the good practices of rising awareness on national levels.

The way they network and some of the projects they run are all interesting and inspiring, and all could be replicable in other environments. The two greatest barriers we see are money and time - we've seen that it can be economically sustainable, but it really isn't easy, and about time, I think now the greatest barrier is that our hands are full with responsibilities coming from the FLN project deliverables and administration.

However, the model of the FLB took long time to become sustainable, therefore an important barrier in transferring good practices could be time. If not supported by important human and financial resources years can pass before such transferred good practices can show concrete



results in the society. I think there is need to support more activities with excellency potential and care more about ways how those projects can grows into business.

Of course we would like to implement the lessons learned from the visit. In our case the most important is the way of community building.

The way that FLB has engaged their local community to empower the citizens with help of the knowledge developed in a FabLab is an interesting approach that could be applied in other FabLabs. Another lesson learned is that FLN members could shift from services to the members to more conceptualized and complex development projects. A realistic goal could be to work more closely with private companies on ideation projects.

5. Inspirations for the future of the FabLabNet as CE Network of FabLabs

Important part of activities in FLB are result of collaborations and networking. This is great example of how wider community can benefit of collaboration within a network of organizations. We can expect the same from the CE Network, which might have socio economic impact on national levels but also on the whole region. Seeing an outstandingly working model has helped us to rethink new opportunities and possibilities of FabLabNet further development and leadership. The experience of the FLB shows that the most important way to be economically sustainable is to have interesting and relevant programs. The investors and potential partners are not interested in machines but in innovation and creation potential.

Simple programs such as trainings are not interesting enough content for an international collaboration. They are completely rooted in local needs of everyday users who rarely need an international context for basic steps in development of their prototypes. The idea of FabLabNet partnership offering a High Level Training as an international programme might be, from this perspective, questionable. There is no evidence that individual makers would travel to another city to get the same training they can get at home. We can use some help of audience development theory which builds its methodology not just on “willingness to pay“ for certain product or service but also on “willingness to travel”. In other words, we should ask ourselves how many kilometers would a person from Ljubljana or Trento do for a training.

Given the FLB experience it might be more reasonable to build an international cooperation by mobilizing diverse expertise of fablabs and makers in order to address common challenges such as transport, aging, food production, noise pollution, etc. This kind of cooperation could have a form of short term and long term prototyping workshops and might be more interesting for participants since it would give them a sense of purpose, the opportunity to exchange values and knowledge and to meet other professionals in concrete co-working environments.

Another model that we have seen at FLB is the program of international internships which is also feasible if a fablab has something more to offer than mere technical trainings. The programs of



internships or a job shadowing programme would be interesting for FabLabNet, since they would offer the possibility to widen the network and to involve fresh and innovative young minds in local fablabs.

The FLN also needs to be more visible. In order to become a sustainable CE network the FabLabNet partnership should first set more ambitious goals, serving the society and local communities in a meaningful way by empowering them to solve different burning problems. As all the members of the FLN are experts in prototyping, we should create concrete examples with high communication potential to show what we can offer to different communities as a network. In this sense we have to think beyond technology and use our fablabs for what they offer - crossroads of arts, design, engineering, education, technology, humanities and sciences. We should work on on common objectives, which are measurable and communicable, across different regions.

As we could see in FabLab Barcelona - making connections between different stakeholders is very important. In case of CE FabLab Network the partners are also connected to different communities, institutions and companies, which makes an added value to the project. What might be missing are more projects that would connect those stakeholders in a meaningful way, inspiring common projects and good communication tools which would attract other fablabs to join us. Some partners already have common projects with FabLab Barcelona. This visit will definitely help FabLabNet to be a bridge between the future members and the most active FabLab in Europe.

6. Conclusion

Visiting the first EU FabLab and also one of the first self sustainable labs was an inspiration for future activities of individual members and the FLN network.

Thanks to the thoughtful organisation by the lead partner, the FLN consortium had a really inspiring visit with many insights which can be used in further development of the CE network.

The most important lesson from the visit is that the FLN has first to articulate the values behind the transnational network, than we should rethink how we wish to communicate those values and at the end we should decide what kind of activities we can offer to communities in order to support the core values.



The FabLabNet group visiting the Green Lab in Valldaura.

DT.1.4.1 FAB14+ event

Report from FAB14+ Study visit - France
Fab City summit, Fab Distributed, Fab14

Version 1
08 2018





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1. Visit outline

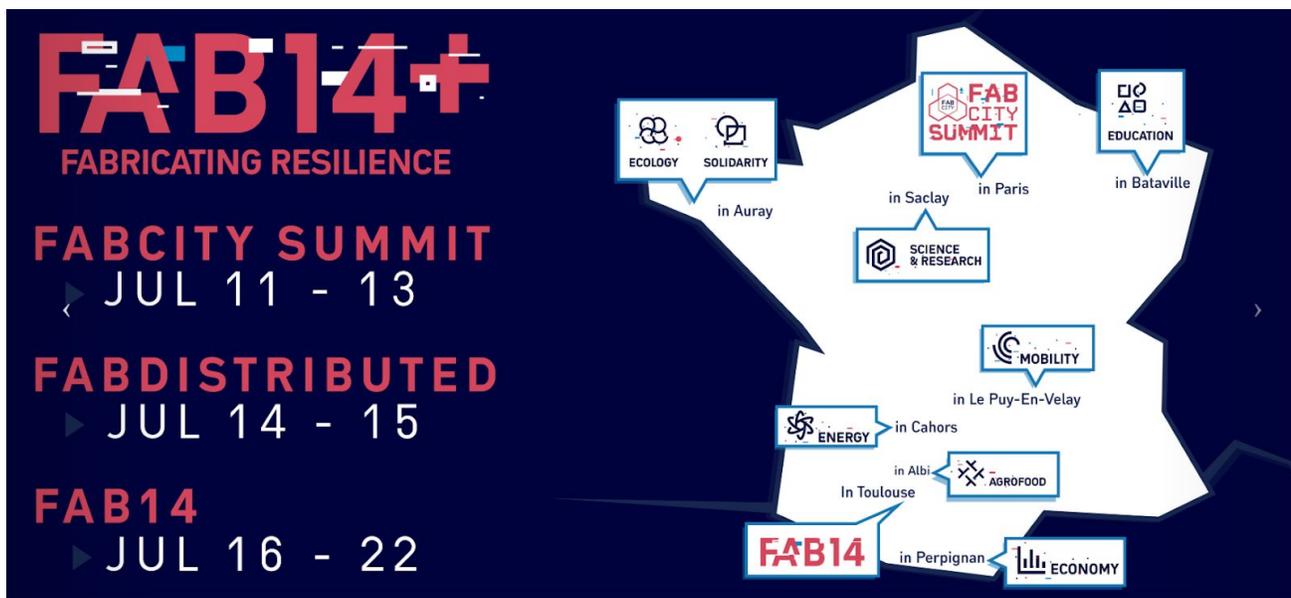
Dates: July 11th-22nd 2018

Venues:

[Fab City Summit](#) July 11-13 2018, Paris, France.

[Fab Distributed](#) July 14th and 15th, 8 location and themes: AGROFOOD in Albi, ECOLOGY in Auray, ECONOMY in Perpignan, EDUCATION in Bataville, Grand-Est, ENERGY in Clermont-Ferrand, MOBILITY in Le Puy-En-Velay, SCIENCE AND RESEARCH in Paris, and SOLIDARITY in Auray

[FAB14](#) July 16-22 2018, Main event in Toulouse, France



The event overview graphics (Creative commons, FAB14)



2. Overview¹

#FABRICATING RESILIENCE

Each year members of the more than 1,200 worldwide Fab Labs gather to share, discuss, collaborate and create communities around the different local and global interests regarding digital manufacturing, innovation, and technology.

This year, the FAB14+ conference will be spread out over multiple locations. [Fab City Summit](#) from July 11-13, [Fab Distributed](#) all over France, July 14th and 15th (8 location and themes to choose from: AGROFOOD in Albi, ECOLOGY in Auray, ECONOMY in Perpignan, EDUCATION in Bataville, Grand-Est, ENERGY in Clermont-Ferrand, MOBILITY in Le Puy-En-Velay, SCIENCE AND RESEARCH in Paris, and SOLIDARITY in Auray) that will allow you to discover different parts of our beautiful country. And finally, FAB14 Main event in Toulouse, France the 14th International Fab Lab Meeting to be held, July 16-22 at the Pierre Baudis Convention Center; with “Fabricating Resilience” as its central topic.

FAB14+ in France has established 3 center point that marks the path to a new way of Fabricating Resilience, where this year Fabbbers will have the opportunity to travel around France and discover the magic that Digital Fabrication brings to the Region. Today thanks to technology, our French culture and society are becoming more and more integrated into the world, generating a sort of understanding to other alternatives ways to grow as a country, society, and community. This event aims to gather people from the global network to debate and build the Fab Lab Network and to forms of knowledge networking. The most distinguished investigators and specialists from all over the globe are invited, generating activities and traversal impact in the Toulouse. Our motto “Fabricating Resilience” sets the stage for sharing experiences and creating a collaborative network. To make this possible we have created 5 topics to be developed that can create a big impact in the region, which are: FOOD, MOBILITY, MACHINES, MONEY AND ACCESS.

Partners attending the visit:

LP MUSE - Museum of Science Trento - MUSE FabLab (Marco Fellin)

PP2 - Happylab Wien (Karim Jafarmadar)

PP3 - HU FabLab Budapest (David Pap)

PP5 - CZ Brno University of Technology (Tomáš Koutecký, Aneta Zatočilová)

PP6 - PL Regional Development Agency in Bielsko-Biala (Jan Sienkiewicz, Patrycja Węgrzyn)

PP7 - SI RogLab (François Friderich, Meta Štular, Tomo)

PP8 - SK Slovak Scientific and Technical Information Centre - Fablab Slovensko (Nina Bratkova, Jozef Vaško)

PP9 - HR FabLab Zagreb (Roberto Vdović, Zrinka Valetić)

PP10 - DE UnternehmerTUM MakerSpace GmbH (Julia Kitta)

¹ Text from the Fab14+ event organizers. Creative commons, Fab14.



The FabLabNet group at the FabCity Summit in Paris

3. Lessons learnt

3.1. FabCity Summit - Paris

The event gathered together the fast-growing community of FabLabs, together with the persons and institutions who has funded it. The major figures in this sense were Prof. Neil Gershenfeld, the Director of MIT's [Center for Bits and Atoms](#), Tomas Diez from FabLab Barcelona and [Fab Cities](#), Sherry Lassiter, president and CEO of the Fab Foundation.

The global FabLab movement is growing fast, doubling its number every two years. We are not talking about marginal movements, no more an utopia, but a real new player which can address major world challenges.

We are on the edge of a new revolution, where it's possible can build locally using global information (FabCity). This process can be a new production economic model, extremely efficient in terms of carbon emissions and produced wastes. The FabLabs are not in competition against



the big companies, but they propose a new development model where the goods will not be transferred (no more containers, ports, cargo ships...) but only data knowledge is transferred. During the event the capacity of manufacturing with extremely small building blocks has been presented. This is interesting now in locations where the supply chain can be problematic (e.g. International Space Station, or remote areas), but in a close future extended to the world. In simple words, it is the ability to create e.g. electronic components beginning with a few universals nano blocks, specifically assembled by a nano-resolution machines on specific needs. This is where the Bits and Atoms are important: Bits represent the global infrastructure, where Atoms the local one.

Each Fab Lab can also be the place where a new FabLab can be started; both the FabLab organization/space structure and machines can be build (some equipment e.g. a 3D printer can be produced in Fab Lab, see as an example [RepRap](#)).

These laboratories are important for the involvement of people. The outcome from the FabLab often is not the product, but the process of making itself.

The FabLab can have a great role for barriers destruction. Physical barriers (in a FL it's possible to build aids for impaired persons), cultural (a FL is a training and teaching institution) and even political (making something together is a great mutual knowledge opportunity, and eventual ethnic fights disappear. It is the case of [Fablabil](#) and [Hope Lab](#) that gather together Palestine and Israeli members or the [Belfast Fablab](#) in Northern Ireland.

The training and teaching spans from as low as 8 years old pupils to very advanced courses, which may take the name of *Fab Academy*. All these courses can help to share global knowledge on local level. Diffusion of knowledge, sharing more than learning, giving more than taking, are the pillars of the FabLab. In this sense FabLabs are diffusing knowledge, schematics, codes, layouts under a free use right (see e.g. [creativecommons.org](#)), or with an easily accessible [Library](#) or a [video tutorial page](#).

Reversible, scalable, possible are the 3 keywords that accompanied the public during this event. There is the need to face another building model for the future cities: a zero waste building which can be entirely recycled after use. A building model where frugality is the ruling keyword, where low tech and high tech meet to generate the *slow tech*, a new paradigm of Eco-buildings and *inclusive city*. The new system generates also by following the UN [Sustainable Development Goals](#).

The environmental aspects around the FabLabs and the world they are helping to build, was well expressed by the [Doughnut economics](#) concept by Kate Raworth.

The event presented real cases of good practices, such as a large scale participatory model in Barcelona city. There the concept of Fab City is taking form in reality, with a new public procurement system, the data sovereignty (every data regarding citizen is open to the public), the adoption of open source software and a secured system for report corruption based on [Tor](#).



Very promising start-ups and successful realities were presented as well. The concept of modular, [upgradeable phones](#), [plastic recycling machines](#) were just a few of the wide examples of project based on community. This is much better than a project funded by a single company: if the company decides to suspend or end the project, the project collapses. But funding a project on community basis it means the project is practically endless.

The Fab City summit in Paris has seen the official presentation of City of Zagreb as part of the Fab City network. FabLab Zagreb, one of the FabLabNet partners, was officially presented and acclaimed in this very exciting moment.



The FabLab Zagreb has been officially included in the FabCity network. A great award to be proud of.

3.2. Fab Distributed - France

Each partner took the occasion to attend one of the various thematics of the Fab Distributed. This allowed maximizing both inputs to the FabLabNet project and output in terms of project presentation to a wide public.

Lead Partner - Italy attended the AgroFood thematic in Albi, PP3 Hungary attended Economy thematic in Perpignan, PP5 Czech Republic attended Scientific Research thematic in Saclay, PP7 Slovenia attended Mobility thematic in Puy-en-Velay, PP9 Croatia attended FabCity in Paris.

The project FabLabNet was actively presented via one to one meetings and also via 2 dedicated sessions. The role of FabLab and FabLabNet for Agriculture-based communities was presented in Albi, and the FabBox experience in Puy-en-Velay.

The Agro-Food thematic was introduced via a visit of the local market. In less than 1 hour participants experienced the various Agriculture sectors: livestock, fishery, vegetables and fruits in both raw and processed typologies. Then participants explored the various opportunities for FabLabs in meeting the AgroFood sectors needs. Demonstrations of hydroponics systems, geodesic greenhouse, smart hives, platform for sharing gardens and garden works took place together via a field study. A very interesting case study was the [Digital Vegetable garden](#)², where a school teaches how to reduce food waste from school canteen. They compost it, and they do a vegetable garden they will eat themselves. The garden is equipped with electronic and hydraulic systems (e.g. water collection...), for data teaching. In this way students learn science, data analysis, ecology, reduction of waste. They also have a bee colony, they promote biodiversity and organic food, they co-teach with various matters in lyceum, solar panels, geodesic dome, LORA data transmission. In addition, they plan to link various schools with both data management and garden results.



The farmer's market in Albi: the best location for knowing the local Agro-food products.

² Potager numerique, Lycee L. Rascol



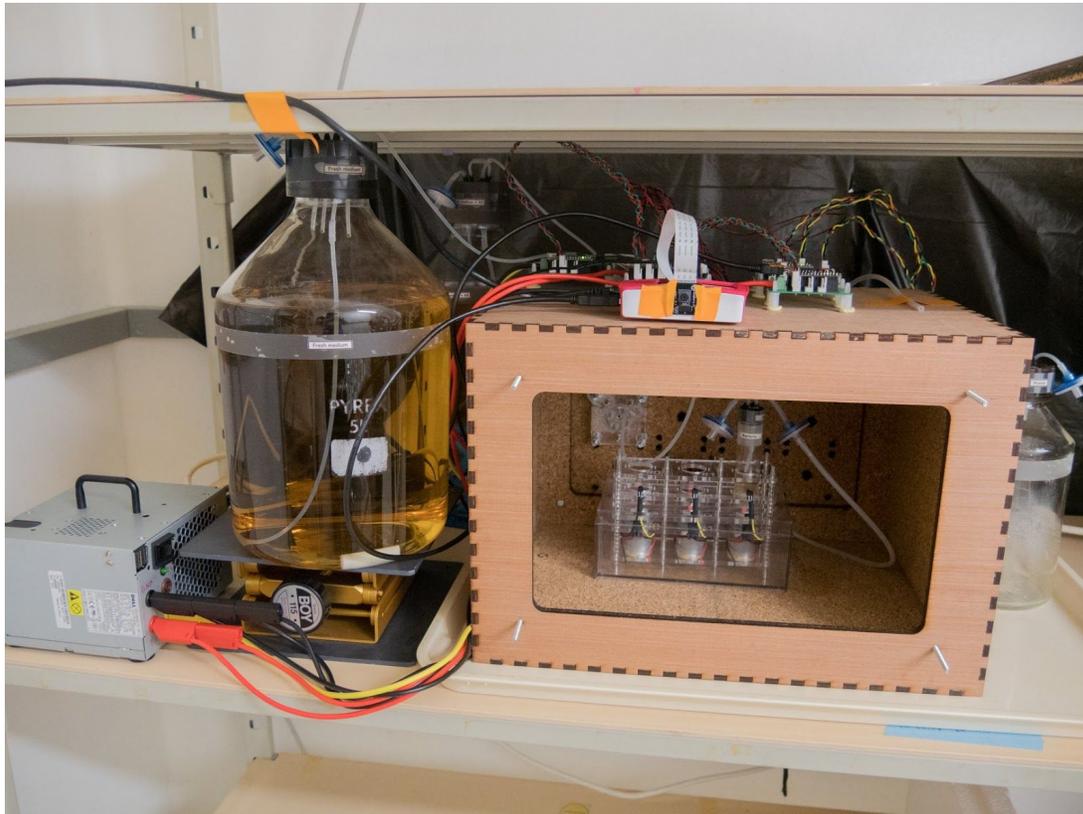
The solar-powered geodesic greenhouse (left) and the hydroponics system demo.



Community shared garden (left), a FabLabNet project presentation (top) and FabLab Albi visit.



The Scientific thematic was carried out as a traditional conference, with some exhibition of case studies where the FabLab had a key role in improving/facilitating research. There is a pretty high number of FabLabs connected to research institutions. Some of these are reserved for students and employees of the institution, while others are open also to attendees from outside of the institutions. In all cases FabLabs are primarily about the community, where ideas and good practises can be shared. The building and equipment are of secondary importance, and also teaching acquires a new meaning: it's no more the teacher who teaches how to use the equipment and how to "do things" but users share their knowledge among others and learn from each other and cooperate.



A demo equipment: the Arduino controlled bacteria & phages bioreactors (credits: Pierre Nicolas and Cyprien Guérin from INRA/MaIAGE, made at Fablab Digiscope)



The keynote speech by Neil Gershenfeld (CBA/MIT) (Credits: FAB14 Distributed Science Research)

3.3. Fab14 conference - Toulouse

The event was very positive for sharing the FabLabNet project: through informal exchanges (workshops, coffee break, evening gathering, parties) many people including key responsible are now aware and engaged on the FabLabnet importance. The dedicated workshop on a FabLab network lead to a chat group which is now a starting point toward a network in Europe's. It became clear that FabLabnet has a very important role to play, especially based on the experience acquired in the first 2 years of project and also concerning the capability of meeting EU funding requirements. During the workshop a memorandum of understanding was written. This process could be similarly applied to FabLabnet, for the signing of the network agreement.

The optimal and sustainable networking it is based on shared values and making projects. It's useless to create a network and only after its creation beginning cooperation. Sharing the network experiences adding new initiatives and being update is a key issue, and we should focus the network efforts in designing a more readable and accessible way for promoting project outputs.

During the event we realized the Pilot Actions we did during the project pioneered and put in practice the leanings were presented as innovative.



A promising topic to be further investigated is the value creation in form of blockchain and fabchain related to Fab City activities.

Important connections were established with the Vulca team (a sort of Erasmus programme for FabLabs) and the French network of fabLabs (Réseau Français des Fablabs).

During the week a dense schedule proposed various experiences and topics. The most interesting projects presented were those not exclusively focused on machines or based on programmes already made by other fablabs. The most interesting programmes were made by interdisciplinary teams, focusing on solving societal challenges rather than producing useless gadgetry it's pretty common to see in many fablabs.



The Fab14 event in Toulouse



4. Mutual benefit and challenges

Attending a so important event, which is the only annual world meeting of FabLabs, has obvious benefits for participants and for the project itself. Meeting people for sharing experiences, challenges, solutions is the major benefit, together with the active participation to the movement which is guiding the global FabLab spirit.

Contacts acquired during these days can be important for future involvement in the project, in terms of direct involvement during events or activities or in terms of getting interesting concrete ideas or best practices.

The event gave the FabLabNet partnership an impulse for the project future activities, especially those oriented to the real constitution of the network of FabLabs. In this sense also being part of the Fab City network, with the Croatian partner, is a strong benefit for the whole FabLabNet network.

This event one more time demonstrated how sharing knowledge, good practices, practical examples of projects, etc. is a benefit for all FabLabs. Inclusion of other FabLabs and involvement of other regions other than the Central Europe are also important for a solid constitution of the network.

On the other side, constituting a Central European network of FabLabs, can better face the Region challenges and proposed solutions. In this sense the focus to one area is positive.

5. Transferability and sustainability

Most of the hands-on and demo activities can be replicated in the partner's FabLabs. Similarly, educational activities are very likely to be tested and implemented, together with incubation programmes for business. The FabLab style that shall be maintained is the importance of the community around the FabLab. The community itself shall be a very active part in teaching FabLab members, encourage the community to learn from each other, cooperate, work on interesting projects.

Allowing a easy knowledge sharing means documenting very well each project, course, activity. For this reason dedicated courses on how to document a project could be organized.

Another interesting idea that could be implemented is the status of super user for some FabLab member. Those selected members have 24/7 access to machines and facilities, and an active and continuative contribution to the FabLab activities (1 task to do every 6 month to keep the status).

To be sustainable a network shall share and meet, in person, at least once per year, by organizing a specific meeting conference.



6. Inspirations for the future of the FabLabNet as CE Network of FabLabs

The FabLabNet network has been inspired by the constituting European FabLab network workshop. FabLabnet plays an important role in this constitution, gathering into the constituting network 2 years of experience.

There is the need of transparency and clarity, which can be addressed by an agreement, as a memorandum of understanding or other typologies.

The optimal and sustainable networking it is based on shared values and making projects. Sharing the network experiences adding new initiatives and being update is a key issue, and we should focus the network efforts in designing a more readable and accessible way for promoting project outputs.

A movement at political level can be also important, informing first then lobbying at the EU level for better support of FabLabs.

The FabLabNet should take advantage of the different types of FabLabs: variety, diversity is a value added. So the network should be open to all kind of fabrication labs, no matter what is their mother institution and how they are called or funded. An exclusivist approach can bring in the long term isolation from other actors of innovative ecosystem.

Involvement of foundations can be also a very good point, to act as a sponsor of the rise of new FabLab or of the network itself.

These topics were actively discussed during a workshop, which minutes are [published here](#).

7. Conclusion

The event was a very important milestone for the FabLabNet project. We had the occasion to present the project to very important stakeholders, to meet in person tens of other FabLab sharing ideas, knowledge, best practices, challenges, solutions.

The participants actively presented the project at various level, with one to one meetings, dedicated presentations, workshops.

The information collected during these 3 connected events will constitute a very important basis for the further development of the FabLabNet.