

# FABLAB LISBOA: when a Municipality Fosters Grassroots, Technological and Collaborative Innovation

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After graduating in design from the Sandberg Institute, Bernardo Gaeiras worked as a designer for 5 years and coordinated a FabLab in Amsterdam in 2007-2008. In 2013, he became director of FabLab Lisboa, a public FabLab implemented by the municipality of Lisbon. He also served as an advisor to the Lisbon municipality on FabLabs and creative industries and occasionally worked as a consultant for the World Bank on innovation policy and makerspaces management. Recently, Bernardo Gaeiras was appointed by the Portuguese Secretary State of Industry as co-director of the forthcoming Portuguese Maker Network.

## KEYWORDS

- FABLAB
- INNOVATION
- MUNICIPALITY
- ACCESS TO TECHNOLOGY
- CITIZEN EMPOWERMENT
- SMART CITIES
- ENTREPRENEURSHIP

This article presents the strategy developed by the municipality of Lisbon to foster innovation and entrepreneurship, as a response to the 2008 economic crisis.

The article specifically focuses on the implementation of FabLab Lisboa, a unique space where anyone can come to develop its own project, using state-of-the-art technology and collaborating with other “makers”. By empowering citizens and fostering innovation, FabLabs appear as a key lever to make our cities smarter and anticipate future challenges.

## INTRODUCTION

*FabLabs have emerged recently – in the United States, at the end of the 1990s – and spread out rapidly in many cities across the world: over 650 FabLabs are active in more than 80 countries today. Most often located in cities, FabLabs – a short term for “fabrication laboratories” – are small-scale workshops enabling individuals’ access to digital fabrication technologies. People can access a 3D printer or any other digital machine in order to prototype and test their ideas. By making knowledge and technologies available to any citizen, FabLabs promote a democratized access to innovation and entrepreneurship. As such, they have a key role to play in smart city strategies as they empower citizens and encourage them to innovate and create. In this context, the potential contribution of FabLabs to make our cities smarter is promising and deserves specific attention.*

*In Lisbon, FabLab Lisboa<sup>1</sup> appears as a unique place dedicated to entrepreneurship, and one of the most innovative initiatives of that kind at the European level. To respond to the economic crisis of 2008, the city initiated several initiatives dedicated to entrepreneurship and innovation such as incubators and accelerators. The launch of FabLab Lisboa in July 2013 is fully part of this strategy: the municipality wanted to create a unique place where anyone could have access to technology and become a “maker”.*

<sup>1</sup> <http://fablablisboa.pt/>

## 1. LISBON'S AMBITION: PROMOTE INNOVATION AND ENTREPRENEURSHIP

### 1.1. PUTTING LISBON AT THE CUTTING EDGE OF INNOVATION IN EUROPE

To respond to the economic crisis of 2008 and the rise of unemployment, the municipality of Lisbon designed an integrated strategy focusing on the promotion of entrepreneurship. The objective was to bring together public, private, local and national bodies in order to create new projects and increase the city's competitiveness at an international scale. António Costa, elected mayor of Lisbon in 2007 and now Prime Minister of Portugal, played a key role in implementing this strategy and in creating an ecosystem favorable to creativity, innovation and entrepreneurship. This policy included several initiatives among which:

- **Creation of a Department of Economy and Innovation** at the municipality level in 2011.
- **Development of business incubators to facilitate the launch of start-ups.** StartUp Lisboa<sup>2</sup> for instance, an incubator created by the municipality in 2011 with a specific focus on new technologies, acts as a real innovation hub and gathers a variety of Portuguese and foreign entrepreneurs. The structure offers key support to many entrepreneurs, through the organization of events providing visibility to entrepreneurs and assistance given to many co-working spaces. Mouraria Creative Hub<sup>3</sup>, for its part, is an incubator launched in 2015 and specialized in supporting creative and cultural industries.
- **Fostering of an ecosystem for innovation through the Lisbon Incubator Network** which aims at federating initiatives in favor

<sup>2</sup> <http://www.startuplisboa.com/>

<sup>3</sup> <http://www.cm-lisboa.pt/centro-de-inovacao-da-mouraria-mouraria-creative-hub>

Source: FabLab Lisboa



Over  
**650 FABLABS**  
in more than 80 countries

**2,066 PEOPLE**  
registered to FabLab Lisboa

**40% OF  
BUSINESS IDEAS**  
presented in worldwide start-up  
competitions and open calls to  
business are related to material  
objects (Vs. digital projects)

of entrepreneurship, including incubators and FabLabs, co-working spaces, business angels, etc.

- **Launch of the Lisbon Challenge**<sup>4</sup>, an initiative that selects local start-ups to receive top mentoring and support in different parts of the world (including in Boston, London and São Paulo).
- **Creation of Lisboa Empreende**<sup>5</sup>, a program that supports micro-entrepreneurs in the fields of commerce and services, from development of business plans to access to funding from microfinance institutions. This program received the top prize of the 2015 European Enterprise Promotion Awards (EEPA).
- **Launch of the Lisbon Youth Entrepreneurship Program** which offers education and training for youth in citizenship and ethics, career development, entrepreneurship and financial literacy.
- And, last but not least, **support to the creation of several FabLabs in Lisbon**, including FabLab Lisboa.

Reflection upon the opportunity of launching a FabLab in Lisbon started in 2012. While several initiatives were already existing at the city level (various programs launched by the municipality, development of knowledge in local universities, network of business innovators and incubators, etc.), the municipality realized that there was no place in Lisbon for citizens to develop, share and test ideas related to hardware and product

<sup>4</sup> <http://www.lisbon-challenge.com/>

<sup>5</sup> <http://www.cm-lisboa.pt/investir/empreendedorismo/lisboa-empreende>

## **“LISBON APPEARS AS A DYNAMIC HUB IN TERMS OF ENTREPRENEURSHIP, AND THE ‘NEW PLACE TO BE’ FOR INNOVATION AND CREATIVITY IN EUROPE.”**

development. In this context, FabLab appeared as the ideal solution to bridge the gap between people’s ideas and existing incubators. FabLab Lisboa was created in 2013 as an open workshop to enable everyone to materialize its ideas. This FabLab represents a key element of Lisbon’s creativity and innovation strategy today.

### **1.2. A SUCCESSFUL STRATEGY INTENDED TO BE REPLICATED AT NATIONAL LEVEL**

After several years, results of Lisbon’s strategy are very positive: the city appears as a dynamic hub in terms of entrepreneurship, and the “new place to be” for innovation and creativity in Europe. As a matter of fact, Lisbon attracts innovators from all around the world: the entrepreneurship network Impact Hub6, established in 5 continents, recently announced the opening of a center in Lisbon, as well as the London-based incubator Second Home7. Similarly, Lisbon will host next November the Web Summit 20168, often called “Europe’s largest technology marketplace”, with 42,000 participants expected.

The success of this strategy is internationally recognized: in June 2014, Lisbon received the *European Entrepreneurial Region of the Year 2015* award. It was the first time that this award, attributed by the European Union to regions that promote entrepreneurship and innovation in small and medium enterprises, was given to a city - and not a region9. It gave Lisbon a great boost to develop new initiatives.

Lisbon’s strategy regarding entrepreneurship and innovation should now be replicated at national scale. This is the ambition of our Prime Minister, António Costa, who initiated Lisbon’s innovation policy, before taking national responsibilities. Last spring, he announced his willingness to replicate what he did in Lisbon at the country level – which is very good news. First signals of this ambition are already visible: João Vasconcelos, founder and executive director of StartUP Lisboa, was named as Secretary of State for Industry in November 2015 and a national program for entrepreneurship, named



Source: FabLab Lisboa

StartUP Portugal10, was announced in June 2016 in Oporto. Running until 2020, this program aims at creating an enabling environment for the development of entrepreneurship (international visibility, access to funding, etc.). Among the different initiatives that are part of this nationwide program, there are a National network of Incubators and a National network of FabLabs, which I am currently co-developing and will be formalized soon. For the record, Portugal’s legislation was already very favorable to entrepreneurs. In 2005, the national government implemented a set of measures removing barriers to the setting up of companies: the “Empresa na hora” program for instance enables anyone to set up a company in only 2 hours (it is so far the fastest and easiest registration process in Europe).

FabLabs are expected to play a major role in this strategy and to disseminate in the whole country.

## **2. FABLABS: FOSTERING INNOVATION AND SHARING KNOWLEDGE**

### **2.1. FABLAB: A BOOMING CONCEPT**

The very concept of FabLab appeared at the end of the 1990s at the Massachusetts Institute of Technology (MIT), when a teacher set up a class with one objective: enabling his students to create almost anything, by providing them with state-of-the-art desktop machines. The success of this class was so astounding and the resulting projects so interesting that the concept rapidly expanded and FabLabs started to appear all over the world. There are now more than 650 FabLabs globally11, in developed countries as well as in emerging countries, and their number doubles every one or two years.

6 <https://www.impacthub.net/>

7 <http://secondhome.io/about-us>

8 [http://websummit2016.org/?gclid=CjwKEAjw\\_LG8BRDb1JTxm8uP\\_UwSJA\\_Du\\_8pWqUlfr3h33jGtt67bPMBxiQ0dtqyuvNISrmvLm9Q6RoC3D3w\\_wcB](http://websummit2016.org/?gclid=CjwKEAjw_LG8BRDb1JTxm8uP_UwSJA_Du_8pWqUlfr3h33jGtt67bPMBxiQ0dtqyuvNISrmvLm9Q6RoC3D3w_wcB)

9 The city of Valencia in Spain also received the award the same year.

10 <http://startupportugal.com>

11 The list of FabLabs is available here: <https://www.fablabs.io/labs>

While the concept flourishes worldwide, Portugal is a pioneering country in connecting FabLabs with municipalities – which is, more generally, quite specific to the European context. This particularity lies at the very heart of FabLab Lisboa: it is really an initiative imagined and implemented by *the municipality*, as part of its broader strategy in favor of innovation and entrepreneurship. More and more municipalities are tempted to do so today.

## 2.2. FROM A COMMON APPROACH TO LOCAL APPLICATIONS: A KEY SUCCESS FACTOR FOR FABLABS

All FabLabs share the same basic concepts, materials and functioning. Indeed, to be labelled as FabLab, initiatives must meet certain conditions. The main conditions are:

- Public access to the FabLab, at least part-time: a key requirement as the objective of FabLabs is to democratize access to technologies;
- Subscription to and endorsement of the FabLab charter<sup>12</sup>;
- Common tools and processes, with at least the following capabilities: a laser cutter to make 3D structures, a sign cutter to make antennas and flexible circuits, a high resolution milling machine to make circuit boards and 3D molds, a larger milling machine to make furniture and housing and programming tools for circuit prototyping. Open source software and freeware complete these tools;
- Participation in FabLab global network: creating a FabLab means being part of a global community and collaborating with other FabLabs.

Depending on their level of compliance with these requirements, FabLabs are given a conformity-rating, each criteria being rated from A to C. For instance, FabLab Amsterdam is rated AAAA as it guarantees free public access, refers explicitly to the charter, detains all required tools and processes and is actively involved in the global network.

This standardized approach is a great opportunity that enables to adapt FabLabs to local contexts and local communities' needs. Indeed, knowledge is created at global scale and can easily be shared with all the members of the network. For example, of an India-based FabLab designed an electronic sensor to test milk quality: although this innovation would not necessarily be useful in Lisbon, the knowledge developed to design this electronic sensor could contribute to develop a similar technology adapted to Portugal's context.

The strength of FabLabs really lies in this common ground which strongly facilitates knowledge sharing.

## 2.3. FOCUS ON FABLAB LISBOA: PROMOTE INNOVATION AT CITY-LEVEL

FabLab Lisboa, which has just celebrated its third anniversary in July, is totally aligned with these principles.

We put forward free access to our equipment two days a week (called "OpenDays") to anyone who wants to experiment or prototype after registering on our website (people only have to pay for the materials). Then, our community of makers who want to use the machines on a

more regular basis and for commercial purposes has to pay per hour of use. Still, while our objective is to have a place that is accessible to anyone, we make sure that our prices remain very low, between 10 and 20€ per hour.

Currently, 2 066 people are registered to FabLab Lisboa. If we assume that every user is working on a project, it means that we have helped more than 2000 projects to materialize - which is huge! When writing this article, I was asked to describe two or three projects in order to give readers an idea of what our community can produce. Yet, as FabLabs gives you the opportunity to make *anything*, there are so many different projects that it is merely impossible to pick only two of them... Projects developed in our facility can go from street food cars to open sourced handicraft, jewelry, drones, furniture, prosthesis for children or musical instruments. We sometimes organize events to promote projects designed in the FabLab: it is great to see fifteen or twenty so different projects gathered in the same room!

Besides our community of makers, one of our key objectives is to raise awareness of the general public and to give anyone the willingness and the courage to jump in and to launch their own project. To comply with this objective, we regularly organize workshops, where we convene adults and children in order to trigger their creativity spirit. For instance, we have recently hosted a workshop with local entrepreneurs in the area of "edutainment" where children were taught how to build their own automated little robot car. We are also currently hosting a biweekly workshop where people can learn to program in Python language (for a very modest cost: the entire program, made up of 12 sessions, only costs 5€ - 15€ if the participant does not finish it).

## 3. CHALLENGES AND PROSPECTS FOR THE DEVELOPMENT OF FABLABS

FabLabs currently face four main challenges.

### 3.1. COLLECTING INFORMATION ON PROJECTS

All FabLabs face the same difficulty: getting precise information on the projects designed and developed in their facilities. Indeed, the concept of FabLabs means open spaces and free innovation: everyone can come in, work on a project for one hour and leave. It means that we cannot know what happens in our spaces. Sometimes, we even discover successful projects that have been developed in our own FabLab when they are presented on TV!

<sup>12</sup> <http://fab.cba.mit.edu/about/charter/>



Yet, knowledge sharing is crucial for the ongoing learning process: it is important that users share their experience in order to make the community smarter. FabLabs' ambition is to enable everyone to learn from his/her neighbor. This is one of the key principles of the sharing economy: we share things and we share knowledge.

In order to achieve this goal, it is important to design tools to monitor projects and their results. At the beginning, we were very strict and always asked people to document what they were working on: they had to send us information about their projects to be allowed to come back. Yet, we realized that this requirement threatened the very principle of open access and the appropriation of the place by users, so we finally dropped it. We are currently working on a "Fab Kiosk" to deal with this challenge. The idea is the following: when you enter FabLab Lisboa, you check in on the kiosk and enter some information related to your project: field of work (designer, artist, etc.), quick description of the project, upload of some pictures. The information given is then made available to the rest of the community and can be used for reporting.

**"I OFTEN COMPARE FABLABS TO CONTEMPORARY LIBRARIES WHERE YOU CAN FIND THE KNOWLEDGE YOU NEED, STUDY AND EASILY DEVELOP YOUR OWN PROJECT – IN A NICE AND COLLABORATIVE ENVIRONMENT. OUR MOTTO COULD BE: 'LET'S 3D-PRINT A SOLUTION WHILE HAVING A CUP OF COFFEE.'"**

### 3.2. FINDING NEW SOURCES OF FUNDING

The second concern for FabLabs worldwide is the financing issue: FabLabs continuously have to show that they have a sustainable business model to maintain their activity in order to get funds. Fortunately, the municipality of Lisbon has understood from the beginning the relevance of FabLab Lisboa and the impact it can have on citizens and has provided all necessary means to the continuation of its daily activities. However, most of the time, FabLabs struggle with the financing aspect.

Hopefully, there are more and more funds available, from international organisations - the European Union, the World Bank, etc. - but also from municipalities (Ulan Bator for instance has recently showed interest in federating its community of makers). Yet, to gain access to these sources of funding, FabLabs need to prove their Social Return On Investment (SROI), just like any organization. This can be quite difficult, because of the reporting issue (mentioned above), and also because we always have to find a middle ground between the interest of different stakeholders – the municipality and the general public.

In this context, the endorsement of a FabLab by a municipality (like in Lisbon) is a great opportunity – as long as municipalities are truly committed, both for the FabLab (in terms of financial viability) and public authorities. Indeed, FabLabs are formidable tools serving the interest of the general public in the same way as a library or a swimming-pool. In fact, I often compare FabLabs to contemporary libraries where you can find the knowledge you need, study and easily develop your own project – in a nice and collaborative environment. Our motto could be: *"let's 3D-print a solution while having a cup of coffee"*.

In the future, I really think that there will be a clear difference between cities that will have developed this kind of facilities and the other ones. Cities must innovate to be able to face future challenges: instead of outsourcing, they must invest to improve their in-house facilities and produce better services. This is, in my perspective, a key component of the "smart cities" concept: FabLabs will enable cities to anticipate and imagine their future, in a cross-sectorial perspective.

### 3.3. BUILDING A GLOBAL NETWORK GATHERING ALL FABLABS

Another key issue for FabLabs is to keep on building and feeding a consistent network to share knowledge between FabLabs at national but also at global scale. It was with this aim in mind that FabLab Lisboa organized a national FabLab meeting last January, to enable Portuguese FabLabs to meet and exchange ideas. Besides this event, we are also collaborating with other FabLabs, on a project basis. For instance, we recently mobilized national FabLabs to co-design and co-create a wood pavilion for the annual Maker Fair Lisbon. Because the structure is based on a modular design, its different parts were designed in Oporto FabLab and the file was sent to 6 FabLabs all over Portugal to be machined. The different parts were then transported and brought together into one single massive pavilion at the place of the fair in Lisbon. We didn't know if it would work until the last minute, but it did and it was a very impressive collaborative exercise! The ambition now is to structure this collaboration between FabLabs at national scale. In Oporto in June 2016 was announced the launch of a National network of Incubators and a National network of FabLabs, which I am currently co-developing and shall be officialised soon as the Portuguese Makers Network.

At global scale, there are also efforts to create a community gathering FabLabs. The Fab Foundation<sup>13</sup> has created the FabLab network, to gather a community of makers from over 78 countries.

### 3.4. REINVENTING FABLAB'S IDENTITY: COLLABORATION VS. TECHNOLOGIES

A key issue for FabLabs is to continuously reinvent themselves.

For a long time, FabLabs have mainly been seen as "technology temples" where everyone can have access to state-of-the-art technologies. It is important to stress that they are *much more* than that. FabLabs are not only about technology. Technology evolves rapidly (we are speaking about 3D printers for now, but they did not exist yesterday and will be replaced by new machines tomorrow), and will be easily accessible to everyone in the near future. If one says that FabLabs are just a way to democratize access to technologies, it means that they will disappear as soon as people can afford to buy personal 3D printers. This is complete non-sense. Technology is only an excuse to gather people, but the true purpose of FabLabs is to make people work together and collaborate. They are places that connect three main features - resources, ideas and people – in an emulating and innovative atmosphere. This magic combination is the true inner richness of FabLabs.

This is a crucial challenge: it means that FabLabs have to constantly innovate and listen to their community of makers in order to design new tools and ways to make people work together.

## CONCLUSION

*The strength of FabLabs resides in their ability to make innovation available to anyone. They democratize access to technological tools and machines and, above all, give people the taste to innovate and collaborate. This "openness" is the very essence of FabLabs and we will always keep our doors open to anyone.*

*Yet, FabLabs should also pursue an additional objective: professionalize their services by helping makers to move up from a personal project to a professional and entrepreneurial project. Most of our makers need to be assisted in this transition in order to transform their project into an entrepreneurial venture. This need is already visible in the innovation ecosystem. While most start-ups used to develop digital projects (mobile applications in particular) in the last few years, we are progressively coming back to a more "material" culture where people want to produce objects. 40% of business ideas presented in start-up competitions and open calls to business are related to material objects. This is a challenge for FabLabs as it is much easier to support software applications than to support the creation of products. In order to efficiently help this kind of projects, FabLabs will have to work with partners (incubators and accelerators for instance), and provide their communities with more professional services. This is, in my mind, the future big challenge for FabLabs.*

**"IN THE FUTURE, I REALLY THINK THAT THERE WILL BE A CLEAR DIFFERENCE BETWEEN CITIES THAT WILL HAVE DEVELOPED [FABLABS] AND THE OTHER ONES. (...) THIS IS A KEY COMPONENT OF THE 'SMART CITIES' CONCEPT: FABLABS WILL ENABLE CITIES TO ANTICIPATE AND IMAGINE THEIR FUTURE, IN A CROSS-SECTORIAL PERSPECTIVE."**

<sup>13</sup> <http://fabfoundation.org/>