



D.T1.4.4

Joint SWOT Analysis to explore network
synergies
PP10/ MakerSpace

Version 2
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1. SWOT ANALYSIS

A SWOT analysis helps an organization or a project gain perspective and gather information about the current competitive position through actively assessing the strengths, weaknesses, opportunities and threats associated with an organization or project.

Analyzing your current position on the market, the staffing of a project and therefore the capabilities of the team to reach the goals helps the project to constantly evaluate the effectiveness of the strategy as well as identify priorities and expose potential.



An organization's **strengths** can be described as current factors that have prompted outstanding performance, like a clear understanding and motivation among employees, focus on quality improvements, state-of-the-art equipment, etc.; assets that will give the organization advantage over others.

The **weaknesses** of an organization are factors that will place the business at a disadvantage. Those factors will most likely increase costs or reduce the quality of the output, like poor usage of resources, insufficient trainings, lack of financial resources or simply a structure that limits collaboration.

After analyzing the internal part of an organization it is also important to determine opportunities and threats or the external part thereof. An organization could exploit **opportunities**, like significant new available business or collaboration potential through the development of networks, increased funding, reputation in a community, etc., to its advantage. On the other hand it is essential to be aware and consider **threats** to an organization. A threat can be described as factors and/or actors, like economic instability, an increasing demand for expensive technology that is not cost-effective, increasing state and federal budget deficits, etc., that could negatively affect an organization's or project's performance.

The last gathering of data has been helpful in order to see the position of each fablab included. The next step is to combine the strengths, weaknesses, opportunities and threats of all fablabs included in the project and analyze how we, as a collaboration and network, are positioned and how we function together.

It is therefore essential to understand how existing weaknesses in that network can be balanced by seeking and actively using presented opportunities. It is also very important to take the chance and use our strengths in order to convert our weaknesses into strength or weaken threats that we are faced with.

1.1. SCOPE OF JOINT SWOT ANALYSIS

The following analysis will identify the value added through a network cooperation between Europe's FabLabs. It will also explore how synergies between all the Project Partners involved in Interreg's mission to create a connected European FabLab community can be best utilized.

2. RESULTS SWOT ANALYSIS

The questionnaire was sent out to the nine project partners who, within one week, filled in answers concerning open and closed questions about their perspective on the strengths, weaknesses, opportunities and threats of the FabNet cooperation.



2.1. Strengths and Synergy Effects

The first question of the survey was aimed at asking the participants to write about what they consider strengths, potential strengths and synergy-effects that can be derived from creating a cooperation network between European FabLabs. The answers can roughly be categorized into the following areas of strengths according to the participants.

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

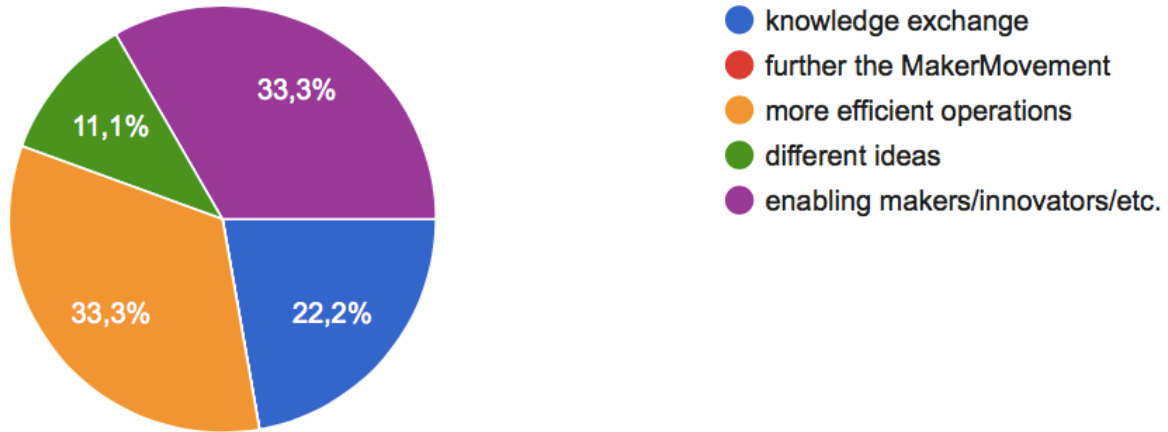
- Activity to engage schools and education
- Open Innovation Laboratories: leveraging external ideas and technology to reduce costs and time spent in research and, more crucially, from inside out, making unused innovations more accessible to external users
- Joint Research Projects
- Educational Programs

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 → support
- Stronger position in negotiations with machine suppliers
- Improved attractiveness for companies

2.2. Most important Strength

The second question asked the participants about what they considered the most important strength a FabLab community would provide. Enabling makers and innovators as well as creating more efficient operations were considered the major contributions of the cooperation.



2.3. Potential Weaknesses of creating a network

The third question asked the participants about what they consider potential weaknesses of creating a cooperation network between European FabLabs. Weaknesses were either concerned with cultural differences, administration issues, differences in size, concerns about a long-lasting effect or, some mentioned a weakness in financing.

CULTURAL DIFFERENCES

- Cultural environment make it difficult to use ideas across countries
- Financial and operational gap between different countries
- Language gap → communication problems
- Local Laws
- Innovation policy gap between different countries

ADMINISTRATION

- Over Administrating Processes → may reduce dynamism and innovation → Bureaucracy: more paperwork/ overlapping efforts and resources
- Possible insufficient communication lines
- coordination



DIFFERENCES IN SIZE

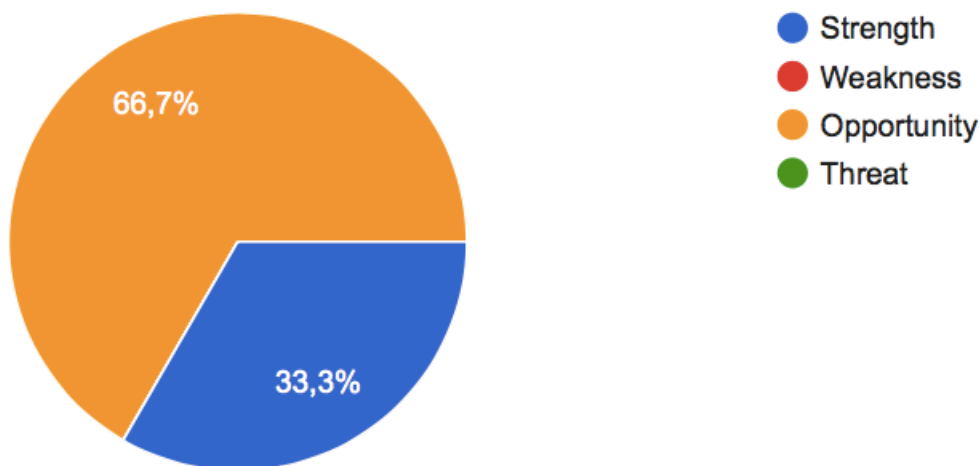
- Cooperation between different types of labs/entities
→ widen gap between developed and underdeveloped labs/spaces/regions
→ random variable into daily operation
- Different specializations
- Hard to react to the changes of ecosystem/business model/portfolio, etc.
- Polarization = enemy of effective processes

SUSTAINABILITY

- “empty box” if not enough effort and energy into the project

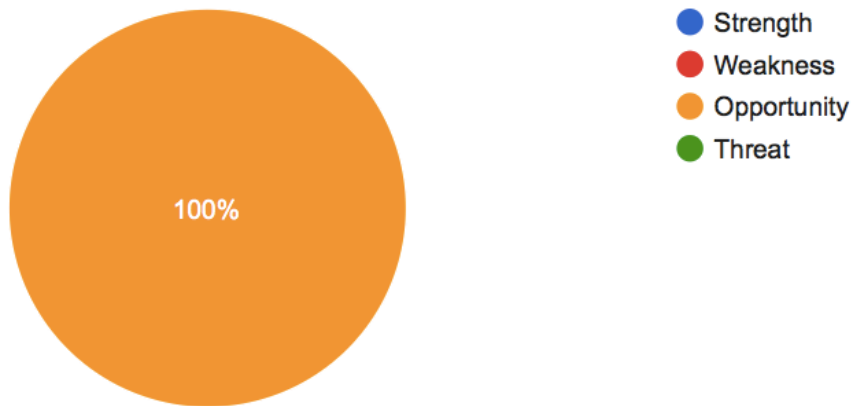
2.4. Other FabLabs

In order to check how the survey participants assess the other members in the cooperation the next question asked how they consider other FabLabs. All of the participants value the partners in the network positively - most of them (67%) see the partners as an opportunity and 33% consider the partners a strength of the network.



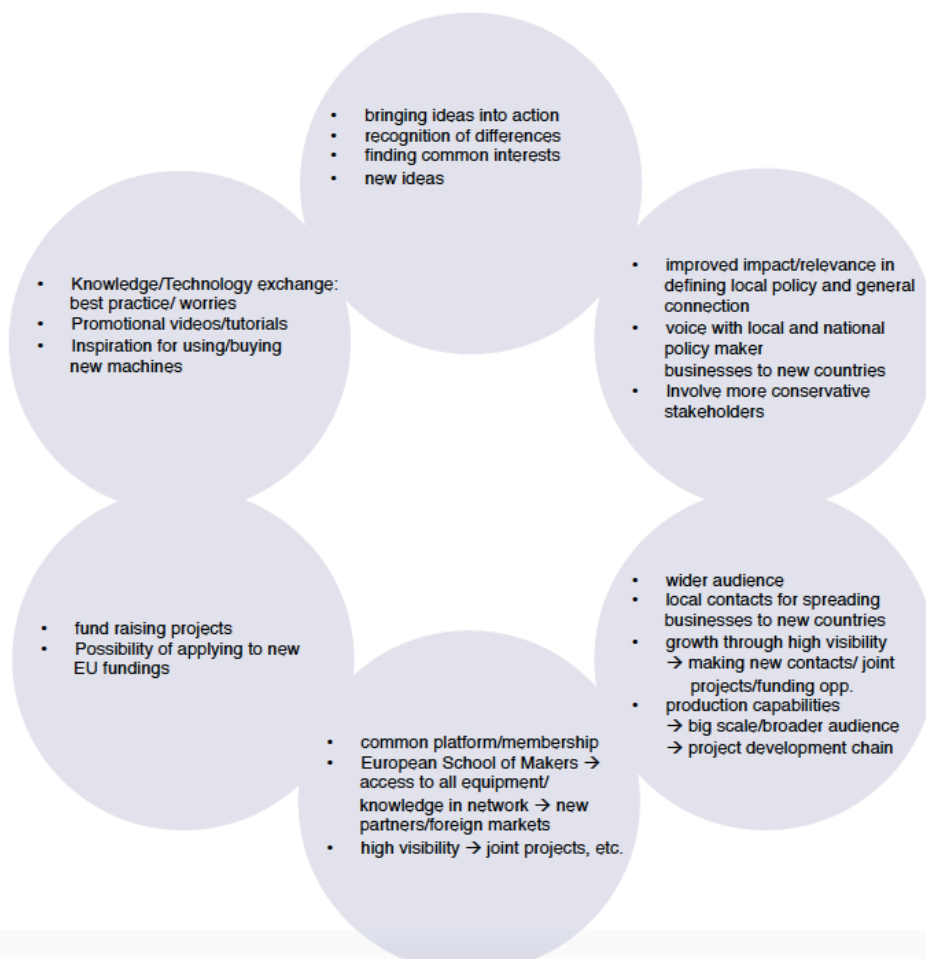
2.5. Private Financial Resources

All of the survey participants consider financing FabLabs through private financial resources an opportunity.



2.6. Opportunities of the Network

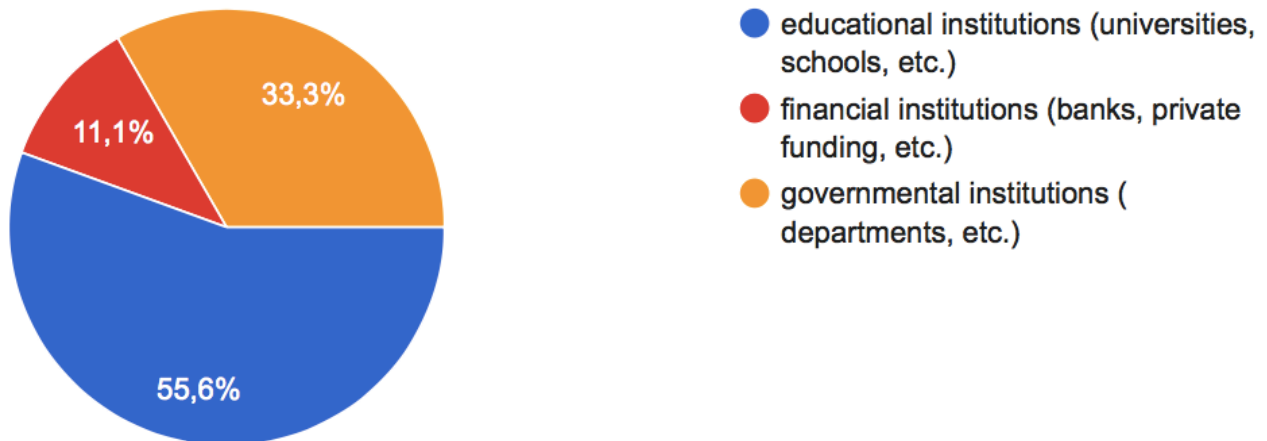
Most participants see the network's opportunities in turning ideas into actions, the involvement of stakeholders and a greater audience, establishing a common European membership, fundings and knowledge exchange.





2.7. Most important opportunities of the Network

This question is aimed at assessing what the participants of the survey consider the most important opportunity that can be gained through the European FabLab network?



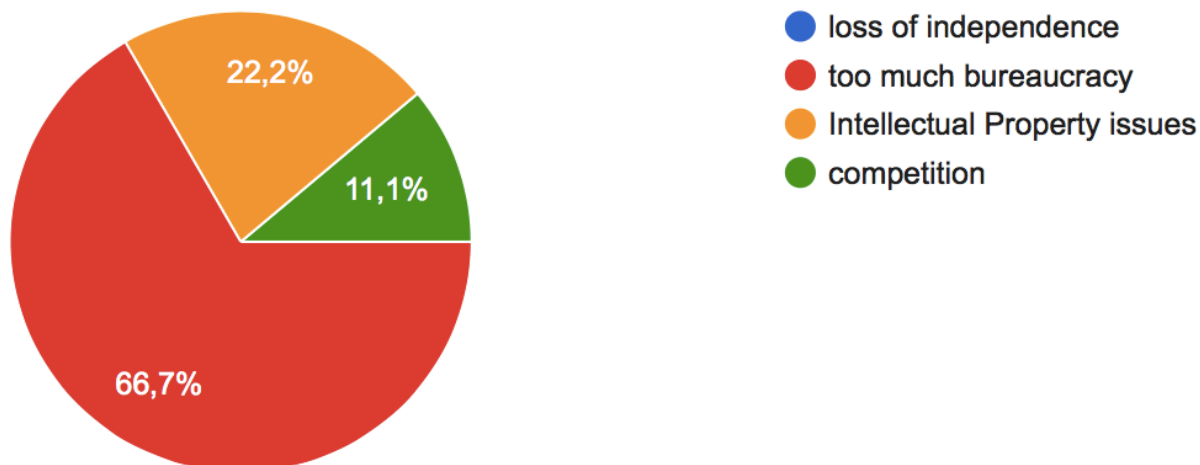
2.8. Arising Problems

Most of the survey participants consider effectiveness and coordination problems, as well as increased bureaucracy, differently set goals and engagement in the project as threats that could derive from a cooperation network between the European FabLabs.

<p>EFFECTIVENESS/ COORDINATION</p> <ul style="list-style-type: none"> • too much time/resources on non-creative activities • language issues • bottom-up institution • loss of benefits because of scaling up too much • technical gaps limiting a smooth management 	<p>BUREAUCRACY</p> <ul style="list-style-type: none"> • overly regulated procedures • administrative burden
<p>DIFFERENT DIRECTIONS</p> <ul style="list-style-type: none"> • no common goals • models that don't benefit local community • competition between network partners → funds, costs of operation, technological limitations • "bad" partners 	<p>ENGAGEMENT</p> <ul style="list-style-type: none"> • high expectations → missing action/ engagement • long-term sustainability • reluctance to share know-how

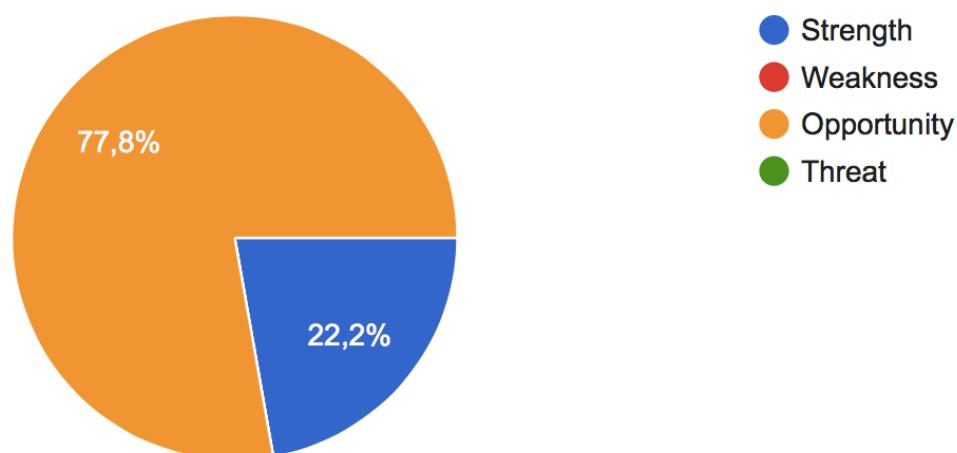
2.9. Threats from Network

This question asked the survey participants about possible threats they see deriving from a European cooperation network?



2.10. Local innovation ecosystem

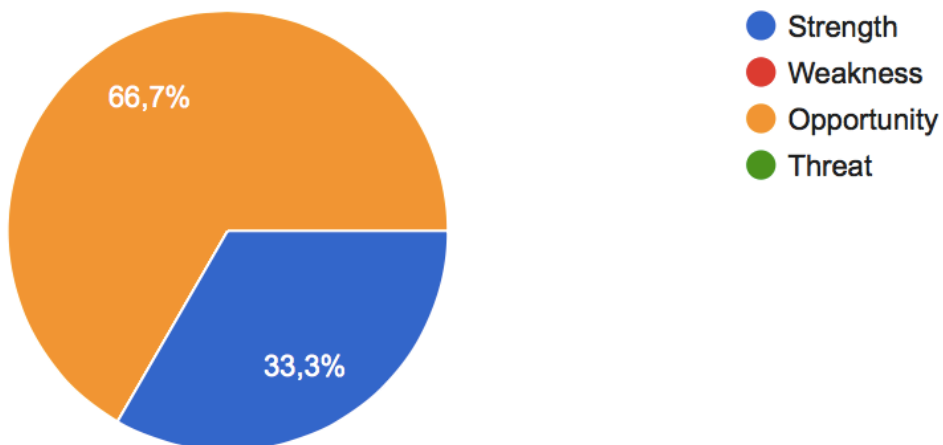
Most of the survey participants consider the local innovation ecosystem an opportunity for the cooperation network.





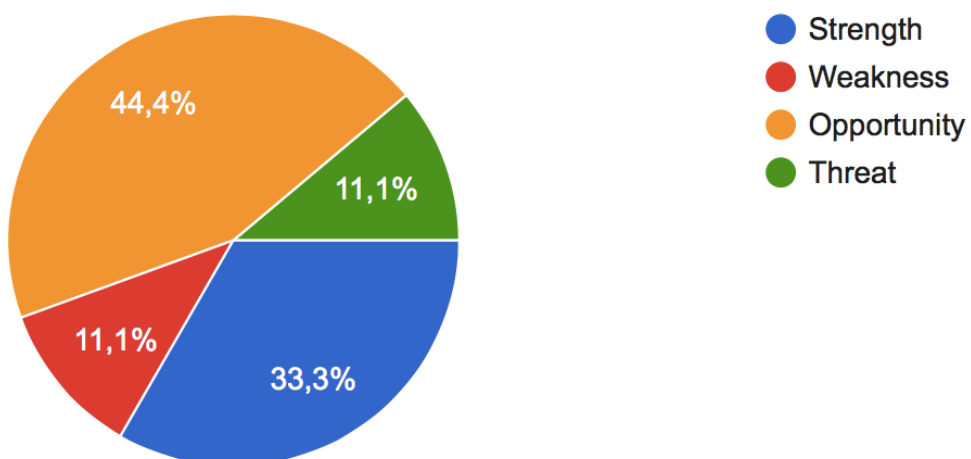
2.11. FabLab Users

Other surveys have shown that the majority of the FabLab users are up to 30 years old which 67% of the participants consider an opportunity for the network.



2.12. Social Media

Most of the survey participants see the fact that Social Media is one of the most important communication channels positively. 22% see it either as a weakness or threat.



3. Give-Get-Analysis

The following form particularly asked the participants about what they considered their strengths in different fields/areas of their FabLabs or MakerSpaces. Those strengths will later on be considered something the project partners are able to contribute/"give" to the network. The form also asked about weaknesses that project partners were able to identify in their FabLabs or MakerSpaces.

The following will give an overview of the answers the project partners provided (unfortunately not all project partners answered the second part, the form, of the SWOT-analysis).

3.1. Give-Get-Analysis: IT

Strength of the partner FL	"to give" to the network	Weakness of the partner FL	"to get" from the network
EQUIPMENT			
SLA PRINTER	SLA PRINTER	Lack of possibility of using big/noisy/dusty machines (lathe, sawmill...)	Use of industrial equipment
Chocolate Printer	Chocolate Printer		
SERVICES (please indicate target group)			
Educational services to secondary and high schools	Transcripts and indications on how to provide these services to secondary and high schools	Opening hours of the FL are limited to those of the museum (10-18 MO-FR, 10-19 SA-SU)	Acquisition of a tool for allowing access to members (e.g. FabMan) or guidelines on how to create a "duplicate fablab" in a room that can be accessed 24/7.
Educational services to elderly people on basic informatics	Transcripts and indications on how to do these services to secondary and high schools	Limited number of technicians for members following	Winning management of the economic model of the FL, including personnel cost.
Workshops on basic 3D printing, laser CNC, 3D modeling, Arduino, photogrammetry	Workshops on basic 3D printing, laser CNC, 3D modeling, Arduino, photogrammetry		
TECHNOLOGY			
Circuit making: an easy-learning electronic platform for kids	Circuit making: an easy-learning electronic platform for kids	Advanced programming: Python, Arduino, Raspberry	Advanced programming: Python, Arduino, Raspberry
Linux/Ubuntu/Open source alternatives to commercial software for	Linux/Ubuntu/Open source alternatives to commercial software for		



both basic office work and FabLab activities	both basic office work and FabLab activities		
KNOWLEDGE/SKILLS IN			
Designs, Architecture	Designs, Architecture	Basic electronics	Basic electronics
Scientific domains (physics, mathematics, ecology, forestry, Biology, geology...)	Scientific domains (physics, mathematics, ecology, forestry, Biology, geology...)	New, catchy workshops to attract young users	New, catchy workshops to attract young users
NETWORK/CONNECTIONS			
Local enterprises and schools	Our experience on how to connected those entities, services provided, packages offered	Real and practical involvement of the Artisanat world	How PPS have involved the artisans
Museums (ECSITE)	Our experience on how we connected those entities, services provided	Real and practical involvement of the modelers (diorama makers, trains, aeromodelers, drones...)	How PPS have involved the modelers
Local communities and associations	Our experience on how we connected those entities, services provided	Creating a community of repairer, e.g. a repair café	How PPS have involved general public on repairing
RESEARCH /TECHNOLOGY DEVELOPMENT			
GENE		Electronics	Electronics
		Advanced Programming	Advanced Programming
ORGANIZATIONAL PRECONDITIONS			
Visibility and promotion of FL through the Museum	Visibility and promotion of FL through the Museum	We are part of a huge system, naturally slow in decision making	
Fundraising through local stakeholders		Fundraising through National/International stakeholders	

3.2. Give-Get-Analysis: AT

Strength of the partner FL	“to give” to the network	Weakness of the partner FL	“to get” from the network
EQUIPMENT			
Fab Boxes	Knowledge on mobile Fab Lab	Safety issues with new machines	Experience in safety handling of new machines
Equipment Diversity	Instructions on machine safety	Not enough space for new ones	Capacity sharing within the network
Machine Safety	How to make your lab safe		



SERVICES (please indicate target group)			
24h Access	Fab Lab Management Tools	Cannot provide training for all the equipment	Share training content (European school of Makers)
Fab Store	Supply chain		
affordable and transparent pricing			
TECHNOLOGY			
Fab Man	Best practice in management tools	Survey of future trends	Knowledge exchange
Process automation	Best practise and technical solutions		
KNOWLEDGE/SKILLS IN			
Video tutorials	We share video tutorials on you tube	Cannot provide formal credits for workshops.	Cooperate with educational institutions in the consortium.
Online knowledge base (wiki)	Shared online		
NETWORK/CONNECTIONS			
Big community	Engaging communities	Maintaining a large community	Ideas for community building
good relations with policy makers	Best practices		
Highly connected with local communities	connections		
RESEARCH/ TECHNOLOGY DEVELOPMENT			
participation in different prior projects	Best practice	Communicating our technology know how	Best practices
research on Fab Labs, education	Research knowledge		
ORGANIZATIONAL PRECONDITIONS			
Independent legal entity	Fast decision making for cooperation	Not embedded into a large organisation	Best practices (e.g. general terms and conditions)
Event organization know how	Knowledge exchange		

3.3. Give-Get-Analysis: HU

Strength of the partner FL	“to give” to the network	Weakness of the partner FL	“to get” from the network
EQUIPMENT			
3D scanners	experience and scanning capacity of multiple methods	Metal work in general	We are only able to mill softer materials, unable to cut them and mill tougher metals like steel
Army of 3D printers	Print capacity of 9 FDM printers		
SERVICES (please indicate target group)			
Workshops with young adults	Held several workshops (some in collaboration with others) and a few university courses	Inexperienced (and probably inaptient :D) in working with children (and elderly people)	Know-how of workshops for children, elderly people, immigrants, etc. (practically anyone outside of university or college youth and young adults)
Professional services (e.g. working with companies and entrepreneurs)	Several years of experience in working “on the market” with companies from multinational level to SMEs		
TECHNOLOGY			
Wood working	Experience in producing things using several woodworking technologies from kitchen equipment up to furniture	Advanced 3D printing	Although we have a great amount of experience in FDM and SLA printing we had very few opportunities to work with advanced 3D printing technologies (SLS, SLM, etc.)
3D scanning	Wide range of projects from scanning people to artifacts		
KNOWLEDGE/SKILLS IN			
Wood working	Equipped with a rather good wood working space and constantly working with it to create furniture/decoration/interior, etc.		
		Welding in general	We have the equipment but we lack the knowledge



3D scanning	Did several projects with various scanning techniques (coordination, measurement, structured light, optical tracking, etc.		
		Electronics	We have the equipment but right now no one is an expert in the field
NETWORK/CONNECTIONS			
Universities	Several years of cooperation with Hungarian universities leading their respective field (BME, MOME)	“maker communities” and social initiatives	Lackluster connections to other bottom-up initiatives and communities
Large companies	Been working for industrial leaders like SIEMENS and NNG		
RESEARCH/ TECHNOLOGY DEVELOPMENT			
Been part of the creation of several industrial proof of concepts/prototypes/etc.	Project management and technological experience		
ORGANIZATIONAL PRECONDITIONS			
Independent private company	Fast autonomous decision making, adaptability, flexibility	Independent private company	You are on your own as well when you mess up, no calculable financial background

3.4. Give-Get-Analysis: CZ

Strength of the partner FL	“to give” to the network	Weakness of the partner FL	“to get” from the network
EQUIPMENT			
Training Room with PCs	Organizing Trainings	No other technical equipment	Access to technical equipment
SERVICES (please indicate target group)			
Educational services and courses	Support of FabLabs with additional courses	Limited propagation	FabLab network could be a new distribution channel of services
TECHNOLOGY			
		No manufacturing technologies	Access to manufacturing technologies
KNOWLEDGE/SKILLS IN			
Large portfolio of Software tools	Enlargement of courses offered for FabLab	Limited availability of lecturers/trainers	Enlargement of course portfolio using skilled



	participants		students from FabLab
Project management	Possible course of PM for FabLab participants	Limited portfolio of courses	Enlargement of course portfolio on technologically oriented courses
Well established educational course system	Support of FabLabs with additional courses		
NETWORK/CONNECTIONS			
Large network of technical high school teachers	Dissemination of FabLab idea and advantages to wide audience	Limited propagation in foreign countries	Possible international participants in courses from FabLab network.
Number of skilled lecturers (CAD and other SW tools)	Enlargement of courses offered for FabLab participants		
Pool of technical high school students interested in CAD	Identify talented and motivated students for possible participation in local FabLabs		

3.5. Give-Get-Analysis: PL

Strength of the partner FL	“to give” to the network	Weakness of the partner FL	“to get” from the network
EQUIPMENT			
White Light 3D Scanner	Scan small objects in their original color without overlapping textures	Only 3D printing and rapid prototyping equipment	Experience in connecting cutting-edge technology with traditional crafts and hands-on manufacturing
SLA Printer	Photopolymer resin prints	No hands-on manufacturing – f.ex. nothing connected with wood and metal processing and electronics	
Laser engraver control + monitor	Coolant temperature monitoring system of the laser tube with alarm and launching of the cooling system based on the AVR microcontroller (under construction)	Fablab safety	Best practices on work with people
SERVICES (please indicate target group)			
Educational services for secondary school	Plans of workshops, best practices	Lack of professional staff – need to hire more experts and	We can promote our services to a wider audience thanks to



and high-school pupils		technical staff	the network
Workshops on 3D printing, rapid prototyping, laser cutter open for everyone		Lack of professional staff – need to hire more experts and technical staff	
TECHNOLOGY			
Mobile fab cloud	A Linux-based system called OpenWrt that can be deployed on virtually any type of Router/Access Point (a usb port required to connect an external drive) that easily hosts other types of files like Software, drivers, manuals, tutorials or sample projects, no only the internet and other network services. It can also be used as print server for usb printers or LTW internet receiver via usb modem	FabLab Management System	FabLab Management System
		Anti-theft system	Best practices
KNOWLEDGE/SKILLS IN			
Project Management	Big experience of Regional Development Agency in managing European projects		
			How to create a network that will bring some economic benefits to FabLab
Video tutorials – 3D design	Basic tutorials on how to use free Autodesk 123d design and commercial Rhinoceros 3D		Best practices
NETWORK/CONNECTIONS			
Linkages with educational institutions	Experience in networking with educational institutions – best practices	Relatively small amount of the users – location change	Gaining new FabLab community users
Good relations with local policy makers			Creating new partnerships
RESEARCH /TECHNOLOGY DEVELOPMENT			
			Best practices
ORGANIZATIONAL PRECONDITIONS			
		Body governed by public law	
New FabLab localization near the city center – more accessible for users			



3.6. Give-Get-Analysis: SI

Strength of the partner FL	“to give” to the network	Weakness of the partner FL	“to get” from the network
EQUIPMENT			
3D printer: Form2 + UV curing	High definition 3D printing facilities	Limited capacities due to limited spaces	Online printing service for rush time
Portable laser cutters + portable 3D printer (FabBox)	Best practices for transportable fablab (FabBox)	Small bed dimension (30x50cm)	Advanced cutting facilities
Raised 3D N2 „plus“ 3d printer	Printing facilities for 30x30x60cm objects	No multi color printing, no metal printing, no Clay printing	Metal and other material printing facilities
SERVICES (please indicate target group)			
Training on 3D printing, Adults, beginner	PPT of the course	1 session course, focus on technology with poor „ROI“: less than 10% of trained people become members.	Example of 3d printing courses that engage people in more effective way (more sessions? More focus on a project or a product? More focus on 3d modelizing?)
training on lasercutting, Adults, beginner	PPT of the course	No 2D design course (illustrator or other vector design software)	PPT of 2D vector file training
Training on CNC milling machine, Adults, beginner	PPT of the course	Limited open hours (only 4 hours a week),	
3D unformal workshop, Adults, all level	Best practice of partnership with a 3d company	Participation is decreasing	Best practices how to engage new people on 3D technologies
Kids workshops, 7-12 years old kids	Lists of workshop done so far, how-to and blueprint files.	Time consuming to prepare a new workshop every 2 weeks	Exchanging kids workshop ideas and how-to's.
		No offer in electronic, arduino, programming, design thinking, business coaching, open source culture, summer camps	Any best practice on these matters welcome!
KNOWLEDGE/SKILLS IN			
		Poor experiences in teaching electronic, arduino, programming, design thinking, business coaching, open source culture, summer camps	Any exchange of info on this



NETWORK/CONNECTIONS			
Faculties	Great cooperation and common project with faculties	Limited propagation in foreign countries	Possible international participants in courses from FabLab network.
Other FabLabs	Very good cooperation with most of other Slovene fablabs		
Companies	Exchange or hiring services with 2 private companies	No income generation	Best practice for sponsorships/financial support from private companies
ORGANIZATIONAL PRECONDITIONS			
Experience of Meta in fundraising		No or few experience in private fundraising	Best practice for sponsorships / financial support from private companies

3.7. Give-Get-Analysis: SK

Strength of the partner FL	“to give” to the network	Weakness of the partner FL	“to get” from the network
EQUIPMENT			
3D printers	Organizing workshops	Dependency on public funding, understaffed	Good practices learning new approaches, information sharing, exchange of experience
Engraving machines	Organizing workshops	Dependency on public funding, understaffed	Good practices learning new approaches, information sharing, exchange of experience
Sewing machine	Mentoring	Dependency on public funding, understaffed	Good practices learning new approaches, information sharing, exchange of experience
SERVICES (please indicate target group)			
Educational courses	Good practices, sharing experience	Only for students	Good practices learning new approaches, information sharing, exchange of experience
Workshops	Good practices, sharing experience	Ad-Hoc workshop creation	Good practices learning new approaches, information sharing, exchange of experience
Excursions for primary and secondary schools	Good practices, sharing experience	Small capacity of the room	Good practices learning new approaches, information sharing, exchange of experience
KNOWLEDGE/SKILLS IN			
Basic 3D modeling skills	Sharing of good practices		Exchange of experience



3D scanning skills	Sharing of good practices		Exchanges of experience
NETWORK/CONNECTIONS			
Technical High Schools			Offering excursions for High Schools within the network
Universities			Sharing relevant contacts
Primary Schools			Offering excursions for Primary Schools within the network
ORGANIZATIONAL PRECONDITIONS			
Workshops and conferences	Possibility to organize events		Contacts

3.8. Give-Get-Analysis: HR

Strength of the partner FL	“to give” to the network	Weakness of the partner FL	“to get” from the network
EQUIPMENT			
Portable Engraving Machine	Know-how to use engraving machine as subtractive digital fabrication device & precaution	demonstration and education mostly	
Portable CNC Machine	Know-how to use CNC machine as subtractive digital fabrication device & precaution	education purpose only	
Desktop 3D Printers	Know-how to use 3D printer as additive digital fabrication device & precaution		
Paste Extruder	Know-how to use past kind of material as additive digital fabrication device	Complicated to work with	
Portable 3D Scanner	Know-how to use 3D-Scanner easy	precision by equipment	
Structured-light 3D Scanner	Know-how to use 3D-Scanner	prerequisites for process	
Biosensors electronics	Know-how to play and explore with biosensors	limited resources	
Bridge AR device	Know-how to use AR devices and develop own (Google cardboard)	limited resources	
Oculus Rift VR device	Know-how to use VR devices	limited resources	



SERVICES (please indicate target group)			
Educational workshops for kids and students	responses from users	ad-hock course creation	more systematic course design and feedback
Educational workshops for teachers	responses from users	ad-hock course creation	more systematic course design and feedback
Educational workshops for specific social groups	responses from users		
KNOWLEDGE/SKILLS IN			
Educational Knowledge			
Product design skills (in cooperation with School of Design)			
NETWORK/CONNECTIONS			
Design District	Network Events		
Science Picnic	Network Events		
Network of technical subject teachers (primary schools)	Can be interesting for surveys and pilots		
Network of art subject teachers (secondary schools)	Can be interesting for surveys and pilots		
Local civil associations network (people with disabilities)	Can be interesting for surveys		
Large community overall	Can be interesting for surveys		
RESEARCH /TECHNOLOGY DEVELOPMENT			
Full equipped Computer Lab for research (in cooperation with Faculty of Architecture)	Space to perform research up to 30 people	Restricted Access	
ORGANIZATIONAL PRECONDITIONS			
Civil association independent	Social aspects, fast decisions	Limited resources	Know-How to perform more sustainable
Organizational possibilities (in cooperation with Faculty of Architecture)	Possibility to organize mid-size events and workshops	Limited availability, Coordination with faculty	
Workshops for about 30 attendees			
Events with up to 100 participants and few thousands visitors			

3.9. Give-Get-Analysis: DE

Strength of the partner FL	“to give” to the network	Weakness of the partner FL	“to get” from the network
EQUIPMENT			
CNC machine park	Know-how and courses/training e.g. water-jet		
Diversity high-tech/high- end equipment	Know-how/training on machines, usage, etc.	Data (efficiency, usage, corrosion, etc.)	Sensor infrastructure
SERVICES (please indicate target group)			
Offer many machine courses	Knowhow and training	Have not reached full capacity yet	Interested people
Part of UnternehmerTUM	Start-up infrastructure		
TECHNOLOGY			
High-tech machines	Diversity, knowledge, courses		
KNOWLEDGE/SKILLS IN			
		Cannot provide formal credits for workshops.	Cooperate with educational institutions in the consortium.
Online knowledge base (wiki)	Shared online		
NETWORK/CONNECTIONS			
Partnerships	Know-how on creating synergy effects	Creating more partnerships	Ideas how to reach economic partners
relations with the economy	Best practices		
RESEARCH/ TECHNOLOGY DEVELOPMENT			
participation in different projects	New/fresh ideas/technology		
Summer school/ university cooperation, etc.	Know-how		
ORGANIZATIONAL PRECONDITIONS			
Part of UnternehmerTUM	infrastructure		