

REPORT ON P2P KNOWLEDGE EXCHANGE

D.T1.3.6

PP1 MakerSpace Garching visit

Author: Sabina Barcucci

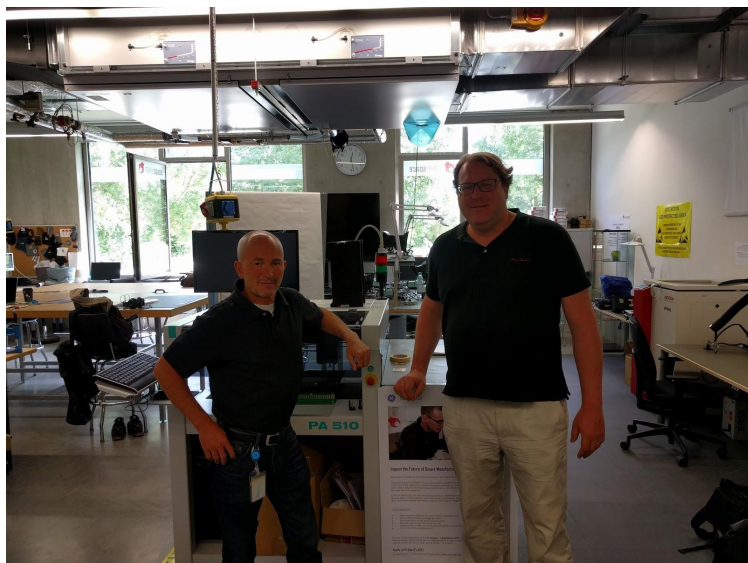
Version 2

11-2017





Except where otherwise noted, this work is licensed under
<https://creativecommons.org/licenses/by-nc-sa/4.0/>



Phil Handy and Martin Laarman shot in the electronics workstations areas by Sabina Barucci, LP content manager, at TUM Makerspace, Garching



Phil Handy and Sabina Barucci shot in the electronics workstations areas by Martin Laarman, at TUM Makerspace, Garching



1. Visit outline

Date:

30 June 2017

Venues:

Main Venue: **UnternehmerTUM MakerSpace GmbH**, Lichtenbergstr. 6, Garching,

Extra Venue: BIOTOPIA Naturkundem Museum Bayern

Host Partner:

PP10-DE UnternehmerTUM MakerSpace GmbH

Attendees:

PP1 IT MUSE FabLab CM Sabina Barcucci

Agenda:

1. Day: Friday, June, 30th

09:00 - 10:00 Visit to BIOTOPIA Naturkundem Museum (Opening expected for 2024) with Micheal John Gorman

10:30 - 13.00 Tour of Makerspace.de facility

13:00 - 14:00 Lunchtime

14:00 - 17:00 working session on Pilot 2 with Martin Laarman and David Pap (remotely connected)

17:30 end of official visit



As a representative of FabLabNet Lead Partner, I landed in Munich for a short p2p visit on Thursday 29th evening planning to get back already the day after. I arranged to visit TUM Makerspace to explore the facility and to develop with Martin Laarman the backbone of FabLabNet pilot 2, for which is responsible the Hungarian partner and in which IT and DE (plus HR and SK) are also participating.

Since two weeks before I attended the Ecsite Conference in Porto - the annual conference of Ecsite network of european science centers and museums - in order to advertise MUSE FabLab activities through the FabLabNet project, I got the chance to meet in person with Micheal John Gorman, founder and former director of Science Gallery Dublin and now creator of the forthcoming new natural Science Museum of Munich named BIOTOPIA, which opening is scheduled for 2024.

In Porto I quickly arranged to meet also him too during my visit to Munich, that would have happened two weeks later, proposing him to join too the makerspace visit. Since MUSE Science Museum is based very close to the South Tyrol region, we are strongly interested in creating a network that put in connection us (as a museum and a fablab) with the TUM Makerspace and BIOTOPIA and, reversely, the BIOTOPIA director and founder is highly interested in maker community and especially in TUM Makerspace for the community-based approach that the BIOTOPIA museum is heading for.

Finally, Micheal Gorman wasn't able to attend the visit to Garching, but invited me to join him at the future BIOTOPIA spaces early in the morning and before the makerspace visit to connect and learning more about the FabLabNet project and potential opportunities coming from our network. So I did.

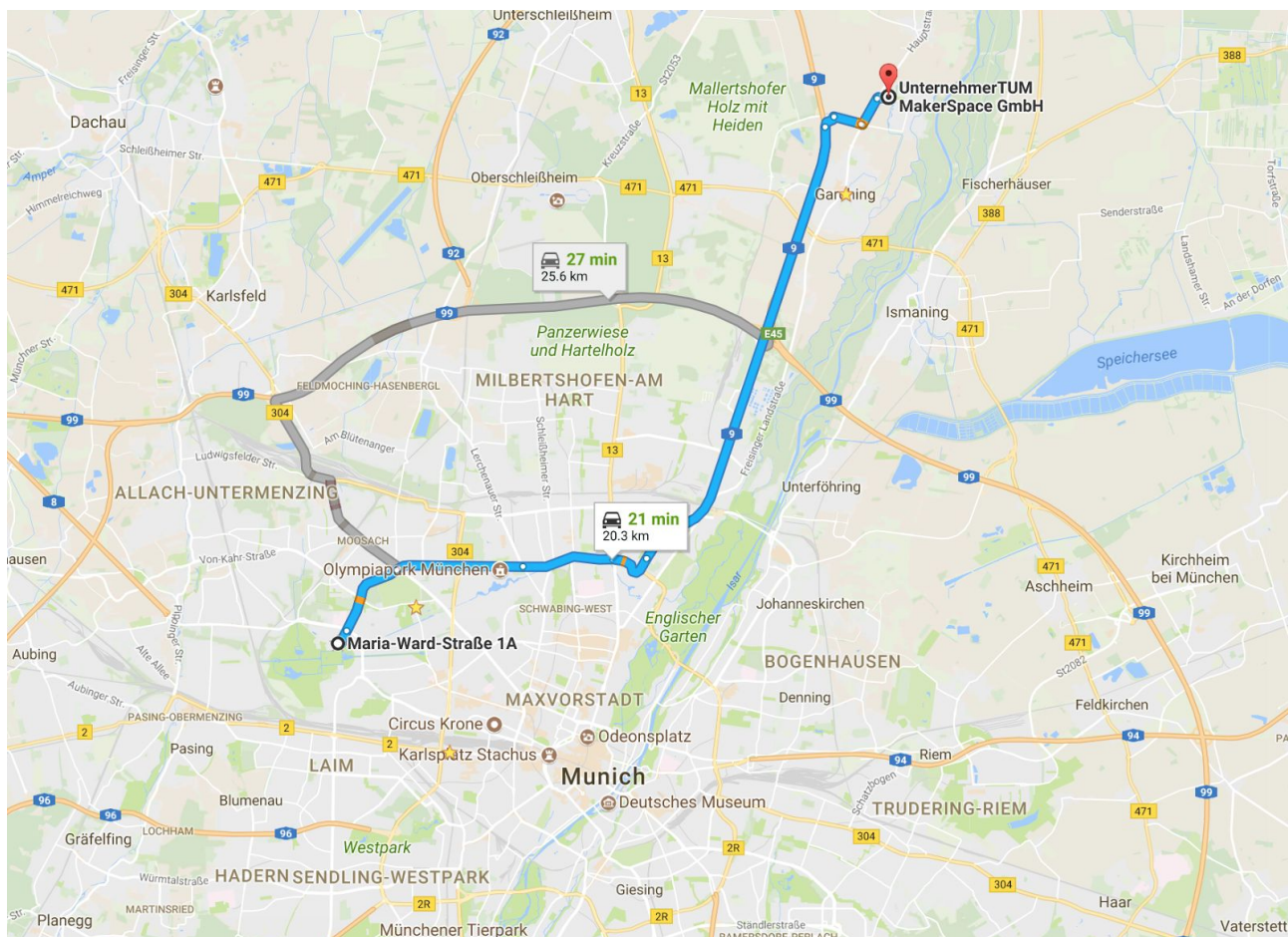


*The entrance of the future BIOTOPIA museum. More info about the future project development:
<http://biotopia-bayern.com/de/>*



With Gorman we discussed about fablabs and science museums, and how to integrate in the museum cultural and scientific offer the role of communities and of DIY approach to technology and science. Gorman is highly interested in bring the DIY bio community of makers into the BIOTOPIA museum program and to do that we were thinking to co-organize some DIY bio maker faire related in collaboration with TUM Makerspace and MUSE Science Museum for the next summer, during the ongoing launch of future BIOTOPIA museum that will start during summer 2018 until the official opening in 2024. So, I promised to share the Gorman contact with my german colleagues and keep the conversation on this project going.

Right after the short meeting with Gorman, at 10.00 I headed to Garching to start the makerspace visit at 10.30. Below the route I used to travel from Biotopia to Garching.



I met Phil Handy and Martin Laarman at the Unterhenmer TUM bar and we introduced each other with Phil Handy since that one was the first and only time we met, even if we had earlier so many conversations at the phone. He shared with me some interesting insights about the general german technological ecosystem, split on the many different german cities. This let me understanding that, if nowadays Berlin is the



technological german capital of software, Munich keeps the primacy in hardware development. This makes a lot of sense, since the biggest automotive industry is all located in Munich area. The TUM Makerspace is a clear demonstration of this technological ecosystem in Germany.

We started our visit to the makerspace. TUM Makerspace has an interesting and pioneering funding model which is currently monitored by many organizations in the world. Phil Handy explained that he first wanted to set up a Tech Shop at the Unternehmer TUM but the american organization who owns the trademark didn't allowed him to get the Tech Shop licence out of US. That maybe was just a fortunate event, because in these very recent times the Tech Shop project announced to have filed for bankruptcy (<https://makezine.com/2017/11/15/techshop-closes-doors-files-bankruptcy/>).

The current funding model of TUM Makerspace is actually following the Corporate Innovation Lab model. BMW is the makerspace main sponsor among many other big brands. In exchange with machinery and funds, BMW human resources can access the space and use the facility as a innovation playground, following an open innovation quite radical model which is inspiring many other big companies in following the same model. The principle is that anyone from the BMW company - doesn't matter the role or grade - can access the makerspace and follow courses and creative and/or tech & design oriented formats. The result of this kind of open training can bring to BMW many different positive insights and bring to the company and its product-services a more innovative outlook, thank also to the indirect influence of the community of makers affiliated to the makerspace and daily animating it.

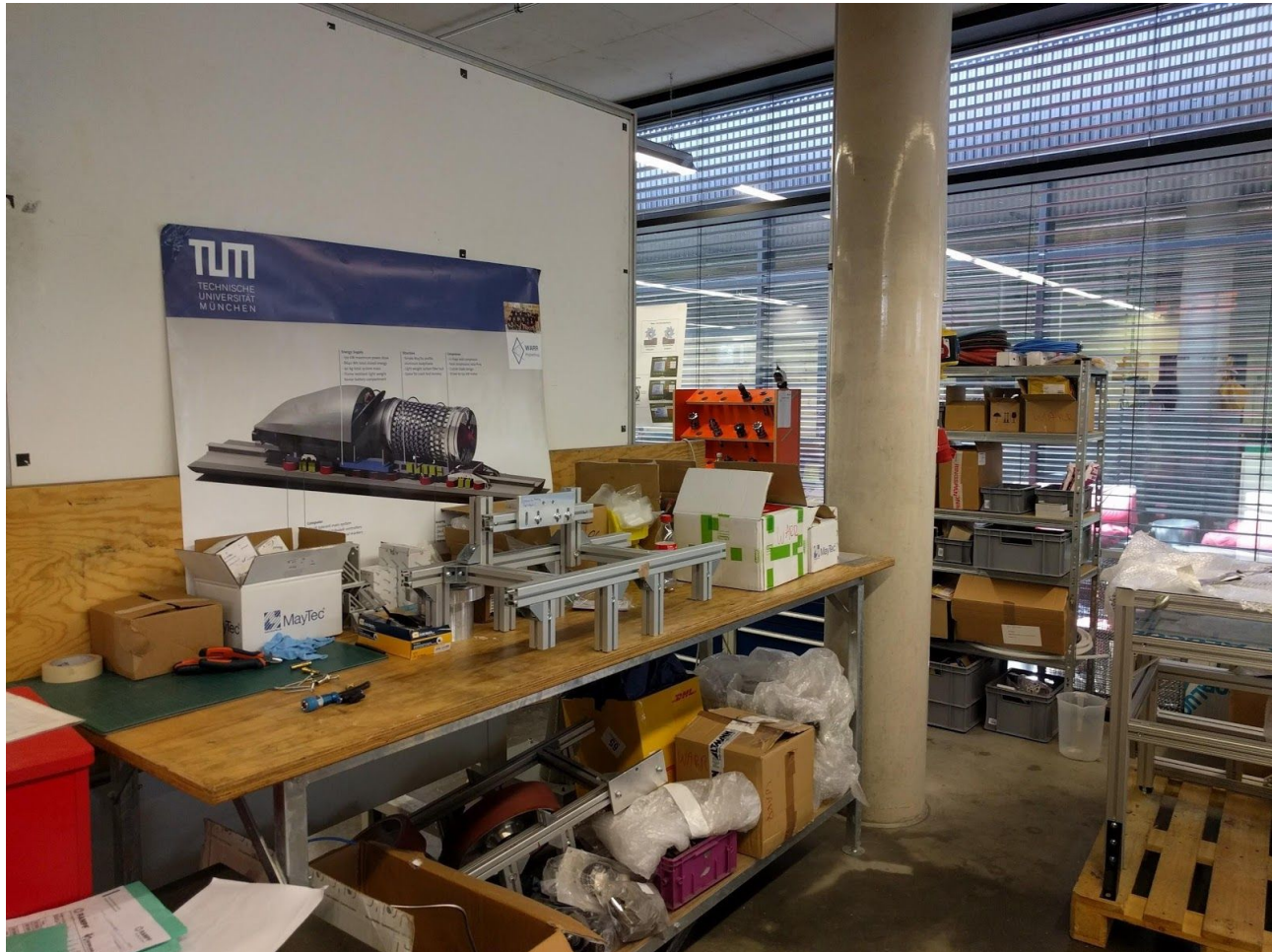
At the same time, this approach allows the makerspace to be equipped with cutting edge machines (included those directly used only by BMW human resources for automotive components engineering purpose) ensuring a top level technological service for its community of users (included students and other affiliated profiles). This radical approach fits perfectly also with the fact that Makerspace is embedded in one of the most important hub for technological research which is the Technische Universität of Munich and its technology transfer incubator, the Unternehmer TUM. This ensure top quality research results and their successful jump on the market thanks to the TUM incubator.



a BML Group big fibre laser cut machine at TUM Makerspace

The impressive machinery of the Makerspace are mainly provided for free by machines suppliers companies, which find more profitable being deployed and showcased in the TUM makerspace than the actual value of the machines they provide. It's perhaps enough to consider that even Angela Merkel went to visit the makerspace as well as many other representative of top companies and organizations in the world.

Being showcased at the TUM makerspace definitely matters. Even Elon Musk for Tesla got interested in TUM Makerspace, specifically because of an engineering students team of TUM who is participating in the international challenge launched by Elon Musk for the Boring Machine development.



The student team space at Makerspace TUM who si participating to the international boring machine challenge launched by E. Musk



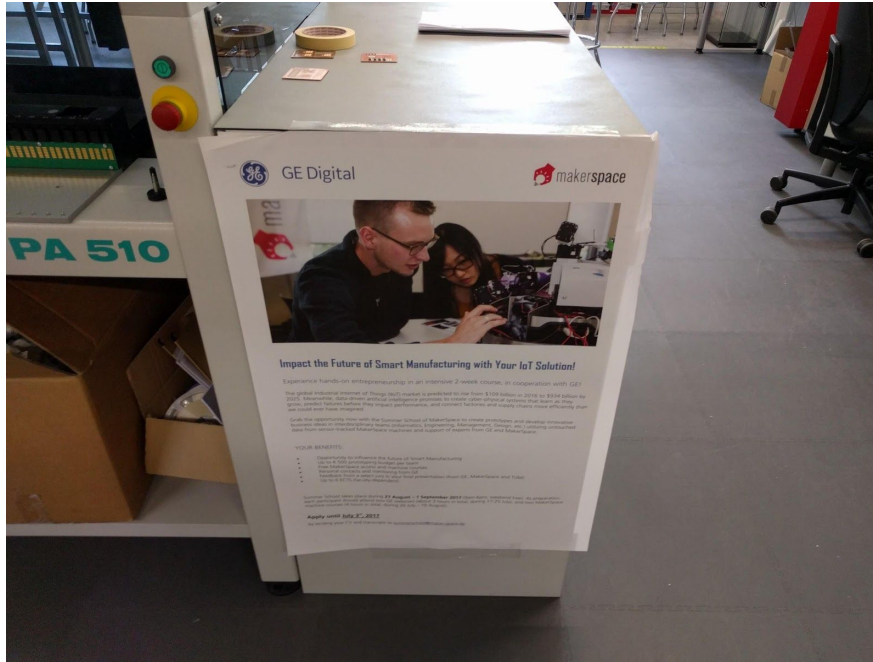
An highly-precision milling machine for metal components from and for BMW company



The big water jet FLOW available for makerspace users



The highly equipped soldering and electronics workstation and its sponsor visibly showcased



General Electrics is one of the main sponsor of TUM Makerspace

Beyond some of the standard features of the facility - which matches with all fablabs facility - and the outstanding equipment and sponsors of the makerspace, I found interesting the following approaches:

- At TUM Makerspace it is possible to get trained to use their several advanced machines and their operating softwares, as well as to smart use of those machines and integration with other equipment of the facility. The training approach deployed at the TUM Makerspace allows users to quickly put their hands on the machines themselves, with short, intensive training formats
- The makerspace organizes many events to involve community of makers even from abroad and to push a startup culture and creation with direct contact and drawing out from the Unternehmer TUM know-how and their companies network, all involved in these hackathon-style events.



An example of a Startup bornt first in the TUM Makerspace and then incubated in the Unternehmer TUM

We ended the visit and we got a pleasant lunch break in which we discussed how the maker movement got settled in our respective countries, Germany and Italy.

In the afternoon, we planned a skype call with me - LP content manager, Martin Laarman - PP10 PM, and David Pap - PP3 PM. Our goal was to profit of this vis-a-vis meeting to work on the Pilot 2 “Connecting to Business” FabLabNet Pilot Action 2. David Pap was connected via skype.

We worked about 3 hours on how to structure that concept and we put some foundation to the forthcoming Pilot Action.



Some sketches produced during the 3 hours meeting.

At about 6 PM I was heading back to the airport to get back to Milan.

REPORT ON P2P KNOWLEDGE EXCHANGE

D.T1.3.6

PP2 MakerSpace Garching visit

Authors: Roland Stelzer FM Karim Jafarmadar

Version 2

11-2017





Except where otherwise noted, this work is licensed under
<https://creativecommons.org/licenses/by-nc-sa/4.0/>



1. Visit outline

Date:

1/2 June 2017

Venues:

Main Venue: UnternehmerTUM MakerSpace GmbH, Lichtenbergstr. 6, Garching,

FabLab Tour: FabLab Munich (Gollierstr. 70), Munich Maker Lab (Dachauerstr. 112f)

Bavarian Dinner: Löwenbräukeller, Stiglmeierplatz, Munich

Host Partner:

PP10-DE UnternehmerTUM MakerSpace GmbH



Attendees:

PP2 AT HappyLab PM Roland Stelzer FM Karim Jafarmadar

PP3 HU FabLab Budapest PM & FM David Pap CM Peter Varga Thematic Expert Vidor Veres-Székely
Thematic Expert Daniel Kiskery

PP5 CZ Brno University of Technology PM David Palousek PM (new) Marek Rozehnal Expert David Skaroupka
Expert Daniel Koutny

PP7 SI RogLab PM François Friderich

PP8 SK Slovak Scientific and Technical PM Inform. Centre - Fablab Slovensko PM Jozef Vasko Expert Hanka
Kubanova

PP9 HR FabLab Zagreb PM Roberto Vdović Zrinka Valetić

PP10 DE UnternehmerTUM MakerSpace PM Phill Handy PM Martin Laarmann CM Lana Handy

AP/PP10 DE University of Applied Sciences Coburg Expert Prof. Anne Bergner



Agenda:

1. Day: Friday, June, 1th

09:30 - 10:00 Welcome with coffee & networking

10:00 - 13:00 Phill Handy: Makerspace LabTour, future plans and MakerSpace Management Practices

13:00 - 14:00 Lunchtime

14:00 - 14:30 PP10 Accociated Partner Prof. Anne Bergner: Talk: Maker Spaces Worldwide (= report from a study, Prof. Bergner made for the Bavarian Ministry of Economic)

14:30 - 15:00 Martin Laarmann: Talk: Munich's Maker Ecosystem

15:00 - 19:00 Tour: Visit of several Makerspaces in Munich (with another talk about the eWindow-Project which connects FabLabs & Makerspaces by Felix Tymcik from FabLab Munich and a talk on the creative quartier from Frank Sollmann from city of Munich)

19:30 Bavarian dinner

2. Day: Friday, June 2nd

09:00 - 09:30 Welcome with coffee & networking

09:30 - 12:00 Hands on workshop: The waterjet cutting machine in action

12:00 - 13:00 Lunchtime

13:00 - 13:30 Phill Handy about the MakerSpace Member Mix (from private persons to corporate companies)

13:30 - 14:30 open discussion / lessons learned

14:30 end of official visit

Photos and videos of this visit:

Video documentation by Jozef Vasko: [click here](#)

Photos by Jozef Vasko: [click here](#)

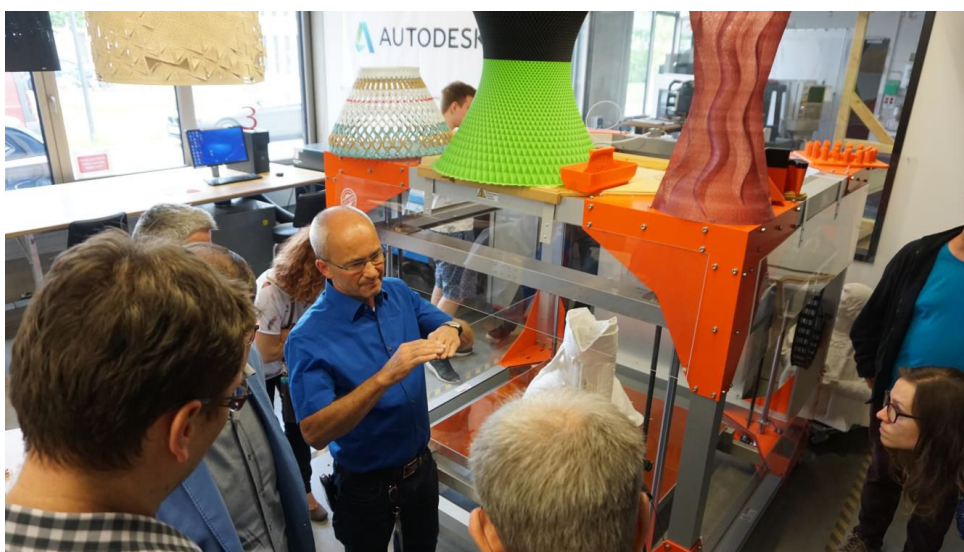


Photos by François Friderich: [click here](#)

Photos by Lana Handy & Martin Laarmann: [click here](#)



Phill Handy (PM PP10) explains the MakerSpace to the FabLabNet partners



The huge BigRep 3D printer



explaining the CNC mill



Haas 5-Axis CNC mill



PP10 Associated Partner Prof. Anne Bergner with her talk about „Makerspaces worldwide“

2. FabLab Reality:

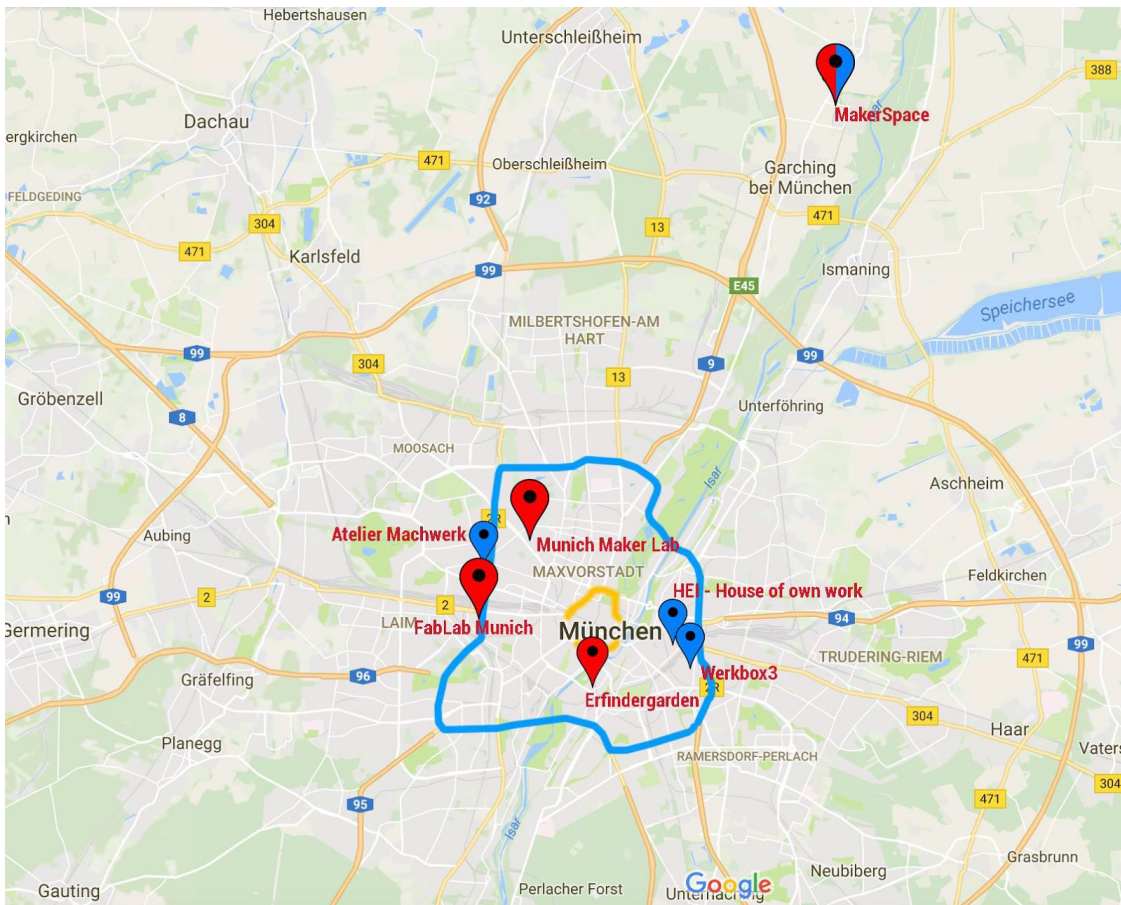
2.1 Location & Munich Maker Ecosystem



Photo: M. Ebener / UnternehmerTUM / TUM



MakerSpace is located close to the university campus of the Technical University of Munich (TUM) in the north of Munich. With 1.500 m² it is - at the moment - the biggest makerspace in Germany. Munich has a vivid makerscene with more than 6 other “Do It Yourself”-locations, everyone with its own specific focus.

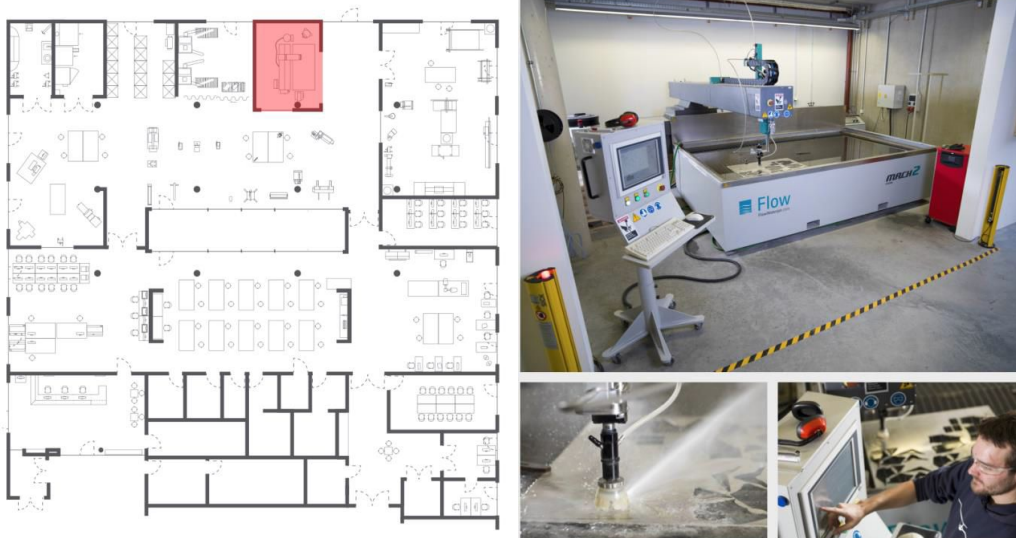


Munich’s DIY institutions are focused either on traditional DIY applications like wood- and metalwork, screen printing, etc. (marked blue in the map) or rather typical FabLab tools, like 3D-printing, electronics/arduino and digital production (marked red in the map).

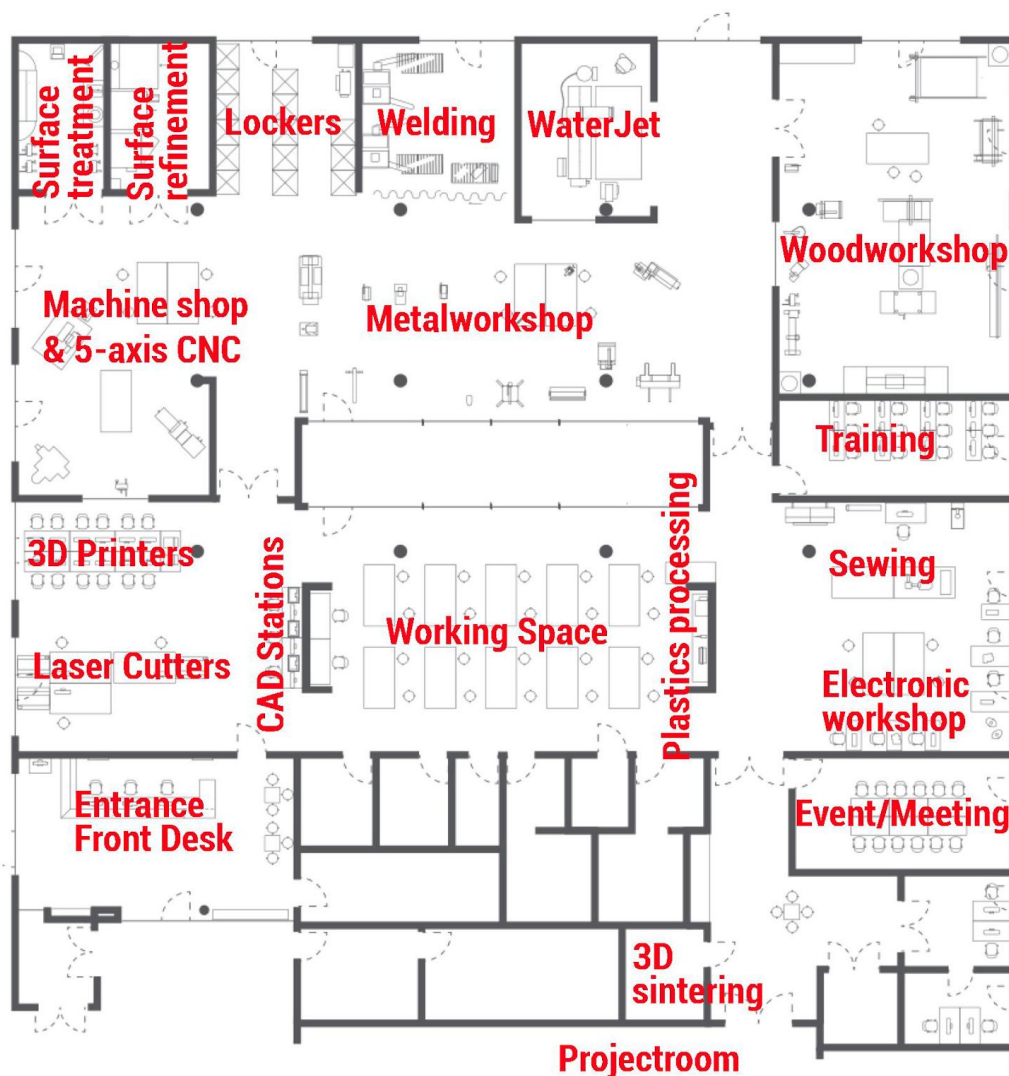
MakerSpace Garching is the only workshop in Munich that combines both areas with high-quality tools in one space.

2.2. Tools and equipment

MakerSpace has more than 100 tools. To get an overview there is a virtual walkthrough, which you can find [here](#). For specific information on the machines, provided by MakerSpace, [follow this link](#) and click onto the map to find out which machines are available in the area.



Example of more information about the WaterJet



Floorplan of MakerSpace Garching



2.3 Management and Organization of the FabLab, Communication

MakerSpace is a privately owned company. UnternehmerTUM Makerspace GmbH is a subsidiary of the UnternehmerTUM GmbH which was founded by BMW board member and major shareholder Susanne Klatten in 2002, with the scope of promoting and supporting entrepreneurship in Germany. Starting off with 5 Mio. Euros in 2014/15 MakerSpace invested 2 Mio. Euros in the machines and tools. The remaining 3 Mio. Euros were used to finance rent payments, HR-costs, etc. during the first years. BMW has also bought 300 MakerSpace memberships for their employees.

In March of 2015 MakerSpace was able to move into their Garching building and also start with the training of the basic crew members. Today MakerSpace occupies 37 employees that work in different areas (Workshop Crew, Frontdesk, Events, Marketing and Educational Coordination). The trainers are self-employed.

In order to gain access to the machines at MakerSpace you need to hold a membership and obtain a mandatory security and basic usage class for the machines you want to use. Crew members are around for constant expert support and maintaining the machines.

The basic membership access can be obtained at 125 Euros/month. Students pay a reduced fee of 95 Euros/month. There are various other programs (scholarships, case-studies, etc.) for students to be able to access the MakerSpace. The front Hub-Area which includes laser cutters, 3D-printers, sewing- and electronics area, can be accessed at 65 Euros/month.

As a member you can use every machine you have taken a mandatory security and basic usage class for for free - only materials need to be paid accordingly. Machines can be reserved for usage between 4 and 6 hours per day for free.

Costs Machine-Classes:

A beginner 65,- Euro, ca. 2,5 h

B intermediate 95,- Euro, ca. 3,5 h

C advanced 125,- Euro, ca. 4-4,5h

MakerSpace has not yet managed to break even. Revenues can be divided into 60% memberships, 25% education, 7.5% events and 7.5% service-manufacturing (ex. 3D-Printing, etc.).



2.4 FabLab's Beneficiaries/Specific Target Group/Clients

This year marks MakerSpace's second birthday. During these two years more than 12.000 people have been shown around the MakerSpace premises and, through that, have been exposed to the vivid maker-atmosphere of our 1500 m² of high-tech-prototyping and workshop area.

MakerSpace Munich is situated in the middle of the, so-called, Universitätsstadt which is characterized by the immediate proximity to the Technical University of Munich (TUM) and various renowned companies. Efforts have been made to take the chance of establishing synergy effects between the present companies and various educational, as well as, research institutions. With the university holding 15.000 students TUM students represent a key target group. University students require both, a place where they can apply and try methods they have learnt in class as well as build prototypes for possible projects.

The second major target group MakerSpace is trying to reach out to are BMW employees as well as their apprentices. BMW, as one of the major sponsors of MakerSpace, recognized the potential of having a place where employees can work on projects and try out their own ideas. Avid DIYs and private makers who appreciate the density of high-tech and high-quality machinery in one space represent MakerSpace's third target group.

Despite the great exposure to potential clients MakerSpace is challenged by getting students to acknowledge the potential MakerSpace holds for the development of their hands-on skills. Out of the 15.000 students at TUM roughly 10% have heard about MakerSpace and knows what it is. A typical student mostly comes and goes for classes only and, as public transportation is located directly at campus, never passes the MakerSpace building.

The same is true for the other target groups which most of the time have either not heard of MakerSpace yet or find the geographic location rather challenging (30 minutes outside of the inner city).

2.5 FabLab work: projects, programmes and connections/cooperation

As mentioned above MakerSpace is mostly challenged with getting people exposed to the idea and concept of a high-tech workshop that is open to anyone who wants to make something.

One of the most challenging targeting group are university students who often lack high disposable income to buy a costly membership to work on their projects. MakerSpace is therefore promoting a fast and cost-free access for students through easy-to-get scholarships (Hans-Sauer Scholarship, Zeidler MINT-Maker Scholarship). Another way of promoting the sale of memberships for students is through specials such as 10-Admissions that can be used through out the year and suit the flexibility of a students day-to-day life. In order to make spending time on a project



more appealing to students MakerSpace, in cooperation with UnternehmerTUM and the university, has started a 3 credits (ECTS) class called “THINK-MAKE-START”. Throughout the three weeks students come up with an idea for a project, that they write a business plan for, prototype at MakerSpace and then present in front of a jury.

The cooperation with UnternehmerTUM as a provider of business and entrepreneurship knowledge is available to all TUM students.

MakerSpace has strong industrial connections to BMW who have, through the purchase of a huge number of memberships which are distributed among their employees, immensely supported MakerSpace and the maker movement.

Other companies use MakerSpace’s location potential in the heart of Munich’s industrial and research area to show-case current technology/machines to their customers in Southern Germany. HAAS, for example, is currently using MakerSpace as a showroom and for testing their vertical and horizontal Metal CNC Milling Machines.

2.6 Impressions by PP2 of the exchange visit in Munich

Even if the Makerspace Munich is located outside the city we thought that one of the benefits is the neighbourhood to the Technical University. In our Makerspace in Vienna we have a lot of students from the Technical University and it can be seen as a benefit of the location to have one of your main target groups in such a close distance. Due to this we were surprised that it seems to be challenging to encourage the students from the university to work and explore the workspace and machines that they have in at hand.

Most of them don’t even know about the Makerspace. It seems to be crucial to have teachers as multipliers at universities that encourage students to use Makerspaces and Fab Labs and show them the potentials. The high membership might be a problem for students with low income and this might become a threshold to join and become a member. The problem seems to be to attract more members for a sustainable financing of the space, even if everyone who visits really likes it. The university started a special program to make the Makerspace more attractive for students in which they can also get some credit points. It is a three weeks program where they come up with ideas for prototypes, set up a business plan and try to start a small scale production or manufacture a prototype that is evaluated by a jury.

The talk of Prof. Anne Bergner was very interesting. She gave us some insides into her research on the Maker Movement and the connection to innovation clusters and innovation in companies. The open source approach in those spaces is a main key for innovation in her opinion and spaces like Fab Labs and their communities have a big influence on this innovation. They provide a



collaborative environment and share ideas within the community and guaranty an innovative climate. Since her research showed that a lot of active Makers are willing to become entrepreneurs and start their own business it might be important for Makerspaces and Fab Labs to offer their members some programs where they can make the next step from Maker to Market and professionalize their product. This is something we are trying with different and new cooperation's with crowdfunding platforms or innovation hubs from Vienna. We try to provide our members with a network they can reach out to when they decide to get on the next level with their projects.

We were glad to see that we are on a good path with our approach in our Fab Lab - Prof. Anne Bergner called it "Kreative und digitale Fitness für alle" and this is what we are trying to do from the beginning. Provide everyone with the chance to get in touch with digital fabrication is one of our main aims - we have a very low threshold access for all age groups and social backgrounds in order to appeal even to those not yet equipped with the relevant prior knowledge.

REPORT ON P2P KNOWLEDGE EXCHANGE

D.T1.3.6

PP3 MakerSpace Garching visit

Authors: D. Pap, V. Veres-Székely, D. Kiskéry, P.
Varga

Version 2

11-2017





Except where otherwise noted, this work is licensed under
<https://creativecommons.org/licenses/by-nc-sa/4.0/>



1. Visit outline

Date:

1/2 June 2017

Venues:

UnternehmerTUM MakerSpace GmbH, Munich, Germany

Visiting Partner represented by:

David Pap, Vidor Veres-Székely, Dániel Kiskéry, Peter Varga

Other Partners attending the same visit: PP2 Happylab, PP5 Brno University of Technology, PP7 Roglab,

PP8 FabLab Slovensko, PP9 FabLab Zagreb

2. Visit report

The majority of first day was spent at MakerSpace Munich. The location has its advantages and disadvantages as well. It is far outside the city, but can be accessed by underground, so it is not completely out of reach. It is right next to the Technische Universität München (Munich University of Technology) so a potential group of users are at hand. However, being in a “school area”, it gets empty on evenings and weekends. We were guided through the MakerSpace in the morning, from 10 am to 1 pm. While the sheer amount and quality of the equipment was impressive enough, for me it was really interesting to see a space directly built



for MakerSpace/FabLab purposes - as it was built for a Tech Shop originally. The venue itself is really well organized, but I did notice the relatively small storage area. Amongst all pieces, our favourites were the waterjet cutting machine and the SLS printer. After the tour, we have learnt about the operation and management of the MakerSpace. It is a privately owned company with income from membership and training fees. There are three types of individual memberships ranging from 125 euros to 65 euros per month. The first one gives full access to the whole MakerSpace provided that the individual completed the training for the specific machine. The second one is the “student version” of the first, giving the same opportunities for 95 euro/month. The third type of membership only grants access to certain parts of the MakerSpace - 3D-printers, laser cutters, the electronic and sewing workshop, just to name a few. This one costs 65 euros. There is a corporate membership costing 4950 euros a year, which gives the opportunity to enlist 20 employees of which two can work at the MakerSpace simultaneously. The training costs are the same as membership fees - 65, 95 and 125 euros respectively, depending on difficulty (beginner, intermediate and advanced). The membership and training fees add up to 85% of total revenue, the remaining 15% being events (e.g. workshops) and selling manufacturing services. MakerSpace is not self-sufficient yet, it would need around 150-200 additional members to break even. There are three main target groups from which they hope to involve those missing memberships: students of TUM, employees of BMW and all the makers interested in working with the high-quality machinery offered by the MakerSpace. They face the same problems every FabLab/MakerSpace does, according to my experience: it is hard to raise awareness about such places, it is hard to involve people who lack an idea/project to realize, and people with low income - for example students - sometimes don't want to invest to a membership and machine education to work on their projects. MakerSpace addresses these challenges with several methods. There are scholarships to financially help students realizing their ideas. Other reach-out methods targeting students are a special type of access called 10-Admission which can be used throughout the year and fits better the students' schedule and special course “THINK-MAKE-START”. The latter worth 3 credits and takes the participants through a start-up-like experience: in three weeks they come up with an idea, prototype it, write a business plan for it and present everything in front of a jury. Employees of BMW and other companies are also hard to reach (BMW alone has several thousand employees in their Munich plant). MakerSpace leaders often hold presentations and workshops to specific divisions of BMW and other companies to raise awareness of MakerSpace and the maker movement.

After the lunch, we had two presentations. First, PP10 associated partner Prof. Anne Bergner presented her study she made for the Bavarian Ministry of Economic about the several kinds of FabLab-like places all around the world. Then PP10 Project Manager Martin Laarmann gave us a speech about Munich's maker ecosystem. There are six “maker-places” in Munich, three are focused in a more traditional ways of DIY (wood- and metalworking, paper/textile/ceramics workshops, etc.), while the other three is more onto digital manufacturing and related activities.

We have visited two of the latter, FabLab Munich and MuMa (Munich Maker Lab). The FabLab Munich is a regular Fablab with the standard equipment and operation model. Felix Tymcik,



the head of FabLab Munich presented us the e-Window, one of the project they have been working on. It is a form of online communication which is peer-to-peer (there is no central server, the data is being encrypted and transferred from computer to computer) and runs on a Raspberry Pi. You can search location and/or field of expertise and it connects you to the other e-Windows, thus helping you to find solutions quickly and efficiently. It was so inspiring to see it working that we have already made plans to build our own piece. The other place, MuMa, is more focused on building a community than being a professional digital manufacturing lab, although they have the standard starter equipment (3D printers, laser cutter, etc.).

On the morning of the second day, we had the chance to participate in a workshop/training of the waterjet cutting machine. Since for the most of us this was the first time to see this kind of machine in action, it was really interesting and inspiring to learn about the specs, tips and tricks.

After the lunch, we had a short talk on MakerSpace members and the hardships MakerSpace leaders face when running the place, and shared our views on these. It was somewhat calming that all FabLabs/MakerSpaces face the same problems and it is not because we do something wrong. We are looking forward to use what we have learnt in Munich during the everyday management of our Fablab.

REPORT ON P2P KNOWLEDGE EXCHANGE

D.T1.3.6

PP5 MakerSpace Garching visit

Authors: Marek Rozehnal, David Palousek

Version 2

11-2017





Except where otherwise noted, this work is licensed under
<https://creativecommons.org/licenses/by-nc-sa/4.0/>



1. Visit outline

Date:

1/2 June 2017

Venues:

Main Venue: UnternehmerTUM MakerSpace GmbH, Lichtenbergstr. 6, Garching,

FabLab Tour: FabLab Munich (Gollierstr. 70), Munich Maker Lab (Dachauerstr. 112f)

Bavarian Dinner: Löwenbräukeller, Stiglmeierplatz, Munich

Host Partner:

PP10-DE UnternehmerTUM MakerSpace GmbH



Agenda:

1. Day: Friday, June, 1th

09:30 - 10:00 Welcome with coffee & networking

10:00 - 13:00 Phill Handy: Makerspace LabTour, future plans and MakerSpace Management Practices

13:00 - 14:00 Lunchtime

14:00 - 14:30 PP10 Accociated Partner Prof. Anne Bergner: Talk: Maker Spaces Worldwide (= report from a study, Prof. Bergner made for the Bavarian Ministry of Economic)

14:30 - 15:00 Martin Laarmann: Talk: Munich's Maker Ecosystem

15:00 - 19:00 Tour: Visit of several Makerspaces in Munich (with another talk about the eWindow-Project which connects FabLabs & Makerspaces by Felix Tymcik from FabLab Munich and a talk on the creative quartier from Frank Sollmann from city of Munich)

19:30 Bavarian dinner

2. Day: Friday, June 2nd

09:00 - 09:30 Welcome with coffee & networking

09:30 - 12:00 Hands on workshop: The waterjet cutting machine in action

12:00 - 13:00 Lunchtime

13:00 - 13:30 Phill Handy about the MakerSpace Member Mix (from private persons to corporate companies)

13:30 - 14:30 open discussion / lessons learned

14:30 end of official visit



2. Management and Organization:

The FabLab - “MakerSpace” is private company located on the outskirts of Munich near the University campus. The Fablab users are mainly commercial entities (large number of customers are from BMW, which is the main sponsor). They are also focusing to hobbyists and students, but it is hard to reach them to participate. So they trying to find new way how to do it and motivate them to use their tools.

From the management's point of view, we have been clarified how the Fablab works, its financing, the feasibility and the development of the project. The main source of money is from membership (60%) then courses (25%), events and service-manufacturing (15%).

As a member you can use every machine you have taken a mandatory security and basic usage class for free - only materials need to be paid accordingly. Machines can be reserved for usage between 4 and 6 hours per day for free.

Costs Machine-Classes:

A beginner 65,- Euro, ca. 2,5 h

B intermediate 95,- Euro, ca. 3,5 h

C advanced 125,- Euro, ca. 4-4,5h

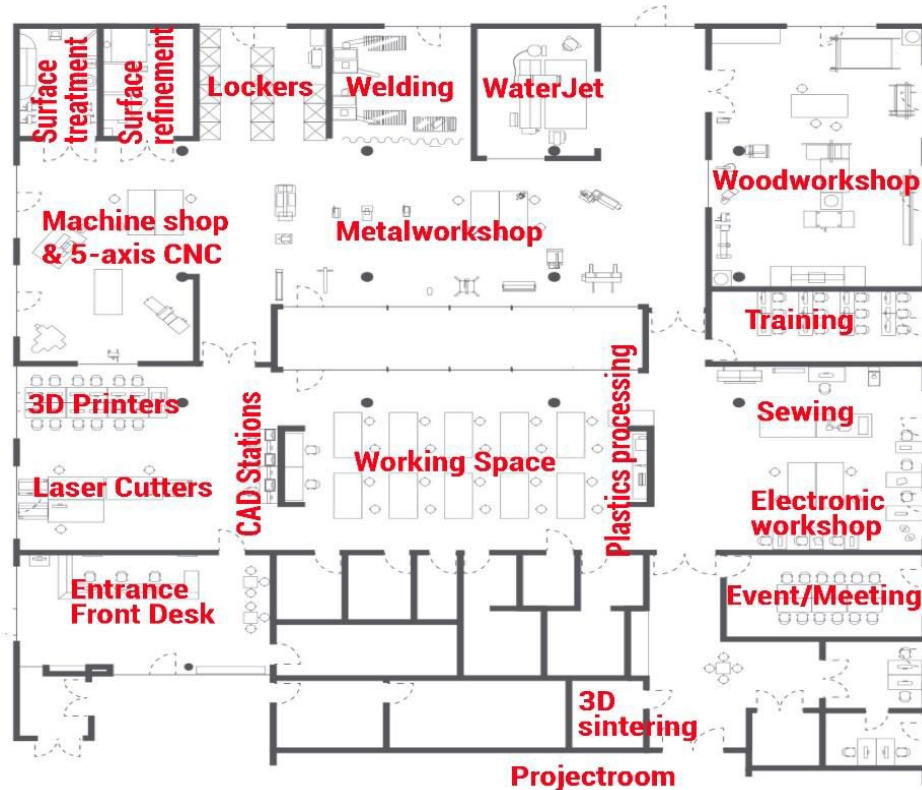
The basic membership access can be obtained at 125 Euros/month. Students pay a reduced fee of 95 Euros/month. There are various other programs (scholarships, case-studies, etc.) for students to be able to access the MakerSpace.

Part of the meeting was also devoted to the useful discussion with other members of Project FabLabNet about the problems how is possible to solve them.

3. Tools and equipment:

MakerSpace has more than 100 tools. To get an overview there is a virtual walkthrough, which you can find [here](#). For specific information on the machines, provided by MakerSpace, [follow this link](#) and click onto the map to find out which machines are available in the area.

What we would like to highlight was the incredible cleanliness of the environment and the machines.



4. Mutual benefit and challenges:

The main mutual issue is how to attract FabLab to student community and motivate them to work on their own projects. There was a discussion about how to select appropriate fee level for them, how to help them with non-technical issues (business, financing, law, etc...), how to connect them between themselves and toward to business sector.

5. Conclusion

Visit of Maker Space was really inspirational. We have seen how a huge Fablab can work on a commercial basis. This Fablab is of a different character than ours, but some of the problems it faces are very similar as ours. So we came home inspired by several thoughts, that we could integrate in our Fablab.

REPORT ON P2P KNOWLEDGE EXCHANGE

D.T1.3.6

PP7 MakerSpace Garching visit

Author: François Friderich

Version 2

11-2017





Except where otherwise noted, this work is licensed under
<https://creativecommons.org/licenses/by-nc-sa/4.0/>



Content

1. Visit outline	3
1.1. Date:	3
1.2. Venues:	3
1.3. Host Partner:.....	3
1.4. Attendees:	3
1.5. Agenda:	4
1.6. Photos and videos of this visit:	5
2. Tour of MakerSpace Garching	8
2.1. Location & Munich Maker Ecosystem	8
2.2. Tools and equipment	9
2.3. Management and Organization of the FabLab, Communication	11
2.4. FabLab's Beneficiaries/Specific Target Group/Clients	11
2.5. FabLab work: projects, programmes and connections/cooperation	12
2.6. Mutual benefit and challenges - Exchange of info	12



1. Visit outline

1.1 Date:

1/2 June 2017

1.2 Venues:

Main Venue: UnternehmerTUM MakerSpace GmbH, Lichtenbergstr. 6, Garching, FabLab Tour:
FabLab Munich (Gollierstr. 70), Munich Maker Lab (Dachauerstr. 112f) Bavarian Dinner:
Löwenbräukeller, Stiglmeierplatz, Munich

1.3 Host Partner:

PP10-DE UnternehmerTUM MakerSpace GmbH

1.4 Attendees:

PP2 AT HappyLab PM Roland Stelzer FM Karim Jafarmadar

PP3 HU FabLab Budapest PM & FM David Pap CM Peter Varga Thematic Expert Vidor Veres-Székely
Thematic Expert Daniel Kiskery

PP5 CZ Brno University of Technology PM David Palousek PM (new) Marek Rozehnal Expert David Skaroupka
Expert Daniel Koutny

PP7 SI RogLab PM François Friderich



PP8 SK Slovak Scientific and Technical PM Inform. Centre - Fablab Slovensko PM Jozef Vasko Expert Hanka Kubanova

PP9 HR FabLab Zagreb PM Roberto Vdović Zrinka Valetić

PP10 DE UnternehmerTUM MakerSpace PM Phill Handy PM Martin Laarmann CM Lana Handy

AP/PP10 DE University of Applied Sciences Coburg Expert Prof. Anne Bergner

1.5 Agenda:

1. Day: Friday, June, 1th

09:30 - 10:00 Welcome with coffee & networking

10:00 - 13:00 Phill Handy: Makerspace LabTour, future plans and MakerSpace Management Practices

13:00 - 14:00 Lunchtime

14:00 - 14:30 PP10 Associated Partner Prof. Anne Bergner: Talk: Maker Spaces Worldwide (= report from a study, Prof. Bergner made for the Bavarian Ministry of Economic)

14:30 - 15:00 Martin Laarmann: Talk: Munich's Maker Ecosystem

15:00 - 19:00 Tour: Visit of several Makerspaces in Munich (with another talk about the eWindow-Project which connects FabLabs & Makerspaces by Felix Tymcik from FabLab Munich and a talk on the creative quartier from Frank Sollmann from city of Munich)

19:30 Bavarian dinner

2. Day: Friday, June 2nd

09:00 - 09:30 Welcome with coffee & networking

09:30 - 12:00 Hands on workshop: The waterjet cutting machine in action

12:00 - 13:00 Lunchtime

13:00 - 13:30 Phill Handy about the MakerSpace Member Mix (from private persons to corporate companies)

13:30 - 14:30 open discussion / lessons learned

14:30 end of official visit

1.6 Photos and videos of this visit:

Video documentation by Jozef Vasko: [click here](#)

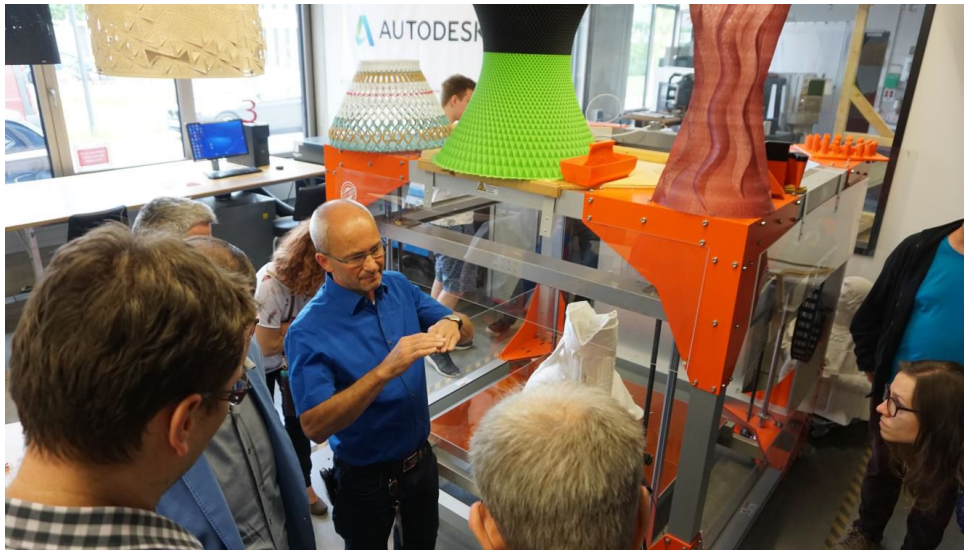
Photos by Jozef Vasko: [click here](#)

Photos by François Friderich: [click here](#)

Photos by Lana Handy & Martin Laarmann: [click here](#)



Phill Handy (PM PP10) explains the FabLabNet partners the MakerSpace



The huge BigRep 3D printer



explaining the CNC mill



Haas 5-Axis CNC mill



PP10 Associated Partner Prof. Anne Bergner with her talk about „Makerspaces worldwide“

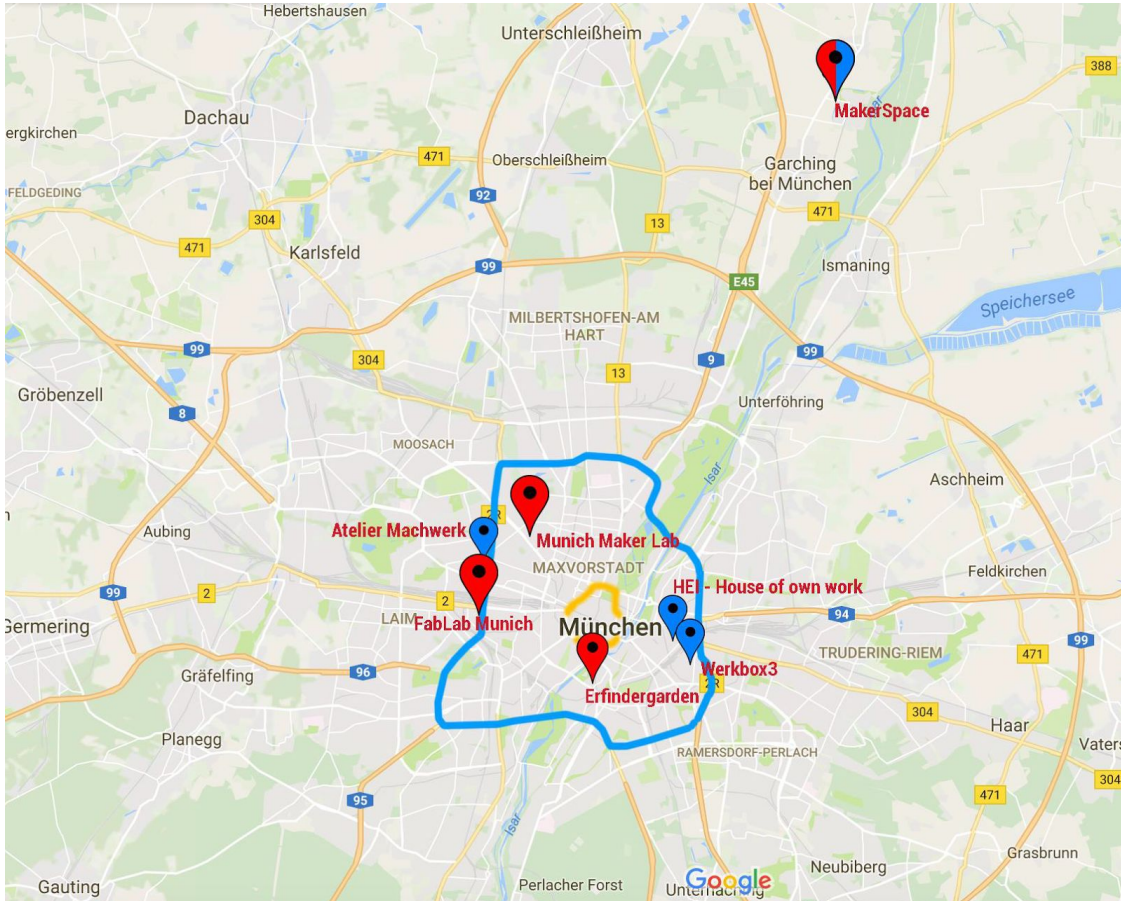
2. Tour of MakerSpace Garching:

2.1 Location & Munich Maker Ecosystem



Photo: M. Ebener / UnternehmerTUM / TUM

MakerSpace is located close to the university campus of the Technical University of Munich (TUM) in the north of Munich. With 1.500 m² it is - at the moment - the biggest makerspace in Germany. Munich has a vivid makerscene with more than 6 other “Do It Yourself”-locations, everyone with its own specific focus.



Munich's DIY institutions are focused either on traditional DIY applications like wood- and metalwork, screen printing, etc. (marked blue in the map) or rather typical FabLab tools, like 3D-printing, electronics/arduino and digital production (marked red in the map).

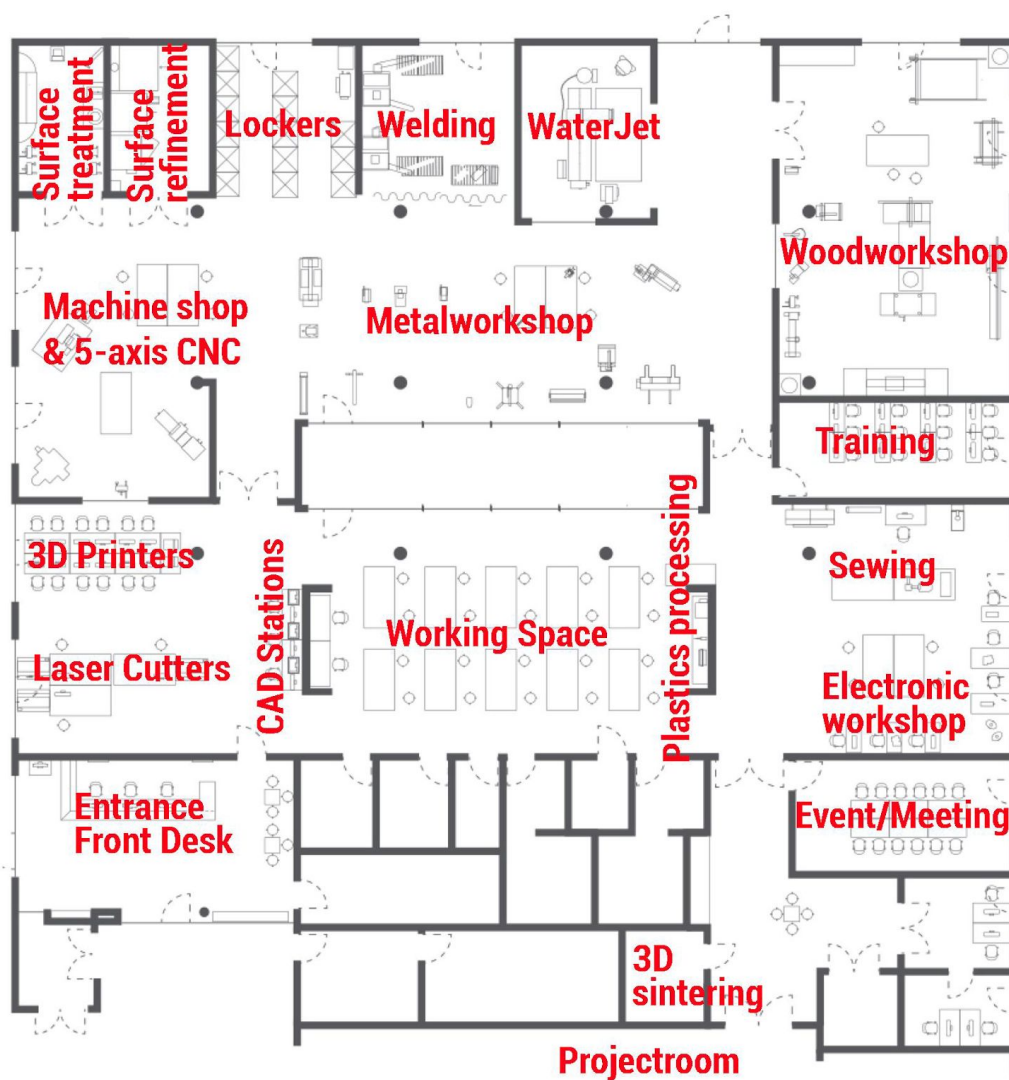
MakerSpace Garching is the only workshop in Munich that combines both areas with high-quality tools in one space.

2.2. Tools and equipment

MakerSpace has more than 100 tools. To get an overview there is a virtual walkthrough, which you can find [here](#). For specific information on the machines, provided by MakerSpace, [follow this link](#) and click onto the map to find out which machines are available in the area.



Example of more information about the WaterJet





2.3. Management and Organization of the FabLab, Communication

MakerSpace is a privately owned company. UnternehmerTUM Makerspace GmbH is a subsidiary of the UnternehmerTUM GmbH which was founded by BMW board member and major shareholder Susanne Klatten in 2002, with the scope of promoting and supporting entrepreneurship in Germany. Starting off with 5 Mio. Euros in 2014/15 MakerSpace invested 2 Mio. Euros in the machines and tools. The remaining 3 Mio. Euros were used to finance rent payments, HR-costs, etc. during the first years. BMW has also bought 300 MakerSpace memberships for their employees.

In March of 2015 MakerSpace was able to move into their Garching building and also start with the training of the basic crew members. Today MakerSpace occupies 37 employees that work in different areas (Workshop Crew, Frontdesk, Events, Marketing and Educational Coordination). The trainers are self-employed.

In order to gain access to the machines at MakerSpace you need to hold a membership and obtain a mandatory security and basic usage class for the machines you want to use. Crew members are around for constant expert support and maintaining the machines.

The basic membership access can be obtained at 125 Euros/month. Students pay a reduced fee of 95 Euros/month. There are various other programs (scholarships, case-studies, etc.) for students to be able to access the MakerSpace. The front Hub-Area which includes laser cutters, 3D-printers, sewing- and electronics area, can be accessed at 65 Euros/month.

As a member you can use every machine you have taken a mandatory security and basic usage class for free - only materials need to be paid accordingly. Machines can be reserved for usage between 4 and 6 hours per day for free.

Costs Machine-Classes:

A beginner 65,- Euro, ca. 2,5 h

B intermediate 95,- Euro, ca. 3,5 h

C advanced 125,- Euro, ca. 4-4,5h

MakerSpace has not yet managed to break even. Revenues can be divided into 60% memberships, 25% education, 7.5% events and 7.5% service-manufacturing (ex. 3D-Printing, etc.).



2.4. FabLab's Beneficiaries/Specific Target Group/Clients

This year marks MakerSpace's second birthday. During these two years more than 12.000 people have been shown around the MakerSpace premises and, through that, have been exposed to the vivid maker-atmosphere of our 1500 m2 of high-tech-prototyping and workshop area.

MakerSpace Munich is situated in the middle of the, so-called, Universitätsstadt which is characterized by the immediate proximity to the Technical University of Munich (TUM) and various renowned companies. Efforts have been made to take the chance of establishing synergy effects between the present companies and various educational, as well as, research institutions. With the university holding 15.000 students TUM students represent a key target group. University students require both, a place where they can apply and try methods they have learnt in class as well as build prototypes for possible projects.

The second major target group MakerSpace is trying to reach out to are BMW employees as well as their apprentices. BMW, as one of the major sponsors of MakerSpace, recognized the potential of having a place where employees can work on projects and try out their own ideas. Avid DIYs and private makers who appreciate the density of high-tech and high-quality machinery in one space represent MakerSpace's third target group.

Despite the great exposure to potential clients MakerSpace is challenged by getting students to acknowledge the potential MakerSpace holds for the development of their hands-on skills. Out of the 15.000 students at TUM roughly 10% have heard about MakerSpace and knows what it is. A typical student mostly comes and goes for classes only and, as public transportation is located directly at campus, never passes the MakerSpace building.

The same is true for the other target groups which most of the time have either not heard of MakerSpace yet or find the geographic location rather challenging (30 minutes outside of the inner city).

2.5. FabLab work: projects, programmes and connections/cooperation

As mentioned above MakerSpace is mostly challenged with getting people exposed to the idea and concept of a high-tech workshop that is open to anyone who wants to make something.

One of the most challenging targeting group are university students who often lack high disposable income to buy a costly membership to work on their projects. MakerSpace is therefore promoting a fast and cost-free access for students through easy-to-get scholarships (Hans-Sauer Scholarship, Zeidler MINT-Maker Scholarship). Another way of promoting the sale of memberships for students is through specials such as 10-Admissions that can be used through out the year and suit the flexibility of a students day-to-day life. In order to make spending time on a project more appealing to students MakerSpace, in cooperation with UnternehmerTUM and the university, has started a 3 credits (ECTS) class called "THINK-MAKE-START". Throughout the three weeks students come up with an idea for a project, that they write a business plan for, prototype at MakerSpace and then present in front of a jury.

The cooperation with UnternehmerTUM as a provider of business and entrepreneurship knowledge is available to all TUM students.



MakerSpace has strong industrial connections to BMW who have, through the purchase of a huge number of memberships which are distributed among their employees, immensely supported MakerSpace and the maker movement.

Other companies use MakerSpace's location potential in the heart of Munich's industrial and research area to show-case current technology/machines to their customers in Southern Germany. HAAS, for example, is currently using MakerSpace as a showroom and for testing their vertical and horizontal Metal CNC Milling Machines.

2.6. Mutual benefit and challenges - Exchange of info

MakerSpace Garsching is definitely the most accomplished fablab within the Project Partners but yet facing challenging sustainability issue. The partnership they have with BMW is a very model, that RogLab could try to apply with some local company, which would like to foster innovation and fabrication set of mind within their staff. The idea is that the company pays for a fixed number of memberships, allowing to offer to his entire staff a free access to the fablab. Though the business ecosystem of Slovenia cannot compare with the Bavarian's one, there are a few relatively big companies in Slovenia which might be interested by the concept. The presentation of the Anne Bergner research concerning the state of art fablab business model in Europe was very interesting. Her way of categorizing fablab business model, comparing them to sport club was very useful to help us each of fablab to better understand in which categories it fits and where it wishes to fit.

3. Mutual benefit and challenges:

The main mutual issue is how to attract FabLab to student community and motivate them to work on their own projects. There was a discussion about how to select appropriate fee level for them, how to help them with non-technical issues (business, financing, law, etc...), how to connect them between themselves and toward to business sector.

4. Conclusion

Visit of Maker Space was really inspirational. We have seen how a huge Fablab can work on a commercial basis. This Fablab is of a different character than ours, but some of the problems it faces are very similar as ours. So we came home inspired by several thoughts, that we could integrate in our Fablab.

REPORT ON P2P KNOWLEDGE EXCHANGE

D.T1.3.4 & 1.3.6

PP8 MakerSpace Garching visit

Authors: Jozef Vasko, Hanka Kubanova

Version 2

11-2017





Except where otherwise noted, this work is licensed under
<https://creativecommons.org/licenses/by-nc-sa/4.0/>



1. Visit outline

Date:

1/2 June 2017

Venues:

Main Venue: UnternehmerTUM MakerSpace GmbH, Lichtenbergstr. 6, Garching, FabLab Tour:
FabLab Munich (Gollierstr. 70), Munich Maker Lab (Dachauerstr. 112f) Bavarian Dinner:
Löwenbräukeller, Stiglmeierplatz, Munich

Host Partner:

PP10-DE UnternehmerTUM MakerSpace GmbH



Attendees:

PP2 AT	HappyLab	PM FM	Roland Stelzer Karim Jafarmadar
PP3 HU	FabLab Budapest	PM & FM CM Thematic Expert Thematic Expert	David Pap Peter Varga Vidor Veres-Székely Daniel Kiskery
PP5 CZ	Brno University of Technology	PM PM (new) Expert Expert	David Palousek Marek Rozehnal David Skaroupka Daniel Koutny
PP7 SI	RogLab	PM	François Friderich
PP8 SK	Slovak Scientific and Technical Inform. Centre - Fablab Slovensko	PM PM Expert	Jozef Vasko Hanka Kubanova
PP9 HR	FabLab Zagreb	PM	Roberto Vdović Zrinka Valetić
PP10 DE	UnternehmerTUM MakerSpace	PM PM CM	Phill Handy Martin Laarmann Lana Handy
AP/PP10 DE	University of Applied Sciences Coburg	Expert	Prof. Anne Bergner



Agenda:

1. Day: Friday, June, 1th

09:30 - 10:00 Welcome with coffee & networking

10:00 - 13:00 Phill Handy: Makerspace LabTour, future plans and MakerSpace Management Practices

13:00 - 14:00 Lunchtime

14:00 - 14:30 PP10 Accociated Partner Prof. Anne Bergner: Talk: Maker Spaces Worldwide (= report from a study, Prof. Bergner made for the Bavarian Ministry of Economic)

14:30 - 15:00 Martin Laarmann: Talk: Munich's Maker Ecosystem

15:00 - 19:00 Tour: Visit of several Makerspaces in Munich (with another talk about the eWindow-Project which connects FabLabs & Makerspaces by Felix Tymcik from FabLab Munich and a talk on the creative quartier from Frank Sollmann from city of Munich)

19:30 Bavarian dinner

2. Day: Friday, June 2nd

09:00 - 09:30 Welcome with coffee & networking

09:30 - 12:00 Hands on workshop: The waterjet cutting machine in action

12:00 - 13:00 Lunchtime

13:00 - 13:30 Phill Handy about the MakerSpace Member Mix (from private persons to corporate companies)

13:30 - 14:30 open discussion / lessons learned

14:30 end of official visit

Photos and videos of this visit:

Video documentation by Jozef Vasko: [click here](#)

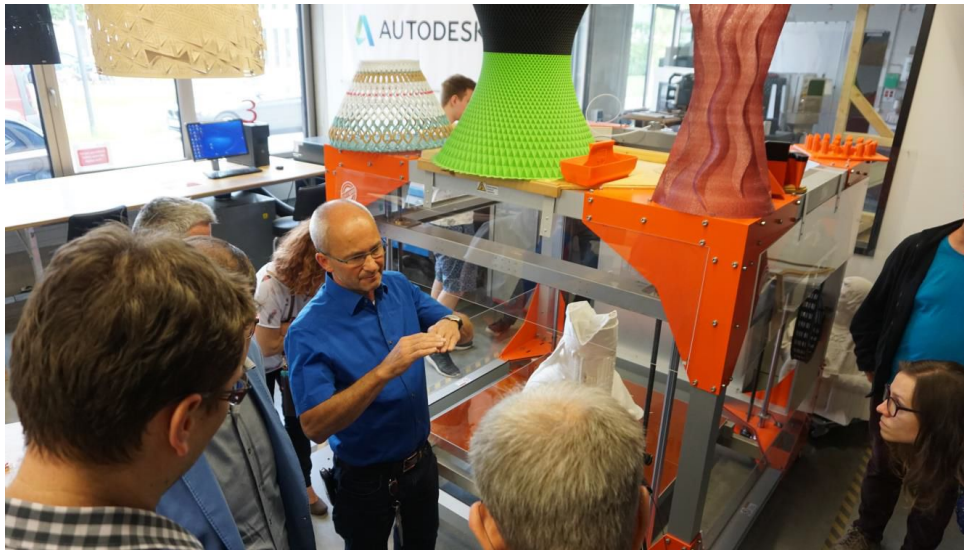
Photos by Jozef Vasko: [click here](#)

Photos by François Friderich: [click here](#)

Photos by Lana Handy & Martin Laarmann: [click here](#)



Phill Handy (PM PP10) explains the FabLabNet partners the MakerSpace



The huge BigRep 3D printer



explaining the CNC mill



Haas 5-Axis CNC mill



PP10 Associated Partner Prof. Anne Bergner with her talk about „Makerspaces worldwide“

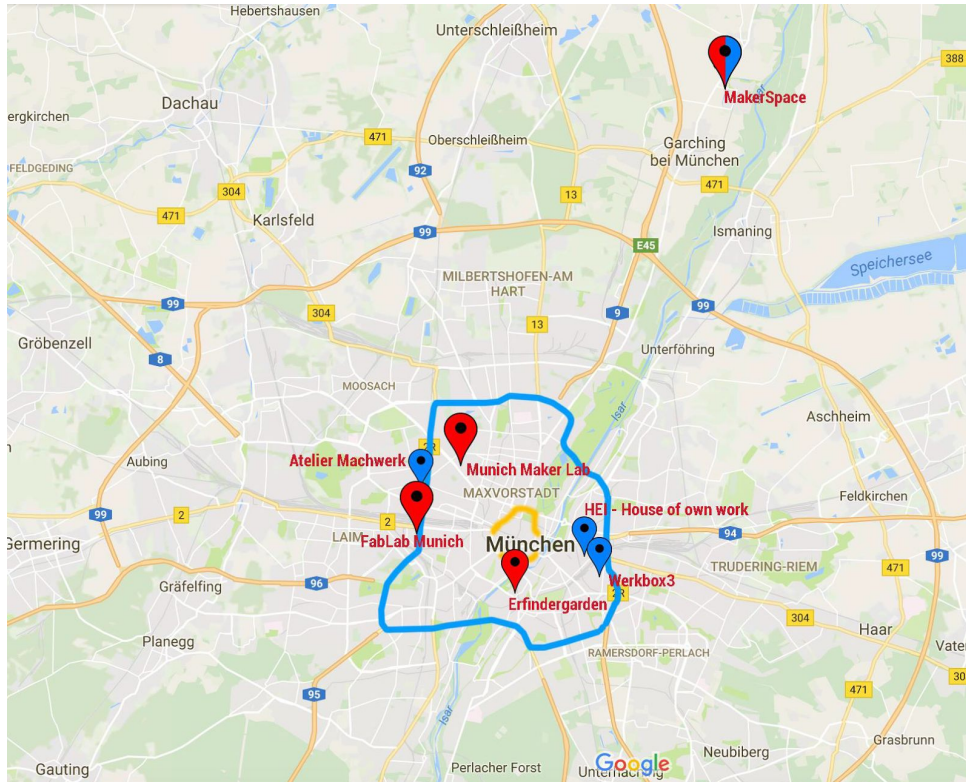
2. FabLab Reality:

2.1 Location & Munich Maker Ecosystem



Photo: M. Ebener / UnternehmerTUM / TUM

MakerSpace is located close to the university campus of the Technical University of Munich (TUM) in the north of Munich. With 1.500 m² it is - at the moment - the biggest makerspace in Germany. Munich has a vivid makerscene with more than 6 other “Do It Yourself”-locations, everyone with its own specific focus.

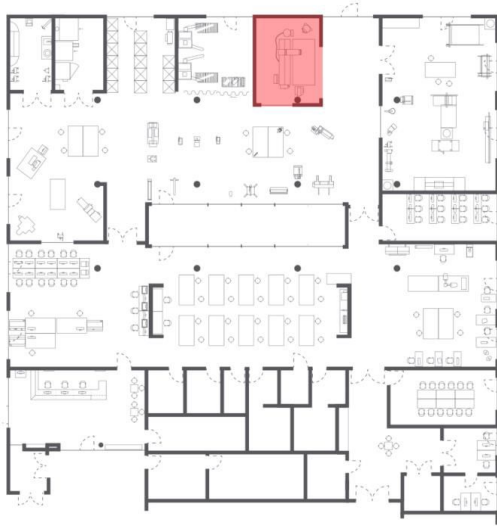


Munich's DIY institutions are focused either on traditional DIY applications like wood- and metalwork, screen printing, etc. (marked blue in the map) or rather typical FabLab tools, like 3D-printing, electronics/arduino and digital production (marked red in the map).

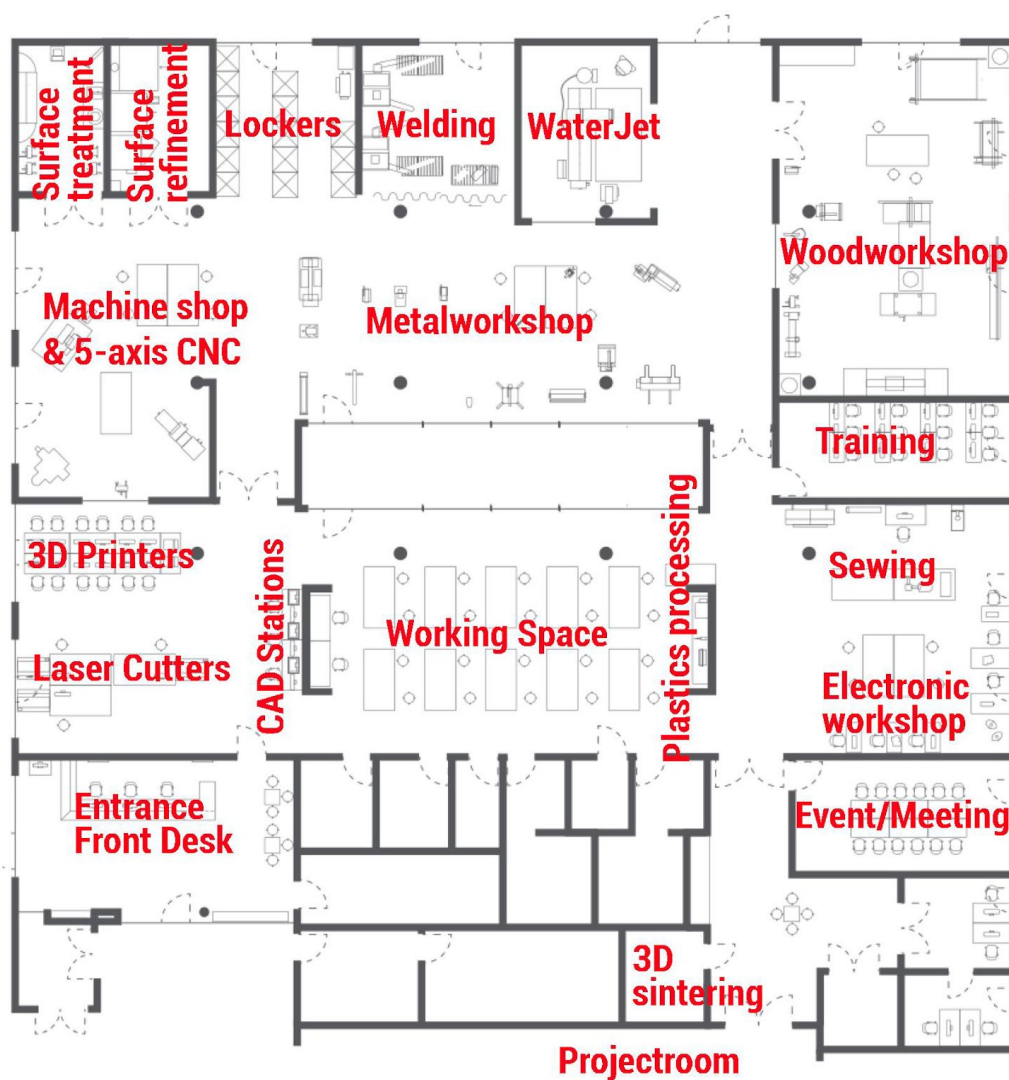
MakerSpace Garching is the only workshop in Munich that combines both areas with high-quality tools in one space.

2.2. Tools and equipment

MakerSpace has more than 100 tools. To get an overview there is a virtual walkthrough, which you can find [here](#). For specific information on the machines, provided by MakerSpace, [follow this link](#) and click onto the map to find out which machines are available in the area.



Example of more information about the WaterJet





2.3. Management and Organization of the FabLab, Communication

MakerSpace is a privately owned company. UnternehmerTUM Makerspace GmbH is a subsidiary of the UnternehmerTUM GmbH which was founded by BMW board member and major shareholder Susanne Klatten in 2002, with the scope of promoting and supporting entrepreneurship in Germany. Starting off with 5 Mio. Euros in 2014/15 MakerSpace invested 2 Mio. Euros in the machines and tools. The remaining 3 Mio. Euros were used to finance rent payments, HR-costs, etc. during the first years. BMW has also bought 300 MakerSpace memberships for their employees.

In March of 2015 MakerSpace was able to move into their Garching building and also start with the training of the basic crew members. Today MakerSpace occupies 37 employees that work in different areas (Workshop Crew, Frontdesk, Events, Marketing and Educational Coordination). The trainers are self-employed.

In order to gain access to the machines at MakerSpace you need to hold a membership and obtain a mandatory security and basic usage class for the machines you want to use. Crew members are around for constant expert support and maintaining the machines.

The basic membership access can be obtained at 125 Euros/month. Students pay a reduced fee of 95 Euros/month. There are various other programs (scholarships, case-studies, etc.) for students to be able to access the MakerSpace. The front Hub-Area which includes laser cutters, 3D-printers, sewing- and electronics area, can be accessed at 65 Euros/month.

As a member you can use every machine you have taken a mandatory security and basic usage class for free - only materials need to be paid accordingly. Machines can be reserved for usage between 4 and 6 hours per day for free.

Costs Machine-Classes:

A beginner 65,- Euro, ca. 2,5 h

B intermediate 95,- Euro, ca. 3,5 h

C advanced 125,- Euro, ca. 4-4,5h

MakerSpace has not yet managed to break even. Revenues can be divided into 60% memberships, 25% education, 7.5% events and 7.5% service-manufacturing (ex. 3D-Printing, etc.).



2.4. FabLab's Beneficiaries/Specific Target Group/Clients

This year marks MakerSpace's second birthday. During these two years more than 12.000 people have been shown around the MakerSpace premises and, through that, have been exposed to the vivid maker-atmosphere of our 1500 m2 of high-tech-prototyping and workshop area.

MakerSpace Munich is situated in the middle of the, so-called, Universitätsstadt which is characterized by the immediate proximity to the Technical University of Munich (TUM) and various renowned companies. Efforts have been made to take the chance of establishing synergy effects between the present companies and various educational, as well as, research institutions. With the university holding 15.000 students TUM students represent a key target group. University students require both, a place where they can apply and try methods they have learnt in class as well as build prototypes for possible projects.

The second major target group MakerSpace is trying to reach out to are BMW employees as well as their apprentices. BMW, as one of the major sponsors of MakerSpace, recognized the potential of having a place where employees can work on projects and try out their own ideas. Avid DIYs and private makers who appreciate the density of high-tech and high-quality machinery in one space represent MakerSpace's third target group.

Despite the great exposure to potential clients MakerSpace is challenged by getting students to acknowledge the potential MakerSpace holds for the development of their hands-on skills. Out of the 15.000 students at TUM roughly 10% have heard about MakerSpace and knows what it is. A typical student mostly comes and goes for classes only and, as public transportation is located directly at campus, never passes the MakerSpace building.

The same is true for the other target groups which most of the time have either not heard of MakerSpace yet or find the geographic location rather challenging (30 minutes outside of the inner city).

Typical clients at fablab.sk at CVTI SR are students. Our primary goal is enlightenment and education. University students work mostly on their projects. Students of primary and secondary schools are mostly on excursions and workshops. The wide public goes to public seminars and trainings.

2.5. FabLab work: projects, programmes and connections/cooperation

As mentioned above MakerSpace is mostly challenged with getting people exposed to the idea and concept of a high-tech workshop that is open to anyone who wants to make something.

One of the most challenging targeting group are university students who often lack high disposable income to buy a costly membership to work on their projects. MakerSpace is therefore promoting a fast and cost-free access for students through easy-to-get scholarships (Hans-Sauer Scholarship, Zeidler MINT-Maker Scholarship). Another way of promoting the sale of memberships for students is through specials such as 10-Admissions that can be used through out the year and suit the flexibility of a students day-to-day life. In order to make spending time on a project more appealing to students MakerSpace, in cooperation with UnternehmerTUM and the university, has started a 3 credits (ECTS) class called "THINK-MAKE-START". Throughout the three weeks students come up with an idea for a project, that they write a business plan



for, prototype at MakerSpace and then present in front of a jury.

The cooperation with UnternehmerTUM as a provider of business and entrepreneurship knowledge is available to all TUM students.

MakerSpace has strong industrial connections to BMW who have, through the purchase of a huge number of memberships which are distributed among their employees, immensely supported MakerSpace and the maker movement.

Other companies use MakerSpace's location potential in the heart of Munich's industrial and research area to showcase current technology/machines to their customers in Southern Germany. HAAS, for example, is currently using MakerSpace as a showroom and for testing their vertical and horizontal Metal CNC Milling Machines.

As a consequence of the visit, in cooperation with universities, we have prepared a semester course on digital production technology. During the semester, students will be able to get acquainted with all the digital production facilities in our Fablab (2D / 3D design, CNC, Vinyl / Laser Cutter, 3D print, electronica, microcontrollers) and implement their personal project. In cooperation with OZ Robotika.sk, we are preparing a seminar on robotics for the general public once a month. A group of young students develops and implements a robot for Robocup Junior in our fablab, and in the same time teaches kids in the field of robotics.

2.6 Mutual benefit and challenges - Exchange of info

The special contribution of Fablab's visits in Munich, Germany, was to meet and share views and approaches to fablabs and their roles in society, business support, and education.

We have gained a wealth of valuable insights, insights and ideas for the management and operation of Fablab at CVTI.

We were intrigued and inspired by experience:

- Mapping of publicly available creative workshops in Slovakia
- Establishing collaboration with organizations in different sectors
- Keeping old and attracting new clients / visitors
- Consider the introduction of a membership contribution.

REPORT ON P2P KNOWLEDGE EXCHANGE

D.T1.3.4 & 1.3.6

PP9 MakerSpace Garching visit

Authors: Roberto Vdović, Zrinka Valetić

Version 2

11-2017





Except where otherwise noted, this work is licensed under
<https://creativecommons.org/licenses/by-nc-sa/4.0/>



1. Visit outline

Date:

1/2 June 2017

Venues:

Main Venue: UnternehmerTUM MakerSpace GmbH, Lichtenbergstr. 6, Garching, FabLab Tour:
FabLab Munich (Gollierstr. 70), Munich Maker Lab (Dachauerstr. 112f) Bavarian Dinner:
Löwenbräukeller, Stiglmeierplatz, Munich

Host Partner:

PP10-DE UnternehmerTUM MakerSpace GmbH



Attendees:

PP2 AT	HappyLab	PM FM	Roland Stelzer Karim Jafarmadar
PP3 HU	FabLab Budapest	PM & FM CM Thematic Expert Thematic Expert	David Pap Peter Varga Vidor Veres-Székely Daniel Kiskery
PP5 CZ	Brno University of Technology	PM PM (new) Expert Expert	David Palousek Marek Rozehnal David Skaroupka Daniel Koutny
PP7 SI	RogLab	PM	François Friderich
PP8 SK	Slovak Scientific and Technical Inform. Centre - Fablab Slovensko	PM PM Expert	Jozef Vasko Hanka Kubanova
PP9 HR	FabLab Zagreb	PM	Roberto Vdović Zrinka Valetić
PP10 DE	UnternehmerTUM MakerSpace	PM PM CM	Phill Handy Martin Laarmann Lana Handy
AP/PP10 DE	University of Applied Sciences Coburg	Expert	Prof. Anne Bergner



Agenda:

1. Day: Friday, June, 1th

09:30 - 10:00 Welcome with coffee & networking

10:00 - 13:00 Phill Handy: Makerspace LabTour, future plans and MakerSpace Management Practices

13:00 - 14:00 Lunchtime

14:00 - 14:30 PP10 Associated Partner Prof. Anne Bergner: Talk: Maker Spaces Worldwide (= report from a study, Prof. Bergner made for the Bavarian Ministry of Economic)

14:30 - 15:00 Martin Laarmann: Talk: Munich's Maker Ecosystem

15:00 - 19:00 Tour: Visit of several Makerspaces in Munich (with another talk about the eWindow-Project which connects FabLabs & Makerspaces by Felix Tymcik from FabLab Munich and a talk on the creative quartier from Frank Sollmann from city of Munich)

19:30 Bavarian dinner

2. Day: Friday, June 2nd

09:00 - 09:30 Welcome with coffee & networking

09:30 - 12:00 Hands on workshop: The waterjet cutting machine in action

12:00 - 13:00 Lunchtime

13:00 - 13:30 Phill Handy about the MakerSpace Member Mix (from private persons to corporate companies)

13:30 - 14:30 open discussion / lessons learned

14:30 end of official visit

Photos and videos of this visit:

Video documentation by Jozef Vasko: [click here](#)

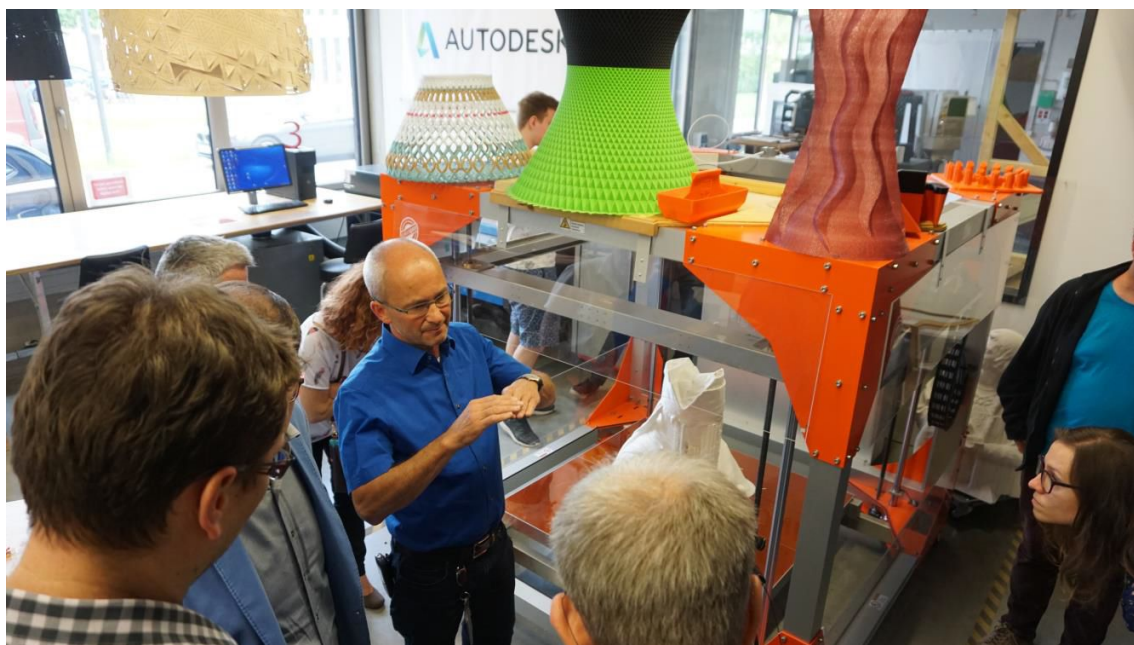
Photos by Jozef Vasko: [click here](#)

Photos by François Friderich: [click here](#)

Photos by Lana Handy & Martin Laarmann: [click here](#)



Phill Handy (PM PP10) explains the FabLabNet partners the MakerSpace



The huge BigRep 3D printer



explaining the CNC mill



Haas 5-Axis CNC mill



PP10 Associated Partner Prof. Anne Bergner with her talk about „Makerspaces worldwide“

2. FabLab Reality

2.1. Location & Munich Maker Ecosystem

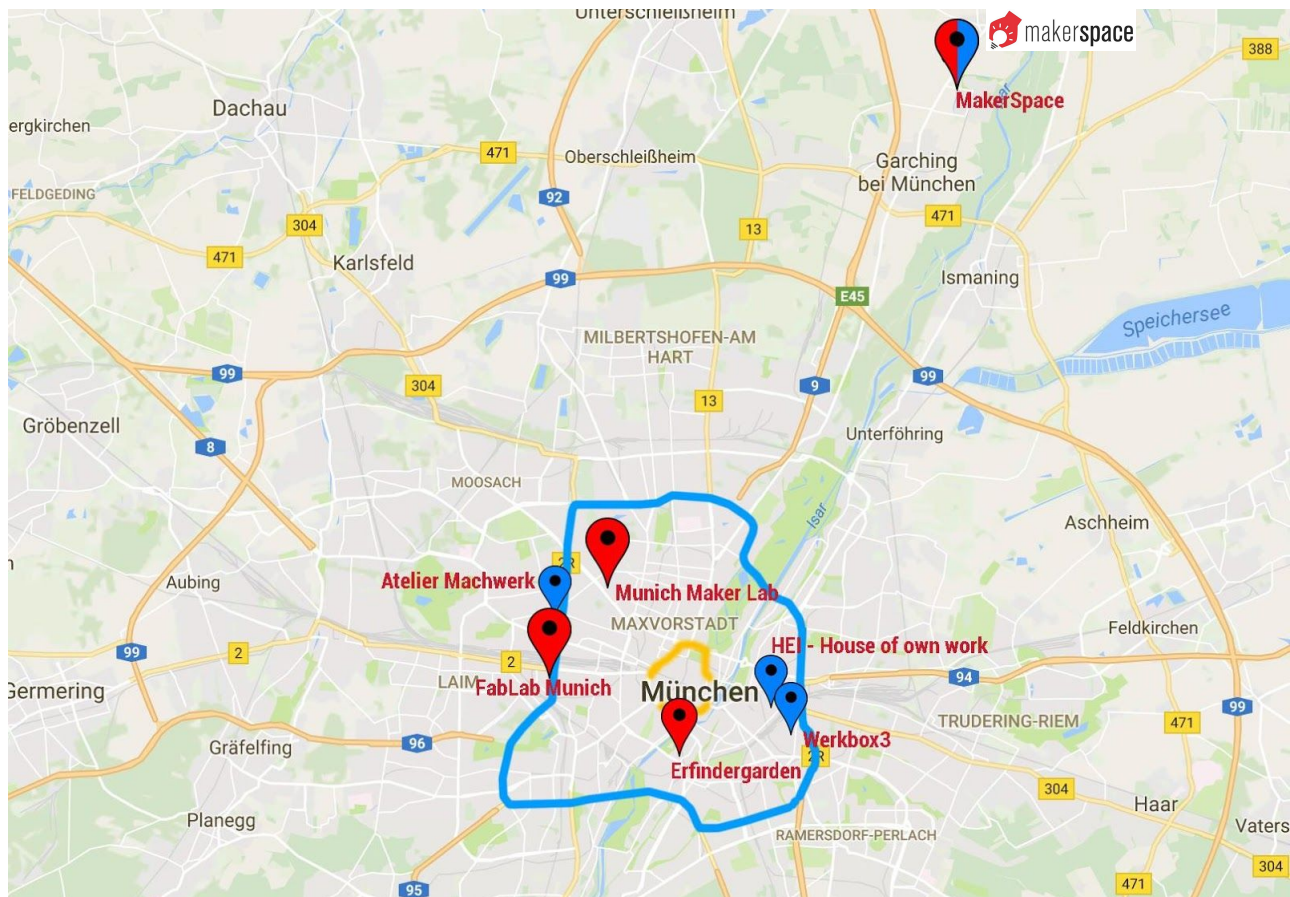


Photo: M. Ebener / UnternehmerTUM / TUM

MakerSpace is located close to the university campus of the Technical University of Munich (TUM) in the north of Munich. With 1.500 m² it is - at the moment - the biggest makerspace in Germany, and it is probably the biggest among partners on the FabLabNet project. Munich has a vivid makers movement with more than 6 other “Do It Yourself”- locations, each one with its own specific focus.

Munich’s DIY institutions are focused either on traditional DIY applications like wood- and metalwork, screen printing, etc. (marked blue in the map) or rather typical FabLab tools, like 3D-printing, electronics/arduino and digital production (marked red in the map).

MakerSpace Garching is the only workshop in Munich that combines both areas with high-quality tools in one space.

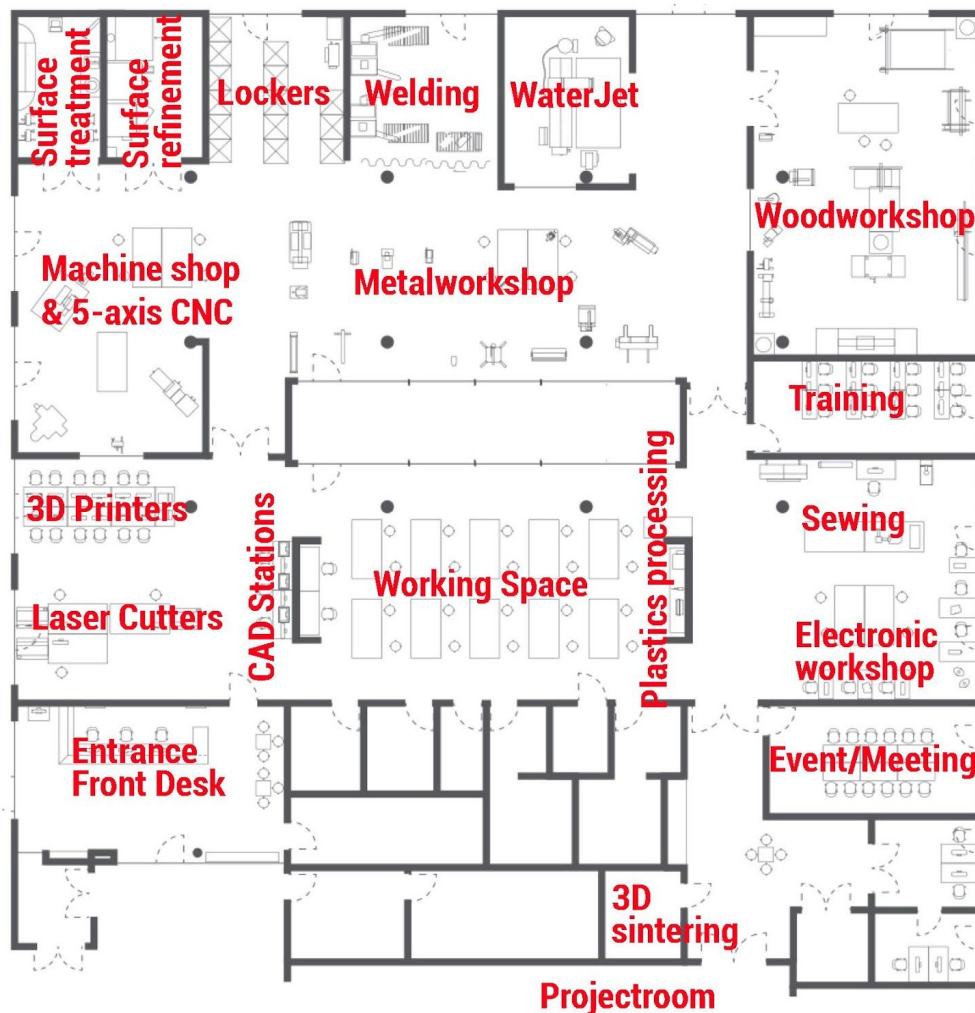




2.2. Tools and equipment

MakerSpace has an impressive collection of tools. Several mil. EUR in equipment is supported by staff and other infrastructure. The Maker-Space provides access to metal and wood workshop, as well as to the state of the art digital additive and subtractive technologies. It is a great space for learning by doing, upon completion of simple 3-8 hours training for usage of the equipment.

Impressive collection is capitalized with big working area all purpose waterjet cutter. We got short workshop how to prepare and use waterjet with special focus on work protection issues. Each participants received one waterjet cut metal pendant with MakerSpace logo.



3. Management, Organization and Communication

MakerSpace is a privately owned company. UnternehmerTUM Makerspace GmbH is a subsidiary of the UnternehmerTUM GmbH which was founded by BMW board member and major shareholder Susanne Klatten in 2002, with the scope of promoting and supporting entrepreneurship in Germany. Starting off with 5 Mio. Euros in 2014/15 MakerSpace invested 2 Mio. Euros in the machines and tools. The remaining 3 Mio. Euros were used to finance rent payments, HR-costs, etc. during the first years. BMW has also bought 300 MakerSpace memberships for their employees.

In March of 2015 MakerSpace was able to move into their Garching building and also start with the training of the basic crew members. Today, MakerSpace has 37 employees who work in different areas (Workshop Crew, Frontdesk, Events, Marketing and Educational Coordination). The trainers are self-employed.

In order to gain access to the machines at MakerSpace you need to hold a membership and obtain a mandatory security and basic usage class for the machines you want to use. Crew members are around for constant expert support and maintaining the machines.

The basic membership access can be obtained at 125 Euros/month. Students pay a reduced fee of 95 Euros/month. There are various other programs (scholarships, case-studies, etc.) for students to be able to access the MakerSpace. The front Hub-Area which includes laser cutters, 3D-printers, sewing- and electronics area, can be accessed at 65 Euros/month.

As a member you can use every machine you have taken a mandatory security and basic usage class for free - only materials need to be paid accordingly. Machines can be reserved for usage between 4 and 6 hours per day for free.

Costs Machine-Classes:

A beginner: 65,- Euro, ca. 2,5 h; B intermediate: 95,- Euro, ca. 3,5 h; C advanced: 125,- Euro, ca. 4-4,5h

MakerSpace has not yet managed to break even. Revenues can be divided into 60% memberships, 25% education, 7.5% events and 7.5% service-manufacturing (ex. 3D-Printing, etc.).

Since use of machines can be expensive in case of problems, broken parts etc. use is covered by insurance, but each member have to cover flat rate of 200 EUR in case something is broken. In some cases this can be obstacle for more frequent use.

3.1. FabLab's Beneficiaries/Specific Target Group/Clients

This year marks MakerSpace's second birthday. During these two years more than 12.000 people have been shown around the MakerSpace premises and, through that, have been exposed to the vivid maker-atmosphere of our 1500 m² of high-tech-prototyping and workshop area.

MakerSpace Munich is situated in the middle of the, so-called, Universitätsstadt which is characterized by the immediate proximity to the Technical University of Munich (TUM) and various renowned companies.



Efforts have been made to take the chance of establishing synergy effects between the present companies and various educational, as well as, research institutions. With the university holding 15.000 students TUM students represent a key target group. University students require both, a place where they can apply and try methods they have learnt in class as well as build prototypes for possible projects.

The second major target group MakerSpace is trying to reach out to are BMW employees as well as their apprentices. BMW, as one of the major sponsors of MakerSpace, recognized the potential of having a place where employees can work on projects and try out their own ideas.

Avid DIYs and private makers who appreciate the density of high-tech and high-quality machinery in one space represent MakerSpace's third target group.

Despite the great exposure to potential clients MakerSpace is challenged by getting students to acknowledge the potential MakerSpace holds for the development of their hands-on skills. Out of the 15.000 students at TUM roughly 10% have heard about MakerSpace and know what it is. A typical student mostly comes and goes for classes only and, as public transportation is located directly at campus, never passes the MakerSpace building.

The same is true for the other target groups which most of the time have either not heard of MakerSpace yet or find the geographic location rather challenging (30 minutes outside of the inner city).

3.2. FabLab work: projects, programmes and connections/cooperation

As mentioned above, MakerSpace is mostly challenged with getting people exposed to the idea and concept of a high-tech workshop that is open to anyone who wants to make something.

One of the most challenging target groups are university students who often lack highly disposable income to pay for a costly membership to work on their projects. MakerSpace is therefore promoting a fast and cost-free access for students through easy-to-get scholarships (Hans-Sauer Scholarship, Zeidler MINT-Maker Scholarship). Another way of promoting the sale of memberships for students is through specials such as 10-Admissions that can be used throughout the year and suit the flexibility of a student's day-to-day life. In order to make spending time on a project more appealing to students, MakerSpace, in cooperation with UnternehmerTUM and the university, has started a 3 credits (ECTS) class called "THINK-MAKE-START". Throughout the three weeks students come up with an idea for a project, that they write a business plan for, prototype at MakerSpace and then present in front of a jury.

The cooperation with UnternehmerTUM as a provider of business and entrepreneurship knowledge is available to all TUM students.

MakerSpace has strong industrial connections to BMW who have, through the purchase of a huge number of memberships which are distributed among their employees, immensely supported MakerSpace and the maker movement.

Other companies use MakerSpace's location potential in the heart of Munich's industrial and research area to show-case current technology/machines to their customers in Southern Germany. HAAS, for example, is currently using MakerSpace as a showroom and for testing their vertical and horizontal Metal CNC Milling Machines.



4. Conclusion - Mutual benefits and challenges

Due to the regulated access to the university area, MakerSpace cannot promote their services at the university premises. In comparison to the situation in Croatia, where regulations are more flexible, and university institutions are encouraged to cooperate with commercial companies in order to attract younger members of the community and increase participation of young people, either university students or students of secondary schools. Therefore, for PP9 one of most important target groups according to the main mission will be to attract pupils and students from primary and secondary schools and universities.

It was surprising to learn that MakerSpace Garching finds it challenging to bring students to their makerspace, above all, because membership for students is sponsored, and thus free of charge. In addition to that, they have incredible resources, venue and machinery within easy reach, within a 10-minute walking distance.

The idea of PP9 Fablab.hr started at the Faculty of Architecture, University of Zagreb. The co-founders, realized that a workshop already existed at the Faculty, and that its full potential was not utilized because it was focused on the students of the Faculty of Architecture. The idea was to attract wider community to the workshop and thus a civil association was registered as a non-for-profit organization. However, close connections with University exist, and there are some activities in partnership between Faculty of Architecture and FabLab.hr. Recently, in another H2020 project, Faculty will be a project partner and FabLab.hr will be providing operational resources and conducting activities related to schools and local community.

As opposed to PP10, current problem PP9 is facing is space. If we are hosted by the Faculty of Architecture, we will lose our local community members. Non-university members who wish to visit FabLab.hr on regular basis will not be able to participate in the activities any more. Since we have strong bond with the local community, we try to compensate this with significant number of PopUp FabLab activities involving local community, building connections and widening the network. However, at the moment, this is the most challenging issue FabLab.hr is facing. We are actively working on several options to solve the question of space, and one is our participation in urban regeneration of one suburban district of Zagreb, where new innovative incubation space HUB_S(esvete) is planned. We are also participants of the planning process.

We see many opportunities to cooperate with MakerSpace Garching in the future. From more strategic ones, where we could learn how to set-up the FabLab in a more economically viable way, and how to involve the business sector more intensely. We can also participate in hands-on visits and learn how to use professional machines. However, there are also other possibilities for collaboration. Since there are no similar places with such high-quality equipment in Croatia and close by, a good idea for Croatian companies is to collaborate with TUM MakerSpace. Croatian companies working on developing prototypes and products should use the resources and knowledge available in TUM Makerspace in order to efficiently bring their ideas into prototypes. FabLab.hr is also interested to participate in such activities.