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# Multidisciplinary Framework on Commons Collaborative Economy

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# DECODE

## DEcentralised Citizens Owned Data Ecosystem

D2.1 Multidisciplinary Framework on Commons Collaborative Economy

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# Executive Summary

The collaborative economy (or collaborative platform economy) is used as a "floating signifier" for interactions among distributed groups of people supported by digital platforms that enable them to exchange (matching supply and demand), share and collaborate in the consumption and production of activities leveraging capital and goods assets, and labour. It is growing rapidly and exponentially, creating great interest, and has become a top priority for governments around the globe.

However, it suffers from important challenges. We would like to highlight and address two of these challenges with this work: (1) platform collaborative economy is creating high sustainability expectations for its potential to contribute to a sustainable development of society, and for its potential to contribute to the democratization of economy. However, platform collaborative economy lacks a holistic and multidisciplinary framework for assessment of these sustainability and pro democratization qualities. Furthermore, the sustainable design of platform has considered questions of technological and economic aspects, but has not integrated other sustainability relevant questions, such as environmental impact, gender and inclusion, or legal implications, lacking a proper multidisciplinary perspective to platform economy.

(2) There is a confusion about the platforms which present themselves as collaborative while actually they are not; and similar uncertainties and ambiguities associated with diverse models. The disruptive impact of the best known platform economy model, that of Unicorn extractionist corporation platforms like Uber and Airbnb, is provoking huge controversy (Codagnone et al., 2016). Successful "alternative" and truly collaborative models exist, such as open commons, platform cooperativism and decentralized organizations based on a social economy and open knowledge, but these have received neither policy nor research attention. Additionally, there is a lack of a classification system that helps to establish the difference between the different models.

In order to contribute to address these challenges, this work primarily will provide a **commons balance of the platform collaborative economy**. The commons balance is an analytical tool that helps to characterize the platforms, differentiate models by visualizing the commons qualities of platform collaborative economy initiatives, and provide insights of the sustainability implications of their design and performance from several perspectives. This commons balance considers the dimensions of governance, economical strategy, technological base, knowledge policies, and social responsibility towards the externalities of the platforms.

On the basis of the commons balance of collaborative platforms economy, **commons collaborative economy** can be defined as a tendency, a set of qualities, and a modality of collaborative platform economy - regarding both the design and the performance of the process - characterized by a commons approach regarding the dimensions of governance, economic strategy, technological base, knowledge policies, and social responsibility of the externalizations impacts of the platforms. In this regard, commons collaborative economy is characterized by favouring: 1) peer to peer relations -in contrast to the traditionally hierarchical command and contractual relationships detach from sociability, and menelly mercantile exchange - and the involvement of the community of peers generating in the governance of the platform; 2) it is based on value distribution and governance among the community of peers, and the profitability is not its main driving force; 3) it developed over privacy aware public infrastructure, and results in the (generally) open access provision of commons resources that favour access, reproducibility and derivativeness; 4) and, finally, the responsibility with the externalities generated by the process.

The design of the commons balance is informed and based on a multidisciplinary analysis and state of the art of the collaborative economy from an economic, environmental, gender and inclusion, legal and policy perspectives, and an empirical analysis of most prominent cases of commons collaborative economy, as well as the empirical analysis of the case of Barcelona commons collaborative economy ecosystem. The applicability of the commons balance will be illustrated in the deliverable with 10 cases of collaborative

economy at Barcelona. In this regard, we provide first operationalization of the common balance, with a set of basic indicators applied to the 10 cases.

The presented commons multidisciplinary balance of collaborative economy, and the definition of the commons collaborative economy, constituted the first working progress version. In a following work, we will further develop the operationalization of the commons multidisciplinary balance, with a codebook of 150 indicators, and a design larger sample of 100 cases (available in Annex II). On the base of this empirical work, we will review the theoretical work (commons balance dimensions), and we will be able to provide a qualitative and quantitative analysis of the interrelations between the different dimensions considered. For example, the tread off or reinforcing relationship that might be between business models, technological design, governance, or/and externalization effects.

The commons balance is intended to be applied to the empirical analysis and characterization of the opposite model of platform economy, extractionist capitalist platforms like Uber and Airbnb. We did not prioritize this and performed this operation and provided a specific characterization of unicorn like extractionist model of platform economy, as the work is intended to inform a commons oriented platform design. However, we will also retake this work in the further developments.

In this regard, this deliverable should not be read as an end, but as **a starting point** with further theoretical and empirical elaborations in plan, which will take the form of a book by the end of 2017.

## Organization of this deliverable

This work is organized in three sections. The first section, which is the core of the deliverable, provides the multidisciplinary framework, while the other two sections and annexes are complementary and informative to the first section. The first section (section 1) provides an introduction (chapter 1.1) to the whole material, and argumentation on the necessity to overcome current frameworks with a multidisciplinary perspective, and finally, presents the commons multidisciplinary balance of the collaborative economy, while chapter 1.2 provides an application of the commons balance in 10 cases from Barcelona. This section is the core of the deliverable and covers the objectives of the deliverable - builds a multidisciplinary framework of the commons collaborative economy. The two following sections are complementary, and are informative in order to provide the base of the analysis presented at section 1. In this regard, reader should focus on the first section and consult the others in case of interest.

A second section of multidisciplinary analysis and state of the art provides a set of chapters with the different disciplinary analysis: environmental sustainability perspective (chapter 2.1), gender and discrimination perspective (chapter 2.2), from an economical business model perspective (chapter 2.3), and a final part, provides a state of the art from a public policy perspective, in concrete, with a legal and regulatory analysis and public policy innovations perspective (chapter 2.4).

From this second section, it is worth highlighting that chapter 2.1 provides an overview of the sustainability frame of collaborative economy (specifically going beyond the environmental aspect), and that chapter 2.3, the economic analysis extended chapter, provides a revision of the literature on business models and open business models, but also an empirical analysis based on the commons balance to the current most advanced areas of collaborative economy (FLOSS, digital content commons, open hardware, and platform cooperatives), and then focuses its analysis on open data business models.

A third part provides a focus on the Barcelona commons collaborative economy ecosystem, providing empirical insights on current stage of development of blockchain in the city (chapter 3.1) and an assessment of blockchain potential to transform the collaborative economy (chapter 3.2), FLOSS developments in the city (which should be considered as a very preliminary material) (chapter 3.3), and a social mobilization analysis of the situation regarding reactions and responses to AirBnb externalities impact in the urban transformation of the city (chapter 3.4).

In addition, and as a support material for the reader, a glossary of the key concepts regarding commons collaborative economy is available as Annex I. It includes definitions of: Blockchain; Bundle of rights;

Collaborative Economy or collaborative platform economy; Collaborative Economy Platforms; Commons-Based Peer Production (CBPP); Commons Collaborative Economy; Decentralized Autonomous Organization (DAO); Data Common; Digital Commons and Digitally Supported Commons; Initial Coin Offering (ICO); Free License; Open Cooperativism; open cooperative; Open Data; Platform cooperativism and platform cooperative; Smart Contracts; Start-ups, and Unicorn Model.

# Part 1 - Introduction

## 1.1 Multidisciplinary Commons Collaborative Economy Framework: A Commons Balance of the Collaborative Economy

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### *1.1.1 Introduction*

Uber is a platform for matching of drivers with a car and those in search of a ride. After seven years, the company is estimated to be worth $62.5 billion. Fairmondo is a platform that matches those offering ethical products with those searching for these. In three years, it has grown into a community of more than 12.000 users, and two million products. Both are examples of the collaborative economy -also known as the sharing economy- but they represent different modalities: Uber is a private, incorporated company that maximizes profit (known as the Unicorn model of platform economy), while Fairmondo is a member-owned cooperative, based on open source and environmentally friendly products, that maximizes community building (known as the commons oriented collaborative economy model). What differentiates them? May they drive us towards diverse sustainable future scenarios? Do these different platform economy modalities have diverse policy implications?

The term collaborative economy or collaborative platforms economy (which only under particular conditions can be considered collaborative and commons oriented) refers to the exchange (matching supply and demand), share and collaborate in the consumption, and production of capital and labour among distributed groups supported by a digital platform. It is growing rapidly and exponentially, and has become a top priority for governments around the globe (i.e. European Commission, 2016). However, it suffers from important challenges. We would like to highlight and address two: (1) platform collaborative economy is creating high sustainability expectations for its potential to contribute to a sustainable development of society (Algar, 2007; Botsman & Rogers, 2010; Cohen & Kietzmann, 2014; Heinrichs, 2013), and for its potential to contribute to the democratization of economy (Fuster Morell, 2016a). However, platform collaborative economy lacks a holistic framework for assessment of these sustainability and pro democratization qualities. Furthermore, the sustainable design of platform has considered questions of technological and economic aspects, but has not integrated other sustainability relevant questions, such as environmental impact, gender and inclusion, or policy implications, lacking a proper multidisciplinary perspective to platform economy. (2) There is a confusion about the platforms which present themselves as collaborative while actually they are not; and similar uncertainties and ambiguities associated with diverse models. The disruptive impact of the best known platform economy model, that of Unicorn extractionist corporation platforms like Uber and Airbnb, is provoking huge controversy (Codagnone et al., 2016). Successful "alternative" and truly collaborative models exist, such as open commons, platform cooperativism and decentralized organizations based on a social economy and open knowledge, with examples like Fairmondo, but these have received neither policy nor research attention. Additionally, there is a lack of a classification system that helps to establish the difference (see Table 1.1: With examples of Collaborative platforms Economy models).

Table 1.1: Examples of Collaborative Economy models[1]

| Collaborative Economy Models | Open Commons | Unicorn model | Platform cooperativism |
|---|---|---|---|
| | Wikipedia, GOTEO | UBER, airbnb | fairmondo, Stocksy United |

In order to contribute to address these challenges, this work primarily will provide a commons balance of the platform collaborative economy. The commons balance is an analytical tool that helps to characterize the platforms, differentiate models by visualizing the commons qualities of platform collaborative economy initiatives, and provide insights of the sustainability implications of their design and performance from several perspectives. This commons balance considers the dimensions of governance, economical strategy, technological base, knowledge policies, and social responsibility towards the externalities of the platforms.

## Organization of the introduction

This introductory chapter will follow with three distinctive parts: first part will provide an argumentation of the necessity to build a commons balance. Section 1.1.2 will provide a review of the state of the art on the commons oriented models open commons and platform cooperativism models, and which limitations from these frames bring us to build a commons multidisciplinary balance. Then, section 1.1.3 depart from collaborative economy frame and review how far there has been previous attend to consider its sustainability, and the necessity to incorporate a multidisciplinary framework on the sustainability perspective to the collaborative economy. Second part of the introduction will introduce the key content of this deliverable: the commons balance of collaborative economy (section 1.1.4).

Lastly, the third and final part, will provide a complementary state of the art of diverse dimensions present at the commons balance. This part will provide an introductory summary to the multidisciplinary state of the art of what do we know on diverse dimensions considered at the commons balance that are later on extensively presented at the following chapters: social responsibility towards the externalities (in particular, environmental, presented in detail in chapter 2.1), and gender and inclusion (chapter 2.2), a review of the business models of the collaborative economy on digital and digitally-supported commons and open data (chapter 2.3), and legal, public policies and regulatory implications, in concrete, a legal analysis of the collaborative economy (chapter 2.4).

Finally, the chapter has a final section which introduces insights of the analysis of Barcelona commons collaborative economy ecosystem case study (while Annex II provides a complete sample of 100 of Barcelona case).

In addition, and as a support material for the reader, a glossary of the key concepts regarding commons collaborative economy is available as Annex I. It includes definitions of: Blockchain; Bundle of rights; Collaborative Economy or collaborative platform economy; Collaborative Economy Platforms; Commons-Based Peer Production (CBPP); Commons Collaborative Economy; Decentralized Autonomous Organization (DAO); Data Common; Digital Commons and Digitally Supported Commons; Initial Coin

[1] Wikipedia wikipedia.org; Goteo crowdfunding goteo.org; Uber "taxi" service uber.com; Airbnb rentals: airbnb.com; Fairmondo marketplace fairmondo.uk; Stocksy, freelance artists stocksy.com

Offering (ICO); Free License; Open Cooperativism; open cooperative; Open Data; Platform cooperativism and platform cooperative; Smart Contracts; Start-ups, and Unicorn Model.

### *1.1.2 A commons balance in order to distinguish between models: open commons and platform cooperativism models of collaborative economy*

The collaborative economy -also given, among many others, the labels of collaborative consumption (Botsman & Roger, 2010), access based consumption (Bardhi & Eckhardt, 2012), or commons based peer production (Benkler, 2006)– is used as a "floating signifier" for **interactions among distributed groups of people supported by digital platforms** that enable them to exchange (matching supply and demand), share and collaborate in the **consumption and production** of activities leveraging capital and goods assets (i.e. money, time, skills and equipment, cars and real estate, among others), and labour (i.e. skills, time, knowledge, interest, among others). The several available characterizations of collaborative economy point to **the diverse range of activities it involves** (Cohen & Muñoz, 2016; Hamari et al., 2016; Martin, 2016; Schor & Fitzmaurice, 2015; Schor et al., 2014). Some of the differentiation characterized concerns interaction modalities (i.e. peer-to-peer or P2P vs. business-to-consumers or B2C), type of activity (i.e. renting, buying, sharing, among others) and type of asset being exchanged (i.e. capital vs. labour). However, the differentiations based on the collaborative, pro common interest, and economical democracy quality -or how value is governed and distributed- have not aroused enough attention or empirical interest. This remains the case despite the rhetoric around sharing and collaboration that bring together highly profitable companies alongside voluntary gift-giving exchange, which has generated controversies in the media (Codagnone et al., 2016). In this contribution we aim to provide a framework for distinguishing between models.

The model of some of the platforms raises criticism concerning their governance and the way value is generated and appropriated, with the argument being made that, while users bring to the platforms some of the fundamental assets that create value, the profits derived are appropriated by the restricted group of platform owners, thus degrading labour, exacerbating inequality and commodifying daily life (Schor, 2016). Some authors claim that the majority of commercial platforms are improperly described as part of the “collaborative economy” (Belk, 2014). Others point to the relevance of other value governance modalities and the potential of collaborative economy to generate alternative modalities of economic enterprise based on shared value (Scholz, 2016). Furthermore, there is the risk in expanding economic logic to larger ambits in society, inserting commodified exchange into areas that were previously under a social relation logic (Morozov, 2015). To have a proper understanding and a tool to distinguish the diverse democratic models and types of value governance of collaborative economy, their potential policy implications, as well as their effects, may help to inform appropriate policies, actors in the field, and technological development. However, empirical analysis of collaborative economy (with the exception of Couchsurfing and Wikipedia) and public debate are focused mainly on the most visible “unicorn” modality, and primarily on a limited set of cases (mainly Airbnb and Uber, as well as labour markets such as TaskRabbit or oDesk) (Cheng, 2016). Still there are some work developed on the common model and more recent platform cooperativism models.

#### Commons model: Commons based peer production

There is already an area of studies focused on the open commons model, known as commons based peer production (CBPP) (Benkler, 2006). Some authors see CBPP as a precedent to the collaborative economy frame (such as, Fuster Morell, 2016a), while others (such as Botsman & Roger, 2010) ignore this previous trajectory. In fact, current investigations under the label of collaborative economy have not engaged or been crossed with the extensive CBPP literature. This contribution aims to help to feed that gap.

In 1990, in an article called “Neither market nor hierarchy: network forms of organization”, W.W. Powell identified a third emerging form of the organisation of production, that is, networks (Powell, 1990), distinct

from the traditional two models considered by economic theory: firms and markets (Coase, 1937; Williamson, 1975). Since then, a rich literature on new forms of economic enterprise has been developed, especially in the sectors more intensively dependent on knowledge, creativity, and innovation such as those impacted by the Internet and digital revolution (Castells, 1996, 2006). Various challenges have been highlighted in the flows of value production, consumption, circulation, and distribution that often escape the ability of traditional systems of accounts and statistical surveys to measure (Brynjolfsson & Saunders, 2009; Cowen, 2011). During the 2000s, a new literature contributed to enlarging the evidence and understanding about the **emergence of unconventional forms of production**, with studies inspired by the unexpected success of initiatives like Free/Libre and Open Source Software (FOSS or FLOSS) and Wikipedia (Raymond, 1999; Benkler, 2002; Weber, 2004). The EU's own research maintained leadership in this field with projects such as FP5's FLOSS, FP6's FLOSSMETRICS, and FP7's FLOSS Include among several others.

To frame these new unconventional forms of production, several proposals have been advanced with concepts such as P2P networks (Bauwens, 2005), cloud culture (Leadbeater, 2010), produsage (Bruns, 2008), free culture (Lessig, 2004), open culture (Stalder, 2005), open content communities (Reagle, 2010), epistemic communities (Tzouris, 2002), wikinomics (Tapscott & Williams, 2006), open source production (Anthony, Smith & Williamson, 2007), recursive publics ns are also one (Kelty, 2008), and online creation communities (Fuster Morell, 2010). Peer-to-peer relation of the scenarios for the Future Internet envisaged by the Pashmina project (FP7).

However, Yochai Benkler - partly relying on the work on the traditional commons developed by the 2009 Nobel Laureate Elinor Ostrom (1990) – in 2002 proposed and in 2006 systematised a new concept aimed at grasping an emerging and distinctive model of production: **Commons-based peer production (CBPP)** (Benkler, 2002, 2006). Benkler created the term CBPP to describe forms of production in which, with the aid of the Internet, the creative energy of a large number of people is coordinated into large, meaningful projects without relying on traditional hierarchical organisations or monetary exchanges and rewards (Benkler, 2006). According to Benkler, four conditions favour the emergence of CBPP: low capital costs; centrality of human capital; decline of communication costs; and the public nature of the good concerned. Additionally, CBPP is more effective if applied to jobs that can be split into small tasks and independent modules (granularity and modularity), and where the value of monetary reward is small relative to the value of either the intrinsic hedonistic rewards or of the social-psychological rewards.

CBPP theory has been developed further by other authors (e.g. Aigrain, 2012; Bollier, 2008; Fuster Morell, 2010; Griffiths, 2008) as a framework to describe new productive activities that take place on the Internet, outside the logics of market and state, with characteristics such as: openness to participation (Fuster Morell, 2010), strong inequality in the distribution of the contributions among the whole community (Ortega, 2011), decentralization (Crowston & Howison, 2004; Lanzara & Morner, 2004), modularity and granularity (Benkler, 2006), no coercivity and coordination based on stigmergy (Siefkes, 2010), transparent process (Bauwens, 2007), intellectual communal property (Wark, 2004), and value dimensions beyond monetary conceptions (Fuster Morell, 2016a).

Most of the research on these conditions has been developed only for the case of FLOSS (Crowston & Howison, 2006; Lanzara & Morner, 2004; Schweik & English, 2012; Weber, 2004). The empirical research was then expanded to the case of Wikipedia (Kittur, Suh, Pendleton, & Chi, 2007; O'Neil, 2009; Ortega 2011; Reagle, 2010; Viégas, Wattenberg & Mckeon, 2007). Hill (2012) provided a qualitative analysis of why Wikipedia was able to succeed in contrast to other apparently similar attempts to build an encyclopaedia. However, this research has failed to take into account the diversity of types of CBPP, concentrating mainly on FLOSS and, later, on Wikipedia.

Particularly, little attention has been paid to the distinction between models and how far common-based peer production differs from platform capitalism.

In the last decade, there has been an expansion of CBPP to areas of activity other than the initial ones (mainly, FLOSS projects and projects using Wikis), like citizen science, product design, and management

of common spaces and open data sources. As part of this expansion, there has also been a "hybridization" of CBPP with cases that seem to retain some commonalities with CBPP, but differ in others, while also adopting aspects from other types of formats, such as corporate-based collaborative economy and traditional market formats that question whether they can actually be qualified as CBPPs, something which also applied to the term collaborative economy (such as Airbnb or Mechanical Turk). This opens up the need to deepen and review the initial conceptualizations of CBPP on the basis of its latest developments, and set "criteria" in order to clarify a phenomenon that has become richer and more diverse (Arvidsson & Peitersen, 2013). The initial and very basic characterization of CBPP as a distinctive form that differs from traditional markets and firms –not operating like traditional command and mercantile exchange – is not enough. Additionally, it would be good to go deeper into our understanding of CBPP in order to be able to define it in terms of how it actually operates, and not to define it in terms of how it does not operate. In these regard, the commons balance aims to provide a characterization and analytical tool which help to distinguish CBPP from other forms of market innovation not based on commons or collaborative logic, even if they claim it.

## Platform and open cooperativism model

Studies of social economy and cooperatives point to their growing diffusion and some of their social and economic sustainability qualities. Making up almost 12% of the entire employed population of the G20 countries, co-operatives generate partial or full-time employment involving at least 250 million individuals worldwide, according to official data from 74 countries, where 26.4 million of these people work in cooperatives (as employees or worker-members) and more than 223 million producers organize their production together within the scope of cooperatives (Roelants et al., 2014). According to data from 2013, the largest 300 co-operatives and mutuals in the world reported a total turnover of 2,360 billion US dollars (World Co-operative Monitor, 2015). Social economy studies point to the major resilience and better working conditions of the cooperative models as compared with traditional firms (Roelants et al., 2012; Birchall & Ketilson, 2009), according to econometric evidence on the comparative behaviour of worker cooperatives and capitalist firms (Burdin & Dean, 2009). There is also a contrast between the behaviour of cooperatives and the overall trends in the industries within which they operate, with a stabilizing effect on employment (Delbono & Reggiani, 2013). It has also been observed that labour-intensive activities tend to be the sectors where cooperatives function best (Cheney et al., 2014), with member-owned businesses tending to provide jobs where the labour market has not provided these (Birchall, 2012; Bonin et al., 1993; Díaz-Foncea & Marcuello, 2014). This has also been observed in comparisons of data on the number of capitalist firms and of cooperatives created annually, which concluded that the creation of worker cooperatives is determined by the unemployment level (Díaz-Foncea & Marcuello, 2015). This evidence would suggest that platform cooperatives could be a model for expansion in collaborative economy, particularly through labour platforms, which may generate better social sustainability and equality effects, particularly in cities with high unemployment.

The term **Platform cooperativism** was suggested as such and started gaining traction in 2015 after it was popularized by Scholz and Schneider (Scholz, 2016; Scholz & Schneider, 2016). According to Scholz, the main characteristics that define a platform cooperative are: collective ownership; decent payment and security of income of its workers; the transparency and portability of the data created; appreciation and recognition of the value generated in the platform activity; collective decision-making; a protective legal framework; transferable protection of workers and the coverage of social benefits; protection against arbitrary conduct in the rating system; the rejection of excessive supervision in the workplace and, finally, the right of the workers to disconnect (Scholz, 2016). In short, according to Scholz, on the one hand, platforms must be shaped around the values of cooperativism, and on the other, digital tools must amplify the scalability and the social and economic impact of cooperative organizations. However, due to its novelty it remains still largely unstudied. At the same time, Mayo Fuster (2017) means that the very construction of technology platforms is not a minor issue and that platform co-operatives should adopt open software and licenses. In short, to create a self-managed governance that allows the articulation of a community of

development around the digital commons (Fuster Morell, 2015) must approach to an "open cooperativism" (Bauwens, 2014) as an antithesis of unicorn and corporate platforms.

Platform cooperativism is the most popular term, but not the first one to point to a match between cooperativism and digital commons. Previous similar research on new forms of cooperativism such as "open cooperativism" (Bauwens & Kostakis, 2014) and also studies of how the digital environment opens up new possibilities for the cooperative tradition (De Peuter & Dyer-Witheford, 2010; Murray, 2010) are of relevance in this relatively new field. Furthermore, Murray (2012) points to the potential of cooperativism and new forms of mutualism for public service reform. There is also a proliferation of relevant books and other contributions from a theoretical framework perspective, but mostly lacking an empirical methodology.

Como developed an exploratory analysis, based on interviews with cooperatives, first in Italy (Como, 2015) and then in nine European countries, of the attitudes of cooperatives towards collaborative economy, and an online survey mapping of cooperatives that are implementing innovations in the collaborative economy field (Como et al., 2016). The interviews found a prevailing positive attitude on the part of the interviewees from cooperative organizations towards the idea of developing innovations with collaborative economy, although critical views were also present in some countries like Italy and the Netherlands. Federations of cooperatives in the UK, Austria and Belgium have programmes to stimulate cooperative platforms (Como et al., 2016).

## Beyond CBPP and platform cooperativism: A multidisciplinary framework of collaborative economy platforms

As presented, the CBPP or commons tradition is not a response to the corporate cooptation of the collaborative economy: it pre-dates and inspired it. Actually, it has overcome various waves of capitalist innovation: from the “Web 2.0” to the emergence of YouTube and Facebook in response to the dot-com crisis in 2000, and the extractionist collaborative economy including Uber and AirBnb in response to the 2008 crisis. These forms adopt the collaborative discourse and mode of production of digital platforms, but at the same time turn their backs on the use of free, transparent technology, on the role of the community of creators in the governance of the process, on the collective ownership of knowledge, and on the distribution of the value generated among those who contribute to create it. The platform and open cooperativism model is a frame that actually was a response to the corporate extractionist unicorn modes of platform economy, and wanted to provide new responses to the question it created, and in concrete the lack of economic models for individual sustainability at the CBPP frame.

The tradition of the CBPP or digital commons poses the challenge of the sustainability of the individuals who contribute to the common good. Some of the models that are being designed and implemented in response to this challenge were described by Philip Agrain in his 2011 book Sharing. In the commons, there is tension between the desire to maintain the predominantly non-commercial nature of projects and to emphasise other, non-monetary sources of value on one hand, and the need to secure income for those who contribute on the other.

The option of setting up cooperatives has also been an alternative in the CBPP digital commons – particularly in the world of free software – although foundations have been a more common model of institutional organisation. Another issue is the need to create legal figures that can allow for the fact that online collaborative production generates patterns of very different levels of participation (in which 1% usually generate the majority of the content, 9% contribute occasionally, and 90% participate passively as “audience”). Another challenge of the CBPP is to move towards decentralisation, which does not seem to adapt very well to the “traditional” cooperative membership model.

Scholz’s platform cooperativism and open cooperativism approach puts the spotlight on the labour conditions of the people who contribute to digital platforms, and on the creation of cooperatives as a means to guarantee ownership. These are certainly key issues, but they push important aspects of the CBPP digital commons into the background. On one hand, open knowledge, knowledge as a common good, and the public dimension of collaborative production through the use of licenses (like Creative Commons) that

guarantee access to the resources; on the other, free technology – platforms based on free software – as a means of communal control of the means of production in a digital environment.

CBPP and also platform cooperativism share other limitation, we would like to contribute to overcome with the commons multidisciplinary balance. The CBPP, platform and open cooperativism frame consider inequality in terms of class, income, and education, but it does not consider other sources of discrimination and inequality in his critique of the corporate platform economy or in his proposed alternative. This is actually one of the weak points of this frame its limited gender perspective. This actually tends to be the rule in discussions around the collaborative economy and critiques of the hegemonic economic approach, which are not the only characteristic of CBPP and open cooperativism. There is little emphasis on the links or dependence between the collaborative economy and the domestic and care economies, or on the feminist reading of the phenomenon. The same can be applied to the environmental impact. There are very little connextions done among environmental questions, CBPP and open cooperativism.

It aims to be an attend to integrate the aspects that CBPP and platform cooperativism draws attention to – cooperativism as a means to ensure democratic governance of economic activity and the conditions of collaborative production that respect basic rights – while keeping in mind the strengths of other processes, including the digital commons – which emphasises the importance of the public and the commons, as well as free infrastructure –, the feminist economy, and the circular environmentally friendly economy. And from there, to develop a new social, feminist, environmental commons economy. The confluence of these diverse sources of socioeconomic innovation, and the economical activity each articulate, might provide a framework for a large scale economical transformation.

This rationale drives us to build a commons multidisciplinary balance of the collaborative economy, which does not leave aside technological and knowledge policies, and also considers gender, environmental issues, and other sources of externalization of negative effects, as well as their implications for policy.

### *1.1.3 A commons balance in order to assess the sustainability of collaborative economy*

In this section, we will jump into the more recent frame of studies on collaborative economy, which departed from Botsman & Rogers' (2010) characterization of collaborative economy swaying away from the collaborative consumption practices, and providing an state of the art on how far there has been applied a sustainability analysis.

In contrast to CBPP and platform cooperativism frames, since the initial characterizations of collaborative economy, its potential to contribute to a sustainable development of society (Botsman & Rogers, 2010; Cohen & Kietzmann, 2014; Heinrichs, 2013) has been pointed out. Nonetheless, the empirical evidence of the expected socio-economic and environmental effects of collaborative economy platforms is still limited, fragmented and inconclusive. Only 9% of the collaborative economy literature has focused on the potential benefits, costs and welfare impact of collaborative economy platforms (Codagnone et al., 2016). The framework of sustainability in collaborative economy has combined social, economic and environmental sustainability dimensions (Botsman & Rogers, 2010). The ex-ante analysis around impact has considered such aspects as consumer welfare, job creation and employment opportunities for independent contractors, job security and quality, and environmental impact, but has lacked in the majority of cases a holistic analysis of the integration of sustainability into society, community and economy perspectives (Bina & Vaz, 2011). Ex-post empirical research remains partial and dispersed. **From a social dimension**, Richardson (2015) points to collaborative economy sustainability as a source of change and of reduction in social inequalities (Dillahunt & Malone, 2015; Fraiberger & Sundararajan, 2015; Reich, 2015). Some studies conclude that peer-to-peer activities potentially benefit the below-median-income part of the population more than the above-median-income one and that sharing firms can be used as means to redistribute income. Schor's empirical work has documented how the market orientation and organization of collaborative economy

platforms are critical characteristics shaping their potential for providing sustainable alternative economic arrangements (Schor & Fitzmaurice, 2015). **From an environmental perspective**, Demailly et al. (2016) argue, based on extensive surveys and interviews in the collaborative economy sector, that although platforms and their users may be moved by sustainable development, various "rebound effects" like compulsive acquisition behaviour around capital assets also take place, something corroborated by other empirical analysis (Parguel et al., 2016). However, collaborative mobility could contribute to reconciling environmental and social demands within a positive narrative of reclaiming urban space and deploying innovative solutions (Brimont et al., 2016).

The multi-disciplinary approach to sustainability is optimal, embracing the complexity of the phenomenon's impacts, but **challenging methodologically** (Heinrichs, 2013). An initial research strategy for approaching sustainability in collaborative economy was based on the use of secondary data and sustainability indicators adopted from corporations' sustainability literature (Delai & Takahashi, 2011). However, this strategy has several limitations. There is no consensus about what sustainability indicators to use (Delai & Takahashi, 2011), and frequently the indicators are not adapted to such collaborative economy features as the non-monetary character of some activities, "micro-entrepreneurs" (Schor, 2014), and rebound effects reducing positive contributions (Heinrichs, 2013).

Another limitation of the current work, in terms of collaborative economy economic sustainability, is that it has focused only on **the impact of the "unicorn" models** in car sharing (Fraiberger & Sundararajan, 2015; Firnkorn, 2012; Hall & Krueger, 2015), on rental industries and tourism accommodation (Fang et al., 2016; Neeser et al., 2015) and on online labour (Agrawal et al., 2013; Horton & Golden, 2015), as well as on the contrasting impact of the "unicorn" model and the current incumbents (Zervas et al., 2016). Furthermore, this work is sometimes presented by stakeholders involved in the controversies. For example, Uber and Airbnb have released dozens of reports, but their reliability cannot be independently validated because the methodologies are not transparently illustrated and data is not made accessible to researchers (De Groen & Maselli, 2016; Kässi & Lehdonvirta, 2016). In contrast, we will connect with the study of sustainability in commons oriented modalities (Ostrom, 2009).

We will develop a framework of collaborative economy sustainability that aims to integrate environmental, socio-economic and gender equality, political, and Internet sustainability dimensions. In contrast to previous work in the field of collaborative economy, we will consider other three critical dimensions to sustainability: gender as a source of inequality, digital sustainability of the Internet as a Commons, and political sustainability on the other. While collaborative economy literature considers the Internet as a given immutable resource, hosting the platforms that support collaborative economy, the "net environmental" approach points to the Internet as a living process and an ecosystem (Holman & McGregor, 2005) of common resources that needs to be preserved in terms of its fundamental principles of net neutrality, decentralization and openness (Boyle, 1997). How far the models contribute to the regulatory requirements and to policy system quality will also be considered as part of the sustainability frame.

### *1.1.4 Commons multidisciplinary balance of collaborative economy*

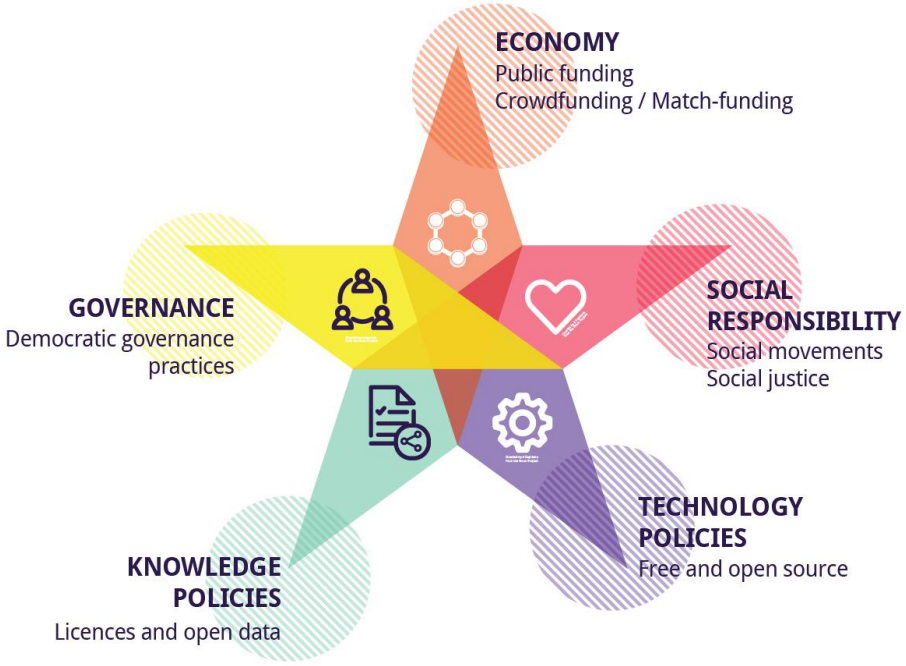
In this section, we will present the framework of the commons multidisciplinary balance of the collaborative platform economy. Here we present the first version of the framework. The design of the commons balance is informed and based on a multidisciplinary analysis and state of the art of the collaborative economy from an economical, technological, environmental, gender and inclusion, legal and policy perspectives, and an empirical analysis of most prominent cases of commons collaborative economy, as well as the case of Barcelona commons collaborative economy ecosystem. The applicability of the commons balance will be illustrated with 10 cases of collaborative economy at Barcelona. We have also collected data from a larger sample of 100 cases. This second sample will constitute the base for a following version of the commons balance, which also provides statistical analysis of the relations between the several dimensions considered

at the commons balance. In this regard, the following work should be considered as a first attend, which will be followed by more elaborated versions.

This commons multidisciplinary balance considers the dimensions of governance design, economical strategy, technological base, knowledge policies, and social responsibility regarding externalization impact of the platforms. The commons balance is an analytical tool that helps to visualize the commons qualities of collaborative economy initiatives, differentiate models, and provide insights of the sustainability of their design, and to inform technological development.

Our starting point is the recognition of collaborative economy as a very diverse and dynamic field. In light of this, the "metaphor" that represents what we see in front of us is more about mapping a plural "galaxy" than drafting a two-sided field. We are not aiming to establish -with the delimitation criteria- two sides with a clear line of "delimitation" of what commons oriented collaborative economy is and what it is not. We are aiming to "map" the diversity of collaborative economy expression typologies, and the various ways in which commons collaborative economy differs from other models. These diverse collaborative economy typologies result from several combinations of elements that constitute collaborative economy, rather than one single formula.

Figure 1.1: Commons balance of collaborative economy



The commons qualities of the collaborative economy are articulate around 5 dimensions (see Table 1.2 regarding the specific indicators connected to each dimension):

**Governance:** Regarding democratic enterprises and involving the community generated the value in the platform governance. Regarding decision-making model of the organization; mechanisms and political rules of the digital platform participation.

**Economic model:** Regarding whether the project financing model is based on a private capital, an ethical finance, or a distributed found (crowdfunding or match-funding); the business models; mechanisms of economical transparency; how far the profitability is driven the whole plan; distribution of value generated; and equity payment and labour rights. To ensure equitable and timely remuneration, and access to benefits and rights for workers (maximization of income, salary predictability, safe income, protection against arbitrary actions, rejection of excessive vigilance at the workplace, and the right to disconnect).

**Knowledge policy:** Regarding the type property as established by the license used (free licenses or proprietary licenses) of the content and knowledge generated; type of data (open or not), the ability to download data (and which formats), and the promotion of the transparency of algorithms, programs and data. Privacy awareness and the protection property from personal data and prevent abuse, as well as the collection or share of data without consent. Guarantee the portability of data and reputation.

**Technological policy:** Regarding the mode of property and freedom associated with type of software used and its license (free or proprietary) and the model of technology architecture: distributed (using blockchain, for example) or centralized (software as a service).

**Social responsibility regarding externality impacts:** These dimensions related to any source of awareness and responsibility regarding the externalities and negative impact such as social exclusion, and social inequalities, regarding the equal access of people with all kinds of income and baggage in an equitable and impartial way (without discrimination) to gain access to the platform; the inclusion of gender, compliance with health standards and safety standards that protect the public; and the environmental impact[2], and the impact in the policy arena, and the preservation of the right to the city of its inhabitants and the common good of the city; the protection of the general interest, public space, and basic human rights, such as access to housing.

On the basis of the commons balance of collaborative platforms economy, **commons collaborative economy** can be defined as a tendency, a set of qualities, and a modality of collaborative platform economy - regarding both the design and the performance of the process - characterized by a commons approach regarding the dimensions of governance, economic strategy, technological base, knowledge policies, and social responsibility of the externalizations impacts of the platforms. In this regard, commons collaborative economy is characterized by favouring: 1) peer to peer relations -in contrast to the traditionally hierarchical command and contractual relationships detach from sociability, and menelly mercantile exchange - and the involvement of the community of peers generating in the governance of the platform; 2) it is based on value

[2] Promote sustainable practices that reduce emissions and waste, taking into account the rebound effect that they can generate, as well as the most efficient use of resources, the origin and production conditions of the goods and services they offer (i.e. if favouring proximity); and minimizing resource management, and recycling capacity.

distribution and governance among the community of peers, and the profitability is not its main driving force; 3) it developed over privacy aware public infrastructure, and results in the (generally) open access provision of commons resources that favour access, reproducibility and derivativeness; 4) and, finally, the responsibility with the externalities generated by the process.

## Commons balance operationalization and data analysis plan

In order to operationalize the commons balance, we built a codebook of 150 indicators. Of these 150 indicators, we selected those which represented a good overall indication of each dimension and were easy to collect. These are presented in the Table 1.2. We applied the codebook to 10 cases in order to test the indicators. We shall apply other verifications of the indicators. Additionally, we designed a sample of 100 cases (see Annex II with the list of cases) and a data collection strategy to collect the data of the 100 cases and to be able to develop statistical analysis of the interconnection between the different dimensions of the balance.

Table 1.2: Indicators of the five dimensions of commons quality of collaborative economy

| | | |
|---|---|---|
| **Governance model** | Type of economic enterprise | Cooperative, foundations or SME with a system involving the community in contributing to the digital platform in the decision making |
| | Open participation at the digital platform | Possibility to participate at the platform so as to contribute to the contents of the initiative |
| **Economic model** | Goal | The main objective of the project and/or organization is not profitability |
| | Transparency | Everybody in the organization (or out of them) has economical information of it |
| **Knowledge policy** | Open content | Free license. The contents can be reused |
| | Open data | Open data licence. Everybody could get and use data platform |
| **Technological policy** | FLOSS | The platform is developed in Free/Libre and Open Source Software |
| | Decentralized | Software can be federated and / or hosted in differents servers |
| **Social responsibility** | Inclusion | Platform has features to favor the inclusion of socially disadvantaged groups<br>Project has an active gender inclusion policy |
| | Green | Initiative with features and awareness of care and promotes environmental impact reduction |

## Application of the commons balance to the diverse models of collaborative economy

At table 1.3, we applied the commons balance with the basic indicators of each of the dimensions to the three models of platform cooperativism.

Table 1.3: Open commons and platform coop versus unicorn models

| | Open Commons | Unicorn | Platform coops |
|---|---|---|---|
| **Type of governance** | Foundations and non-lucrative associations with participatory systems Informal self-managed communities | Multinationals or start-ups.<br>Centralized governance | SME & cooperatives Participative governance |
| **Type of economy** | Crowdfunding; value distributed | Venture capital; value extraction.<br>Oriented on optimizing profit for their investors; minimizes costs and taxation. Optimization of the profit detrimental to laboral rights | Crowdfunding; value distributed |
| **Type of technology** | Free and Open Software (replicable) | Proprietary software, Software as a Service closed source | Free and Open Software (replicable) |
| **Type of knowledge** | Open data<br>Free-libre licenses (Creative Commons, etc) Open Knowledge | Closed or owned data, user data commodification, user policies and rights could be abusive or hardly abusive. Knowledge patented, under copyright | Vary |
| **Social responsibility** | Irregular: Circular economy; gender policies. Social inclusion | Lack of indicators but scandals of abuses.<br>Negative environmental impact, negative social impact on communities; rarely caring on social exclusion issues or responsible exploitation of natural resources | Irregular: Circular economy; gender policies. Social inclusion |

### *1.1.5 Multidisciplinary state of the art*

In this section, we provided a multidisciplinary analysis and state of the art of the different disciplinary analysis connected to the commons balance: environmental sustainability perspective (chapter 2.1), gender and discrimination perspective (chapter 2.2), from an economical business model perspective (chapter 2.3), and, legal and regulatory analysis (chapter 2.4). Here is an introductory summary of each of the perspectives provided. The multidisciplinary state of the art is intended to be complementary and to inform the main goal of the deliverable the commons balance of collaborative economy (presented in the previous section 1.1.4).

#### Social Responsibility: Environmental, and Gender and Inclusion

#### Environmental Sustainability of the Collaborative Economy: An Open Debate

(By Paola Imperatore)

This chapter aims at reconstructing the debate around collaborative economy and environmental sustainability. Even though this model - based on sharing goods and services - was initially greeted from different perspectives as a sustainable alternative to the capitalistic economy, in the last years several scholars have put in question this optimistic interpretation. In parallel with authors that support that collaborative economy is a more sustainable model able to reduce consumption, other scholars argue that it has become a driver of hyperconsumption. The following dissertation tries, in a first part, to present the current debate around the environmental sustainability of collaborative economy, a debate still open. In this part, we also discuss the purpose of some scholars to address collaborative model with a real ecological approach (such as through a legal framework or a pivotal role of social movements linked with the issue of the sustainable consumption) in opposition to the companies that use the sustainability arguments as a brand to attract more people, making a greenwashing operation. In the second part, we show the analysis of the tools proposed in academic literature in order to measure, in a more systematic way, the environmental impact of collaborative business models.

#### Gender, discrimination and collaborative economy

(By Paola Imperatore and Mayo Fuster Morell)

In this chapter, we will present the pivotal facts about the relationship between collaborative economy, gender and inclusions, in which there is a significant gap in current knowledge. Since its origin, this economic model was portrayed as inclusive and open, even though some scholars argue that the collaborative economy model reproduces gender, racial and class hierarchies. By focusing on the gender dimension, this section looks at observing how gender identity operates in collaborative model from different points of view. From a quantitative perspective, we have analyzed the participation of women in collaborative economy observing a low percentage of female components in particular in traditionally masculine area, such as in car-sharing, in which woman represent the 30% of Lyft's drives and only the 14% of Uber's drivers. At the same time the woman's participation is really low also in FLOSS (less than 5%) while their participation percentage in proprietary software is around 30%. rom a qualitative perspective, we have observed their role in collaborative companies to understand the salience of gender in defining the labour division. What results is a sector in which women gain more relevance in traditionally feminine area and as consumers (passive role) while remain excluded or in the minority in the activities defined as masculine and linked with the production (active role). To the end, we illustrate the main challenges linked with gender equity in the collaborative economy, taking into account the limits of antidiscrimination laws to intervene in this sector.

## Business Models

### A Review of the Business Models of the Digital Collaborative Economy: Digital and Digitally-Supported Commons and Open Data

(By Bruno Carballa)

This chapter studies the business models of the digital collaborative economy, namely digital commons, digitally-supported commons and open data. We will show that there are several possible business models compatible with the digital collaborative economy and explain which ones are suited for each type of digital collaborative economy project. Regarding revenue models, six types are identified: 'shifting', 'dissociating', reciprocity-based voluntary contributions, third-party funding, freemium and brokerage. The chapter is structured as follows: Section 1 develops the framework of the study by explaining the particular economic sustainability challenges that arose for commons with the digital era and defines our object of study as well as the concepts of 'business model' and 'open business model'. Section 2 proposes a categorization of four business model families for the digital and digitally-supported commons: FLOSS, digital content commons, open hardware and platform cooperatives. After, we explain the four qualities that make data valuable (size, scope, interoperability and quality) and make the distinction between data commons and open data. Finally, Section 3 identifies five business model families for open data: government open data, private firm standalone open data, non-commercial centralized open data production, multi-stakeholder data pooling, and commons-based data crowdsourcing. The last section concludes by summing up the main findings and suggesting possible further research.

## Regulations, Public policies and Public Innovation

(By Mayo Fuster and Natalia Rodriguez)

Policy questions in the emerging field of collaborative economy have increased in interest with the increase in legal disputes and media controversy around the Uber and Airbnb cases (Codagnone et al., 2016). A first wave of analysis on collaborative economy has focused on a live and polarized debate on regulation: laissez-faire and self-regulation versus top-down application of the same regulatory requirements faced by the incumbent industries (Edelman & Gerardin, 2015). This body of literature is to some extent polarized between those radically in favour of limited intervention -mainly in cases of market failure that cannot be corrected by the platform or the market (Allen & Berg, 2014; Cohen & Sundararajan, 2015; Koopman et al., 2014, 2015)-, and those in favour of some form of regulation (Cannon & Chung, 2015; Edelman & Geradin, 2015). Debates are policy-centric and are around how policies must avoid stifling potentially beneficial innovation, but ensure competition and consumer protection, preserve labour rights and avoid the erosion of the tax base (Sunil & Noah, 2015).

Self-regulation schemes entail the redistribution of regulatory responsibility to parties other than government. In this regard, Cohen & Sundararajan (2015) argue that platforms should not be viewed as entities to be regulated, but rather as actors that are a key part of the regulatory framework. Balaram (2016) similarly suggests "shared regulation", since this entails the redistribution of regulatory responsibility to parties other than government and regulation other than self-regulation by businesses. Admittedly, other authors suggest collaborative co-regulation (e.g. Cannon & Chung, 2014). However, those contributions are framed in a neoliberal perspective, with an exclusive focus on efficiency, and propose some mix of shared responsibility between government and industry entities, with different allocations of responsibility for setting goals, formulating standards and rules, and enforcement, thus, ruling out goals other than efficiency, and not taking into account stakeholders other than government and industry, and not considering all stakeholders.

More nuanced and less radical approaches call for innovative and "smart" forms of regulation (Miller, 2014, 2016; Ranchordas, 2015; Rauch & Schleicher, 2015). Possible sources of innovation considered include

the use of data-based regulation –which implies that companies adopt an open data frame– and co-creation by collaborative economy organizations and government in the provision of public services.

Regarding collaborative economy data ecosystem and data policy, these can be characterized by a paradox: collaborative economy -as activities mediated by a digital platform- has a great potential to generate data, but the current collaborative economy ecosystem of data practices to a large degree does not favour open data access (Codagnone et al., 2016), and flexible API with good coverage of data (Lausch et al., 2015) is not usual. Open data would contribute to solving some of the problems that regulators face regarding collaborative economy, in order to have data on the dimension of activity by each collaborative economy company, but also data on city impact. This is one of the reasons that moves us to investigate open commons models and platform cooperativism models. These alternative models, based more frequently on open data, could represent a shift in collaborative economy data ecosystems towards "opening" it, contributing to solving the policy problem. Wikipedia is a great example of the potential of what an open collaborative economy data ecosystem could mean. Wikipedia, and the Wikipedia collaborative database, have generated data for the most variable research objectives (Benkler et al., 2015; Hill & Shaw, 2013). Milan (2013) is developing a large research project in order to describe alternative data policies such as the one we describe in open commons data.

### A legal analysis of the collaborative economy

(By Guido Smorto and Marco Ciurcina)

Despite the legal debate on the “collaborative economy” is often dominated by disputes related to market regulation and for-profit business models, the advent of collaborative practices is having a much deeper impact on society as a whole. Along this path, this article intends to offer an account of the main societal challenges arising from collaborative practices –market regulation, wealth distribution, city governance, among others - in order to propose how they can be tackled by regulation and how to foster a commons oriented model of collaborative economy.

The legal analysis, particularly regarding data, will be expanded and deep at D 1.8. In a further policy centric deliverable, we will also expand the public policy analysis of the collaborative economy dimension.

## *1.1.6 Empirical analysis: Barcelona case*

A third part provides a focus on the Barcelona commons collaborative economy ecosystem, providing empirical insights on current stage of development of blockchain (chapter 3.1) and an assessment of blockchain potential to transform the collaborative economy (chapter 3.2), FLOSS developments (chapter 3.3), and social mobilization analysis of the situation regarding reactions and responses to AirBnb impact in the urban transformation of the Barcelona city (chapter 3.4).

### The stage of development of Blockchain in Barcelona in 2017

(By Marc Rocas)

This chapter details the stage of development of Blockchain in Barcelona. It incorporates different perspectives and provides a holistic view of the Blockchain ecosystem in Barcelona. The examples provided are illustrative but not exhaustive. The information collected is classified into areas, with one or two examples presented in each area. Although the most important players in each of the various established areas are discussed here, the ecosystem is very dynamic, and new players appear every day. The first area of business, is split into three different subcategories: start-ups, big corporations, and technological consultancy firms. Some of the big corporations are creating consortia in order to boost collaboration among them, a global trend which has as its Spanish example a consortium called Red Lyra. We will also examine the cases of three startups: Verse, Aragon, and CreativeChain; and two consultancy firms: Atraura and Tarsys. The second major area is the social and solidarity economy, represented through

the examples of Fair.coop, Bank of the Commons, and other organizations who are considering the adoption of Blockchain. This report then looks into non-profit associations, particularly into a non-profit association called Blockchain Catalunya which was founded with the mission of developing Blockchain and introducing its technology to the Catalan population. Barcelona is a very active city, and the fourth sector examined is that of the meetups organized around Blockchain, Bitcoin, and Ethereum, which constitute an important medium for communicating issues related to this technology. Events are the fifth area for discussion: Blockchain is becoming more and more present in events related to fields such as social coins or procommerce. Public administrations, who use Blockchain as a mechanism for developing the technology and introducing it to their citizens, are their own category. The first congress regarding Blockchain, planned to take place in October 2017, is also discussed in this section. And, of course, DECODE is especially relevant here thanks to the pilots that will be developed in Barcelona in 2018. Finally, the last area discussed is that of academia. Researchers from at least three different Catalan universities keep regularly in contact to share points of view and discuss items related to the development of Blockchain. Although the presence of Blockchain in a dynamic and active city such as Barcelona is still small, almost symbolic, the holistic vision provided here shows how Barcelona meets the conditions for becoming, in the near future, one of Blockchain world capitals, a development that has to be achieved with the city's people, and not in despite of them.

## Assessment of Blockchain potential for transforming the collaborative economy towards pro-commons and platform-coop models

(By Marc Rocas)

Blockchain, a technology poised to bring huge economic and social transformations during the following years, offers an unique opportunity for the collaborative economy. Because of its inherent properties, Blockchain allows the development of distributed systems of governance based on flat structures of power, direct, secure, and simple peer-to-peer transactions, and the disintermediation of the current role of platforms. This work presents the results from a collaborative activity designed to sound out what the Blockchain community thinks about the principles of Platform Cooperativism and Open Cooperatives. The results show that there is a field of study for the development and implementation of Platform Cooperativism and Open Cooperatives principles through technological models based on Blockchain. Participants showed a high degree of consensus on most of the statements. They also agreed on the incapacity of the current collaborative economy to satisfy those principles, and cited Blockchain as a facilitator capable of developing them. Participants pointed out the necessary role of the public sector in promoting public policies for the development of Platform Cooperativism and Open Cooperatives. Finally, they also detected as an issue to be solved the convergence between the borderless character of Blockchain and the variety of national labour laws.

## Technological Sovereignty and FLOSS trends in Barcelona region

(By Manel Rebordosa)

The chapter will investigate the FLOSS ecosystem in Barcelona, as well as its place in the global FLOSS ecosystem and its most significant current trends. It will also explore all commons-based economy issues related to FLOSS. It will finally explore and re-frame a set of commons-based economy FLOSS cases.

## The transformation of urban space between AirBnb and urban movements. The case of Barcelona

(By Paola Imperatore)

In this section we want to interconnect the studies on digital platforms to those conducted on the urban social movements. Even though many scholars have underlined the negative impacts of digital platforms on a wide variety of aspects (from a working, environmental, legal, gender and other perspectives), there

is a lack of contributions regarding the impacts of some platforms on the urban transformations, such as gentrification, the reconversion of local economy, the forced migration of local residents and others. Taken into account the increasing popularity of digital platforms in redefining the urban contest, it becomes necessary to investigate the effects that these platforms have on civil society. In particular this chapter aims at exploring the impact of AirBnb in redefining urban space with a specific focus on the city of Barcelona. On the other hand, this work wants to analyse the movements against AirBnb that, recently, in the city of Barcelona are gaining relevance. In conclusion, the text will make a brief mention about the strategy that lately AirBnb has adopted: finance club to lobby on policy-makers and to contrast social movements on their field. By relying on qualitative methods, the article tries to discuss these issues by using the in-depth interviews of the actors of the protest and collection of documents redact by the movement's actors. The first part of this section will present an overview of the debate that currently is taking place on this topic. Subsequently, we discuss the case of Barcelona observing the urban transformations brought by AirBnb and the role of movements to contrast it by reclaiming the right to a city for people and not for profit and tourists.

### *1.1.7 Organization of this deliverable*

This work is organized in three sections. The first section, which is the core of the deliverable, provides the multidisciplinary framework, while the other two sections and annexes are complementary and informative to the first section. The first section (section 1) provides an introduction (chapter 1.1) to the whole material, and argumentation on the necessity to overcome current frameworks with a multidisciplinary perspective, and finally, presents the commons multidisciplinary balance of the collaborative economy, while chapter 1.2 provides an application of the commons balance in 10 cases from Barcelona. This section is the core of the deliverable and covers the objectives of the deliverable - builds a multidisciplinary framework of the commons collaborative economy. The two following sections are complementary, and are informative in order to provide the base of the analysis presented at section 1. In this regard, reader should focus on the first section and consult the others in case of interest.

A second section of multidisciplinary analysis and state of the art provides a set of chapters with the different disciplinary analysis: environmental sustainability perspective (chapter 2.1), gender and discrimination perspective (chapter 2.2), from an economical business model perspective (chapter 2.3), and a final part, will provide a state of the art from a public policy perspective, in concrete, with a legal and regulatory analysis and public policy innovations perspective (chapter 2.4).

From this second section, it is worth highlighting that chapter 2.1 provides an overview of the sustainability frame of collaborative economy (specifically going beyond the environmental aspect), and that chapter 2.3, the economic analysis extended chapter, provides a revision of the literature on business models and open business models, but also an empirical analysis based on the commons balance to the current most advanced areas of collaborative economy (FLOSS, digital content commons, open hardware, and platform cooperatives), and then focuses its analysis on open data business models.

A third part provides a focus on the Barcelona commons collaborative economy ecosystem, providing empirical insights on current stage of development of blockchain in the city (chapter 3.1) and an assessment of blockchain potential to transform the collaborative economy (chapter 3.2), FLOSS developments in the city (which should be considered as a very preliminary material) (chapter 3.3), and a social mobilization analysis of the situation regarding reactions and responses to AirBnb externalities impact in the urban transformation of the city (chapter 3.4).

In addition, and as a support material for the reader, a glossary of the key concepts regarding commons collaborative economy is available as Annex I.

# 1.2 Commons Balance of 10 Cases of Collaborative Economy at Barcelona

Mayo Fuster Morell and Ricard Espelt (Dimmons IN3 UOC)

## 1.2.1 Objectives

This chapter will provide an empirical analysis of 10 case study of collaborative economy at Barcelona ecosystem, based on applying the commons balance, a **framework to assess commons qualities of collaborative economy initiatives**, in order to have a better understanding of the commons collaborative economy model.

The chapter will contribute to expanding the empirical base of the analysis on collaborative economy and also to expanding the geographical base of the literature, the majority of which is based on cases in the USA (see study of collaborative economy literature by Codagnone et al., 2016), by providing an empirical analysis of 10 Barcelona case studies.

The 10 cases are part of Barcelona collaborative economy ecosystem. Barcelona has a historical tradition of cooperativism, and social economy represents today the 7% of the city GDP (Fernàndez & Miró, 2016). Furthermore, the city has an alive scene of socio-economical innovation, and Barcelona City Council has a specific program to promote commons collaborative economy in the city. All together point to Barcelona as a rich case to analyse platform cooperativism development and sustainability.

The methods include mapping and typifying 10 commons collaborative economy cases in the city, structured and in-depth interviews, and a co-creation session.

The chapter will provide, first, an overview of previous attempts to classify models of collaborative economy. Then, it will introduce the methodology, and, finally provide the application of the start to the sample of 10 cases.

## 1.2.2 Previous attempts to classify models of collaborative economy

There have been previous attempts to classify collaborative economy. The Spanish Association of the Digital Economy (Adigital) has carried out a study: "Collaborative models are on demand in digital platforms" (2017) to distinguish between activities from: 1) Collaborative Economy: digital platform as an intermediary between equals, either between organizations or individuals, with or without economic consideration; 2) Economy on Demand: digital platform as an intermediary between a professional and a user; 3) Service Economy: a digital platform that, without disintermediation, places users at the service of the goods for their temporary use, adapting to the effective use time required by users and making the spatial location more flexible.

Anyway, if we focus attention on the first group, we will see that this includes projects with highly disparate approaches as AirBnB (a vacational rental platform owned by a multinational) and Goteo (a crowdfunding platform based on commons principles owned by a Foundation). In fact, the interface or the platform design conditions and predefines the social relations —related to the interaction mechanisms, regulation, profile information or promotion, for example—, among users (De Rivera et al., 2016; Finkel et al., 2013; Gordo et al., 2016).

Netnographic investigation of 55 collaborative consumption platforms in «The Triple Impact Assessment of P2P Collaborative Consumption in Europe» project investigation defines three types of collaborative consumption platforms: 1) Network Oriented Platforms (like Airbnb, Blablacar, TimeRepublick or Eatwith),

where users have a lot of communication forms in order to get digital reputation and show confidence to engage other users; 2) Transaction Oriented Platforms (Vibbo or Nolotiro), with less communication and interaction tools, focused on convenience and more connected to the traditional consumer and provider roles; 3) Community Oriented Platforms (WWOPP voluntaries network, La Colmena que dice sí or CiroSel), linked to a social or environmental mission and to a good level of code of conduct. These platforms develop some collective rules beyond a self-management regulation based on the capacity of the individuals to manage their confidence networks. Gordo et al., (2016) determine the relevance of the transformation of the consumer as an entrepreneur or the new role of prosumer. In the end, in some platforms, users provide knowledge, properties or services and intermediaries are those who really earn money (Hernandez, 2015). At the same time, netnographic research highlights the necessity to precisely review «how» each platform initiative works and the social, economic and environmental impacts the platform has (Gordo et al., 2016).

In this context, where a critical and holistic review of the digital platforms that promote the collaborative economy is required, a new key concept emerges: "platform cooperativism" (Scholz, 2016). According to Scholz, digital platforms must be based on collective ownership; decent payment and security of income for its workers; the transparency and portability of the data created; appreciation and recognition of the value generated in the platform activity; collective decision-making; a protective legal framework; transferable protection of workers and the coverage of social benefits; protection against arbitrary conduct in the rating system; the rejection of excessive supervision in the workplace and, finally, the right of the workers to disconnect. In short, according to Scholz, on the one hand, the platforms must be shaped around the values of cooperativism and, on the other, digital tools must amplify the scalability and the social and economic impact of cooperative organizations. At the same time, Fuster Morell (2017) means that the very construction of technology platforms is not a minor issue and that cooperative platforms should adopt open software and licenses. In short, to create a self-managed governance that allows the articulation of a community development around the digital commons (Fuster Morell, 2015) has to be approached as "open cooperativism" (Bauwens, 2014), as an antithesis of the unicorn and corporate platforms.

There have been previous attempts to establish delimitations in commons collaborative economy, and more concretely on CBPP. This is the case of the four freedoms of free software[3]. The four freedoms are being used in relation to whether a particular software program qualifies as free software. A program is free software if it adequately gives users all four freedoms. Although the four freedoms for software might resemble what we are trying to do here, in contrast to the free software definition, CB relates to a collective process and the delimitation criteria for the features of that process. In contrast, the free software definition is individualistically driven and built on the basis of individual freedoms, not the features of the process as a whole.

From our point of view, attending the complexity of the classification of collaborative economy platforms is necessary, and specific analysis are required in order to distinguish models. For example, in the case of Barcelona, during the last three years, a new type of agrofood consumer platform is spreading their activity in the city: La Colmena que dice sí. A recent investigation shows that, in spite of use a similar approach of cooperatives to engage their potential members (disintermediation between local producers and consumers), these organizations are far away of social and solidarity economic values (Espelt et al., 2017). Departing from this reflection, in this paper we provide a framework to characterise models of collaborative economy and visualize its qualities.

### *1.2.3 Methodology*

The methodology combines several methods. A statistical analysis of a large sample of 1000 cases, later reduced to 100, and an in-depth 10 case study comparison. Data collection is based on digital ethnography

[3] See: http://www.gnu.org/philosophy/freesw.html

(in order to collect indicators for the cases and get familiar with them), a co-creation sessions with the cases, and an interview with each of the cases. Data was collected in May 2017. Data analysis combines statistical analysis of indicators and qualitative and visual analysis of data from co-creation sessions and interviews.

### Sampling

The empirical work departs from a mapping of 1000 cases of Collaborative Economy at Barcelona, based on the P2Pvalue directory on commons collaborative economy. From this resources, we selected 100 cases on the base of the following criteria: 1) Projects with activity at Barcelona. 2) Projects based on collaborative production. 3) Projects with a significant level of activity, not in a very preliminary stage. 4) Projects with a social orientation, that is, closer to the cooperative platform than to the unicorn platform scope. In other words, that is, those projects which could be located as a Social and Solidary Economy activity rather than as a part of new forms of neoliberalism, with a clear economic profit approach and without taking into account the social impact of its activity. The cases are mainly platform cooperativism cases. However, the paper departs with a broad approach to cooperatives. Modalities of economic enterprises with democratic mechanisms and channels for value sharing, as well as the other seven principles of cooperation adopted by the International Cooperative Alliance, - which engage or are connected to collaborative production supported by a digital platform - will be studied. We selected socially oriented cases in order to be able to analyse the complexity and the modalities of commons oriented collaborative economy, and inform technological development which could help to support them.

From the sample of 100 cases, we did an analysis of the main features, and selected a resulting 10 key cases for an in-depth analysis. We selected the cases in order to assume diversity, and on the base of being significantly relevant cases. The cases are El Recetario, SmartIB, Goteo, Katuma, Bdtonline, XOBB, Fresound, Sentilo, eReuse, and, Pam a Pam (a presentation of each is provided in the next section).

### Analytical Methods

We did statistical analysis of some key features of the cases of the 100 sample, a virtual ethnography, a co-creation session (5 of May 2017) and an interview of the ten cases.

The co-creation session[1], with the ten cases chosen, is divided in three steps and has three main objectives: draw each project evolution, identify the position in each point of the commons start and collectively manifest the challenges of collaborative procomun economy. In the first part, the participants indicated in a graph their evolution, highlighted milestones and projected their future evolution. In the second part, each platform actively shared how their approach to each point of commons starts (economic model, social responsibility, knowledge and technological policy and governance model). Finally, during the last part, the all participants identified the challenges of collaborative procomun economy in terms of specific needs of the sector, technological demands and public policy recommendations.

## *1.2.4 Analytical framework: the commons qualities of 10 cases of collaborative economy in Barcelona*

In this section, we present the analytical framework of the commons qualities of collaborative economy (Figure 1.2) applied to 10 cases that we analysed on the base of its performance of the start of commons quality of the collaborative economy (El Recetario, SMart IB, Goteo, Katuma, Bdtonline, FreeSound, XOBB, eReuse, Sentilo, Pam a Pam). See Figure 1.3 for a case comparison of the cases on their performance of each of the qualities.

### 1.2.4.1 The commons qualities of 10 cases of collaborative economy in Barcelona

Analysis of the cases regarding the commons balance:

**1. El Recetario** <www.el-recetario.net> Introduction: A collaborative platform, born in 2007, focused on research, experimentation and reuse of waste for the construction of furniture and accessories, where the community of creators (700) share what they do and how they do it (through recipes, 450), learning from it and collaborating with others.

- Governance: Voluntary open participation.
- Economic model: Participated in a Universidad Internacional de Andalucia (UNIA) match-funding Goteo campaign (2015), which allows to improve the project. In spite of that, a sustainable economical model is not already defined.
- Technological policy: The technological platform is developed in Wordpress and, in spite of being planned, the whole platform code is not already open.
- Knowledge policy: At the same time, the content is under a Creative Commons (BY-SA. 4.0 copyleft license).
- Social responsability: El Recetario is in the transition to become a consumer/ producer cooperative platform.

**2. SMart IB** <http://www.smart-ib.org> Introduction: SMart is the abbreviation for the French expression "Societé Mutuelle pour Artististes", a non-profit organization that was launched in Belgium in 1994 under the name of SMartBe. Through the ESempleo Program, founded by European sources and managed by CEPES Andalucía, SMartBe comes into contact in 2011 with a cooperative business group from Andalucía that brings together the social cooperatives AURA ETT, ACTÚA SERVICIOS and A2A Formación, among others. Finally, thanks to the new Law 14/2011 of Andalusian Cooperative Societies that introduces advanced societal models of social innovation, the legal scenario is definitively created so that SMart Ibérica can begin to operate in Spain in May 2013. Currently, the Spanish cooperative gets the economical support of the Belgium cooperative. The project has a good expansion with 3.000 members in Spain and 800 in Catalonia.

- Governance: A Governing board takes the decisions of the cooperative and the users are invited once or twice a year to hold an assembly.
- Economic model: Each member pays a 150 € initial share capital contribution and 7,5% services commission. With this capital, the organization pays members' bills in advance.
- Technological policy: There is not a technological platform running yet.
- Knowledge policy: The knowledge generated is not open.
- Social responsibility: The project promotes cultural and artistic activity.

**3. Goteo** <www.goteo.org> Introduction: A crowd/match-funding platform constituted as a Foundation. The project started through a collaborative founding investigation (2010) and the first version of the platform is launched in 2011. Currently, Goteo has more than 90.000 users, getting 4 millions of euros.

- Governance: As a foundation, the decision making process is carried by a small group of people.
- Economic model: Users pay a 4% of commission, but the promoters have the objective to arrive to 0%.
- Technological policy: Software is subject to a copyleft license (AGPL).
- Knowledge policy: The platform data is freely downloadable in part.
- Social responsibility: In terms of social impact, all the projects which participate in campaigns must define the social responsibility of its action.

**4. Katuma** <http://www.katuma.org/> Introduction: Agro-food consumption platform based on Commons Collaborative Economy values. The project was just launched in 2017 and it is developed by Coopdevs, a

non profit association which is focused on free and open software to promote Social and Solidarity Economy projects.

- Governance: A membership cooperative governance is planned.
- Economic model: The intention is to found the platform with membership fees.
- Technological policy: The platform is developed with open software.
- Knowledge policy: The contents are in Creative Commons (BY NC) license.
- Social responsibility: The project is focused on connecting producers and consumers in terms of social justice.

**5. Bdtonline** <http://www.bdtonline.org> Introduction: Platform of a time banking association [Associació pel Desenvolupament dels Bancs del Temps (ADBdT)] that uses TimeOverFlow software, also created by Coopdevs. Association and software were developed and raised in 2012. Currently, 47 organizations use this platform with 5.800 of users. One of the main goals of the organization is its usability independently of the characterisation of the organization.

- Governance: Annual assembly, they use Loomio groups as a framework of members' participation.
- Economic model: The whole economical information is published on the website. The project is founded by membership fees and a small number of monthly voluntary donations, which are not enough economical sources to invest in improving the project, this being just the developer's' task.
- Technological policy: Public Domain license.
- Knowledge policy: Wiki space under Public Domain license.
- Social responsability: Great number of organizations and users.

**6. FreeSound** <www.freesound.org> Introduction: The project, born in 2005, is promoted by Pompeu Fabra University and it has a research group with the objective to gather free content for educational purposes and research. It was a success, winning prizes from the City Council (2005) and Google (2009). Currently, the platform, which is hosted in a central server, has more than 6 million registered users and over 400,000 registered sounds.

- Governance: Open forum participation moderated by research members.
- Economic model: Growth has been deliberately slow to avoid any financial problems, which could force to close it. The majority of economic limited sources are from research. Promoters are studying new ways of funding based on different types of users or a Wikimedia donations model.
- Technological policy: Open source platform.
- Knowledge policy: Creative Commons license (CC BY) and data is open.
- Social responsibility: Mst creators or producers use FreeSound so as to find sound sources.

**7. XOBB** <http://www.xobb.cat> Introduction: The project, cooperative constituted, is the result of matching two research Universitat Autonoma de Barcelona (UAB) groups from different disciplines: sociology and technology. After the rejection of the national blind association, ONCE, the promoters, with the support of other associations of visually impaired, get resources from a Barcelona City Council grant to finance the first prototype in the Creu Coberta street. Beacons allow blind people to have information about the establishments (e.g. products, offers, opening hours, etc.) without the necessity to access them.

- Governance: Periodic assembly meeting.
- Economic model: Everybody could use it for free, but if somebody gets economic profit of the network, they must pay for it.
- Technological policy: The project, based on open digital infrastructure, replicable, is just starting.

- Knowledge policy: Open data.
- Social responsibility: The main objective of the project is based on inclusion.

**8. eReuse** <www.ereuse.org> Introduction: Computers today are just recycled, not reused. eReuse develops open-data and open-source tools and services to reduce the costs of refurbishing and reusing. It was created in 2015 by Pangea, an independent non-profit association, with 15 community organizations. eReuse launches a tool to trace the origin of the reused material and to see if the end of its life is just recycled.

- Governance: Decision making process of participation focus on local soberany and global federation.
- Economic model: The possibility of agreement with Abacus, in 2017, has allowed the project to get a new dimension by introducing machine cooperative in the recycling circuit. In that sense, there is a good perspective of payment services growth (equipments redistribution, devices appraisal, reporting information…).
- Technological policy: Based on a decentralized open source software
- Knowledge policy: Open data.
- Social responsibility: The project is based on the reuse to decrease unnecessary production impact.

**9. Sentilo** <http://www.sentilo.io> Introduction: Platform to collect data of sensors. It arises from Barcelona City Council in 2012 in the framework of the Internet of Things. The proposal is based on the escenario of exponential sensors growth, when a space, with structured information on each sensor system, will be needed. After that, other ten cities, like Terrassa, implemented it.

- Governance: The organization works like a foundation and the participation model is open.
- Economic model: Some of the proceedings are published on the website.
- Technological policy: FLOSS (LGPL3).
- Knowledge policy: Open data.
- Social responsibility: One of the project objectives is avoid duplicate networks.

**10. Pam a Pam** <www.pamapam.org> Introduction: The platform, born in 2012, is a Setem and XES (two organizations linked to SSE) project to promote responsible consumption. A community of voluntaries map the initiatives, through a qualitative questionnaire. Currently, the project is in a renewal phase with a revitalization plan to face with the difficulty of maintaining territorial community mobilization. At the same time, the promoters want to get a self-managed sustainability funding model, far from subsidies, and legal independence from Setem.

- Governance: Periodic members' assemblies and open participation.
- Economic model: A grant from Barcelona City Council, proposed by Setem, allowed the initial founding. In 2014, a European grant, permitted the incorporation of territorial facilitators and launched a new website more systematic and elaborated.
- Technological policy: FLOSS.
- Knowledge policy: Open data on demand. The new website will allow to download it.
- Social responsibility: The whole projects are linked to the Social and Solidarity Economy.

### 1.2.4.2 Curve of growth and evolutionary stage of the cases

Regarding the stage of the evolution and the curve of growth, the 10 cases shared at the co-creation session position themselves at the curve of growth represented in Figure 1.2, with an initial kick-off, deap growth, maturation with stabilization, and the renewal or gradient. However, cases position themselves in diverse stages of this curve of growth. The majority of them, located in a positive development of their activity.

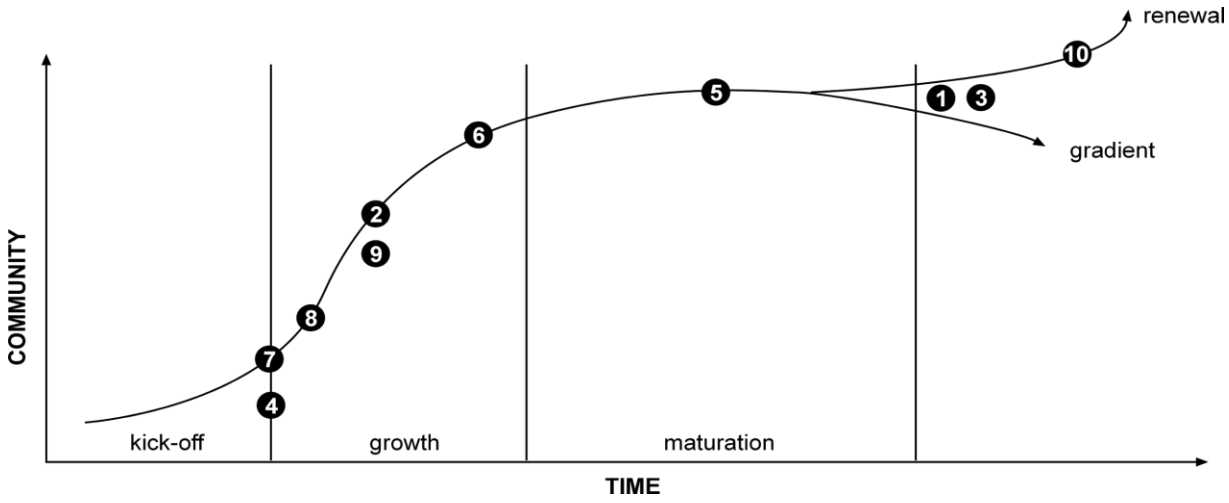



Figure 1.2. Summary of project stage evolution (1. El Recetario, 2. SmartIB, 3. Goteo, 4. Katuma, 5. Bdtonline, 6. XOBB, 7. Fresound, 8. Sentilo, 9. eReuse, 10. Pam a Pam)

### 1.2.4.3 Case comparison analysis

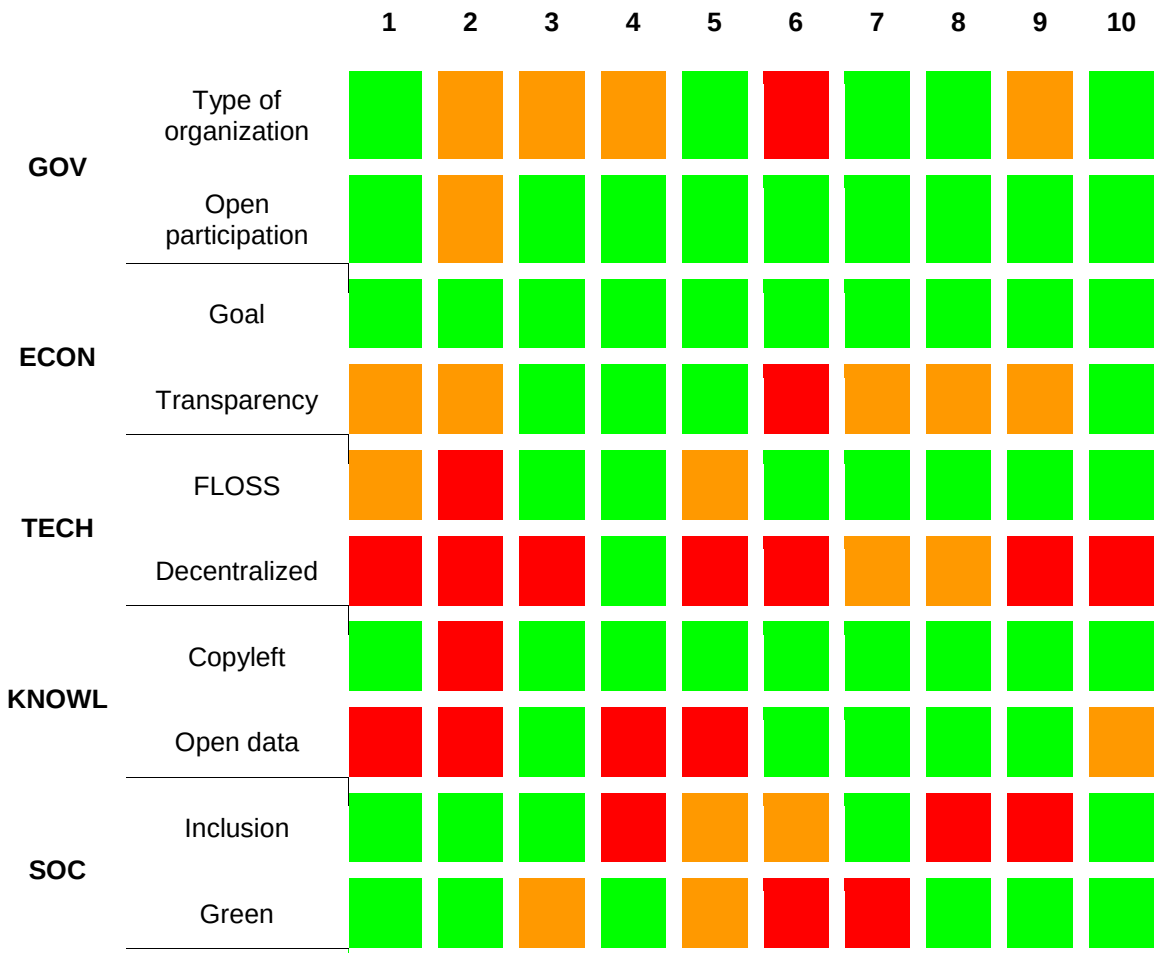
According to the results (Figure 1.3: Case comparison between the cases of the commons balance), none of the cases fulfill the 100% all the 5 qualities. In spite of that, the majority of them accomplish in a good level the commons start collaborative economy review. Some of the cases 3 (Goteo), 8 (eReuse) and, specially, 10 (Pam a Pam), achieve in a holistic approach the majority of commons criterias. Two of these projects (Goteo and Pam a Pam) are in a post-maturation evolutionary stage.

The qualities linked to nonprofit of economic dimension and open participation in governance are the once which more cases fulfill. While technological decentralization, open data and inclusion indicators (in these order) seem to be the areas less fulfilled by the cases.

The governance and economical model get the best test evaluation but, open participation and non-profit organization have better valuation than cooperative governance and transparency, respectively.

On the whole, case 2 (SmartIB), which is in early platform development stage, and it has the less criterias' accomplishment.

Figure 1.3: Case comparison between the cases of the commons balance




Note: Green: fulfillment, Orange: Partial fulfillment; Red: Unfulfillment.
Cases: 1. El Recetario, 2. SmartIB, 3. Goteo, 4. Katuma, 5. Bdtonline, 6. XOBB, 7. Fresound, 8. Sentilo, 9. eReuse, 10. Pam a Pam.

### *1.2.5 Conclusions*

Commons collaborative economy has an important presence. More than 1000 cases have been identified as commons collaborative economy (see directori.p2pvalue.eu). The model is also **very adaptable.** A total of 33 areas of activity where the model is present in Barcelona have been identified (Fuster Morell, 2016b).

Barcelona commons collaborative economy has an important **ecosystemic dimension**. Beyond the extension of the phenomenon in the city, another reflection that emerge from the analysis is that there is a relevant ecosystem aspect of it. Half of the 100 cases analysed (50% of the sample) are not platform per se, or their platform is not their main activity, and connection to commons collaborative economy, but their main activity is to provide complementary services to the commons platforms. These **complementary initiatives** provide technological tools, design services, or networking spaces. In other words, they act as infrastructure and services for the platforms to be able to growth and operate.

All of these projects have a common characteristic: more than to develop or to offer a specific product or service, they focus on creating a **strong ecosystems of relationships**. The ten cases analysed show, in different levels, connections with Social and Solidarity Economy (SSE) and Digital Commons framework, network, and values. On the one hand, Goteo is the strongest project in the Digital Commons area. On the other hand, Pam a Pam is the most matured project of the SSE framework in terms of digital platform.

In spite of the strong ecosystem, the majority of initiatives at the 1000 cases start and kick off, but remain at initial stages, being a fabric of ideas and training; or kick off and growth to a certain level of activity, as satisfactory, but frequently there is not the expectation, nor the intention to **scale** largely. The cases position themselves at a developmental, even mature case, in the curve of growth, even if they are not being "mainstream" or have arrived to the big public. This result is also sound with the results of the P2Pvalue investigation over a sample of 300, which point to a normal distribution of "success" (many medium cases), instead of a power law, few very successful and the majority unsuccessful (Fuster Morell, 2016b).

Regarding business models, the majority of the cases studied depart from a grant or public funding and have a grassroots character. Four of the project were connected to H2020 European funds. The main problem is the project maintenance when the economic support finishes. Only one of the 10 cases sample mentioned here was awarded and used the services for the entrepreneurship of Barcelona Activa (the Barcelona agency of development).

Regarding governance, at the time, several of them have the intention to get another legal constitution. The current legal formulas of economical association do not adapt well to the commons collaborative economy type of activity. Several of them are provided by institutions, be it Universities, like Freesound and eReuse with the UPF, or public administrations, like in the case of Sentilo by the Barcelona City Council. Those that are legally constituted do it through an association (the simplest formula bureaucratically), a foundation or a cooperative. In this sense, some associations (Bdtonline or Katuma, for example) have manifested in the interviews the intention to become cooperatives and others are already in the process (XOBB). What is more, we also observe other cases of collaborative economy platforms (such as femProcomuns) not analyzed in this initial study that are being constituted as a cooperative. If the **legal cooperative formula** spreads on the projects of collaborative economy platform, as this investigation points out, we can find a new bond with growth of cooperatives (Roelants et al., 2014) and the expansion of Social Solidarity Economy movement in the city of Barcelona (Fernàndez & Miró, 2016).

To sum up, most of the analyzed projects part of the four conditions that promote the Commons-based peer production approach (Benkler, 2006): low capital costs, replaced by human capital (the majority of times taking advantage of a community of volunteers), online organized to promote a type of consumption based on collaborative economy and the objective to favour a community of participants. In case of some projects, the holistic correspondence to the commons collaborative economy start framework is excellent and gives a clue to other initiatives. For example, Katuma, agroecological platform which connects consumption cooperatives and producers owned by their own, is using FLOSS software developed by Open Food Network (a decentralized and distributed organization, governed democratically) would be the alternative to the The Food Assembly (La Colmena que dice Sí), unicorn platform that is spreading its activity in the city (Espelt et al., 2017). Despite the relevance of this case (as a platform cooperative, legally constituted as a second degree cooperative) or others, most of the projects, as we expose in the project stage evolution (Figure 1.2), are in early stage and the monitoring of them will be relevant to observing constitutive formulas for other projects that are born within the framework of collaborative economy and like alternative to profit corporate platforms.

# Part 2 - Commons Collaborative Economy: Multidisciplinary State of the Art

## Social Responsibility Regarding Externalizations Impact

## 2.1 Environmental Sustainability of the Collaborative Economy: An Open Debate

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### *2.1.1 Introduction*

Several scholars agree on the lack of attention reserved by the academy to the relationship between collaborative economy and sustainability (Daunorienè et al, 2015; Voytenko, Mont & Zvolska, 2016; Xuemei & Qiang; 2016). There is a significant gap of studies on the issue (Daunorienè et al, 2015), while the supposed benefits created by this model remain scientifically unverified (Parguel, Lunardo & Beinot-Moreau, 2016; Schor, 2014; Voytenko, Mont & Zvolska, 2015). Surely, a problem shown by more scholars regards to the difficulty to identify indicators to measure the sustainability in collaborative economy.

Since its origin, collaborative economy was greeted as a sustainable alternative to the currently unsustainable economy (Heinrichs, 2013; Martin, 2016; Stokes et al, 2014; Wosskow, 2014), and portrayed as a more open, inclusive, democratic and ecological model in what regards to the traditionally economy (Botsman & Roger, 2011; Gansky, 2012).

However, not all scholars agree with this optimistic interpretation of collaborative economy and recent works conclude that collaborative economy does not necessarily exhibit these qualities (Bardhi & Eckart, 2012).

Nevertheless, a deep link between sustainable values and collaborative consumption is a neglected in the research area (Binninger, 2015). In the last years, several studies have tried to focus on the impacts of this model from a social, economic and environmental perspective. Observing the debate on environmental impacts of collaborative economy, we face two mainstream interpretations: one that underlines the benefits of this model, and another that supports the idea that collaborative economy, producing more consumption, increases the pressure on the environment instead. We can conceptualize and synthesize these different points of view through the opposition between who represents collaborative economy as a driver of deconsume and who, instead, represent it as a driver of hyperconsumption (Botsman et al, 2010).

#### Collaborative economy as driver of deconsume

Several analysis support that collaborative economy extends the lifespan of many products by opening up second-hand markets (Binninger et al, 2015; Novel, 2014), and that it can solve the problem of underutilized goods (Demailly & Novel, 2014). In fact, by sharing goods as cars, electric drills and others, it is possible to provide the same levels of services while reducing the production of goods, and thus, also reducing the

associated extraction of resources and the generation of waste (Ibid.). Through a more efficient use of physical capital, fewer resources will be necessary (Sundararajan, 2014).

The benefits of collaborative economy on sustainability are linked with the **optimization of resources allocation** (Hamari et al., 2015), and so with the **resource-saving potential** (Leismann, 2013), with the decrease of carbon emission (Belk, 2014; Kriston et al., 2010; Martin et al., 2011), and with the reduction of gasoline consumption (Martin et al., 2011), in particular through the car-sharing.

Due to the more efficient use of the existing goods, collaborative economy might reduce the demand of new goods (Demailly et al., 2014; Schor, 2014), or of new hotels (Schor, 2014) showing a good ecological footprint. In a better perspective, if collaborative economy operates under the more favourable conditions, it can save up to 7% in the household budget and up to 20% in terms of waste (Demailly et al, 2014). By shifting the paradigm away from individual ownership to collectivity and sharing, less demand for consumer goods may give way to a new economy that could help take on problems such as pollution and excessive energy usage (Prothero et al, 2011), leading to a sustainable consumption. On the other hand, by fundamentally modifying the relations between individuals and consumer goods, it establishes more collective, and probably, more lasting sustainable behaviors (Binninger et al, 2015).

## Collaborative economy as driver of hyperconsumption

However, the presented evaluations of collaborative economy as a source of deconsume are not shared by all scholars. Some studies show that the collaborative economy has become a **phenomenon of hyperconsumption** with negative effects on the environment. This model has created a new market that **expands the volume of commerce** and boosts the purchasing power (Schor, 2014). Due to the low prices, collaborative economy has not represented a substitute for the request and production of new goods but rather, it stimulates and accelerates consumption and provides access to goods that people could not afford before (Belk and al, 2003; Demailly et al, 2014; Denegri-Knott, 2011; Felländer et al., 2015; Schor & Fitzmaurice, 2015;). Schor (2014) calls these results the "ripple effects", they are the indirect effects of collaborative economy: What does the sellers do with the money earned? What does the consumers do with the money saved? (Ibid.)

The low prices attract people and boost them to travel more exploiting car-sharing or accommodation sharing. So car-sharing has not reduced emissions but, by expanding the access to car usage, has increased them (Ibid.). In addition, the cheap ride services are diverting people from public transportation (Ibid.). Also the sharing of accommodation is not showing the expected results: the greenhouse gas emissions of accommodation P2P platforms (including Home Exchange, Couchsurfing etc.) kept invariant compared to incumbent hotel industry (Voytenko et al, 2015), meanwhile several people stayed longer in the spot when they booked accommodation through P2P platforms, which may create extra local pressure on the environment (Ibid.). A recent study (Parguel, Lunardo and Beinot-Moreau, 2016) on redistribution markets shows how the **P2P platforms influence consumers behaviour in negative way for the environment**. Surely the second-hand market has grown strongly with the diffusion of web and of digital platforms, but this did not imply a more sustainable attitude. The second-hand market stimulates demand for new goods while owners of new goods are able to sell their assets more easily a buy new assets more frequently (Thomas, 2003). As a consequence, the second-hand market supports and promotes primary markets by making consumer products into “liquid assets” (Thomas, 2011). The authors show more significant results from their study carried out in France: conscious consumers exhibited more impulse to buying on second-hand P2P platform than less conscious consumers, as these platforms favor self-licensing behaviors[4]. Parguel et al (2016) argue that P2P platforms enhance the consumeristic attitude and,

[4] The concept of self-licensing is based on the finding from decision-making research that people are more likely to behave in ways that can be easily justified (Shafir et al., 1993). This theory has been recently applied to consumer behavior (the term “self-licensing” was first employed by Khan and Dhar, 2006) and

at the same time, represent a perfect context to justify this contradictory behaviour. Because these platforms are supposed to be virtuous, encourage zero-waste, and offer a second-life to objects, they offer an ideal place where conflicts between materialism and environmental consciousness are "solved" by impulsing buying behaviors and so, overconsumption.

These authors read the collaborative economy at the current conditions as a driver of hyperconsumption that ends up being a predatory and exploitative model.

It is also important to say that often the entrepreneurs instrumentalize the environmental arguments as brand to be more attractive and to promote their activity (Demailly and Novel, 2014; Voytenko et al, 2016), with the risk to practice **greenwashing**. On the other hand, the main motivation of users is to optimize purchasing power (Demailly et al, 2014) rather than the environmental reason (Binninger et al, 2015; Voytenko et al, 2016).

However, any generalizations about sustainability of collaborative economy may be misleading because **the results can vary significantly between different types of platforms** (Ibid.). In a study carried out by Voytenko, Mont and Zvolska (2015) on collaborative economy in the accommodation sector, the authors showed different outcomes for different sharing platform: for-profit platforms, the use the ethos of sustainability to attract more users (both hosts and guests), but nevertheless prioritise economic prosperity over environmental or social dimensions. Non-profit platforms, instead, seem to have environmental and social benefits as priorities. At the same time the environmental aspect can gain a different relevance for different actors, as we can see observing Martin's study (2016) on collaborative economy framing subsequently discuss.

### Lack of attention of the commons collaborative economy

Another limitation of the current work is that it has only focused on the impact of the "unicorn" models (Fuster Morell, 2016c). In concrete, it has focused on the impact of car sharing (Fraiberger & Sundararajan, 2015; Hall & Krueger, 2015), on rental industries and tourism accommodation (Fang et al., 2016), and on online labour (Agrawal et al., 2013; Horton & Golden, 2015), as well as on the contrasting impact of the "unicorn" model and the current incumbents (Zervas et al., 2015). Furthermore, this work is sometimes presented by stakeholders involved in the controversies (Fuster Morell, 2016c, 2016d). For example, Uber and Airbnb have released dozens of reports, but their reliability cannot be independently validated because the methodologies are not transparently illustrated and the data is not made accessible to researchers (De Groen & Maselli, 2016; Kässi & Lehdonvirta, 2016). In contrast, there is a lack of analysis of commons oriented modalities of collaborative economy (Fuster Morell, 2016c, 2016d).

## *2.1.2 Attempts to build a research framework to assess environmental impact of collaborative economy*

Independently, by optimistic or pessimistic interpretations of sharing economy, in the last three years several authors from different backgrounds have tried to develop some purposes to study and evaluate the sustainability and the ecological footprint of collaborative economy. We have to discern between the more general and political purposes advanced to create the conditions for an ecological collaborative consumption and other purposes addressed, instead, to develop new methods of investigation, or to evaluate the sustainability narrative in collaborative economy recurring to the concept of the social

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previous research agrees that the context providing justification for self-licensing serves to enhance consumers' self-concept (feeling virtuous), therefore, allowing for transgression versus an initially goal set (Khan & Dhar, 2006). In their paper Parguel el al. (2016) use the self-licensing theory to explain the consumistic behavior in the context of P2P platforms.

movement's studies.

There is a broader consensus among scholars in recognizing the role of a legal framework (Demailly et al, 2014; Schoenbaum, 2016; Voytenko et al 2015; Xuemei & Qiang, 2016), and of social movements (Schor, 2014) linked with the collaborative economy in order to address this model to an ecological approach. So, institutional actors and social movements are identified as subjects capable to address collaborative economy to a more fair model from a social, economic and environmental perspective.

## Absence of a legal environmental framework

One of the most discussed aspects in the collaborative economy debate concerns with the absence of a legal framework, with the consequences that these models can elude **environmental regulations**, only to speak of the ecological issue[5]. As the first step, Demailly & Novel (2014) propose that **public authorities** should conduct an in-depth analysis of the sharing models as a way to recognize them in a political weight. It is necessary to identify virtuous models and implement supporting measures. Then, they have to build an economic and regulatory framework that is conducive to the most sustainable models. In particular, taxation should take environmental externalities into account in the best way possible (Ibid.). Also other scholars agree on the need to regulate collaborative economy (Smorto; 2017; Voytenko et al, 2016) that, as many denounce, operates in a legal vacuum (Kuttner, 2013; Griswold, 2014; Singer, 2014). In parallel with the institutional and legal activity, many authors give a central **role to the social movements**. Nevertheless, Schor (2014) is more critic with collaborative economy, in particular because capitalistic logic has transformed it in a activity only for profit, while the large corporations have co-optate the alternative platforms. Schor recognizes the possibility for the movements or organizations that operate in solidarity to organize and join the user to struggle against these tendencies. Sharing practices and cooperation are into the DNA of social movements that through their activity can create a platform for their members and challenge business model (Ibid.) by building a social, democratic and ecological model. This perspective has shared also by Binninger et al (2015) that, among the various purposes, promote the idea of a critical mass as a fundamental condition to ensure the sustainability of the model. In a more specific way, Demailly et al. (2014) state that social movements can support and address collaborative economy through four main action areas: 1) increasing visibility with communication campaigns or labelling; 2) working as a funding and incubators for innovative projects; 3) adapting of regulation to suit new models; 4) encouraging public authorities to support and implement best practices. The continuous social movements pressure can contribute to develop collaborative economy in a ecological oriented way.

In addition to these purposes, principally focused on the attempt to create a social and political context adequate for a sustainable collaborative economy, other important authors, have thought some models to estimate the ecological footprint of the collaborative economy in a more quantitative way or to evaluate environmental awareness through a qualitative method.

## How to measure the sustainability of collaborative economy?

On the one hand, some scholars promote the idea to estimate the actions of collaborative economy business models (Daunorienè et al, 2015; Demailly et al, 2014). Nevertheless, this is not so simple. On the other hand, other authors prefer studying the environmental narrative that connote these models and the way in which they frame collaborative economy (Martin, 2016; Voytenko et al, 2016).

Evaluating the initiatives put in place by sharing companies seems a good way to verify their sustainability. In their paper Daunorienè et al (2015) recurred to the definition of sustainability evaluation as "a process

[5] The urgency of a legal framework is more important also to regulate the different sector, to protect the workers and the consumers, to impose a taxation and to re-define an antidiscrimination law that take into account the gender and race discrimination in collaborative economy model (Smorto, 2017).

by which the implications of an initiative are evaluated, where the initiative can be proposed or an existing policy, plan, programme, project, piece of legislation, or a current practices or activity" offered by Pope, Annandali & Morrison-Saunders (2004). Subsequently, they propose to **evaluate the initiative considering five environmental perspective** (materials, emission and waste, built-form and transport, energy, water and air) and through a point scale of sustainability[6] to identify poor practices, mid-point/basic equilibrium and highest level of sustainability of the sharing model. Also Demailly et al. (2014) share the necessity to take into account the terms of measures not only referring to the waste generated by the sharing model but also to the energy dimension (the energy and resources to product goods and the energy to transport them). Alternatively, Demailly et al. (2014) propose to estimate the initiatives by checking if they have passed a complete **Life Cycle Assessment** (LCA). In addition they argue that it is necessary not only support the sharing models that demonstrate to have a green approach by passing the LCA, but also to positively support the practices with a proactive environmental approach (such as eco-design, maintenance, recycling, etc.).

This means that both, concluded actions and work in progress activity, can be useful to estimate the sharing models approach to the environmental problems.

## Framing analysis

In parallel, other authors have proposed to estimate the sustainability of sharing models observing their discourse, by using a more sociological approach. By regaining the concept of framing, developed by Snow and Benford (1988) into social movement research, and by adopting a Foucaultian perspective conceptualising discourse “as an ensemble of ideas, concepts and categories [expressed in language] through which meaning is given to social and physical phenomena, [and] which is produced and reproduced through an identifiable set of practices” (Hajer and Versteeg, 2005: 175), Martin (2016) tries to apply this sociological approach to the study of collaborative economy discourses.

Nonetheless, Martin does not focus exclusively on the environmental discourse, his purpose can be very useful to understand the **different actors framing in collaborative economy** and so, also to understand the **relevance that they give to ecological aspects and the way in which they interpret sustainability in their practices**. He argues that the discourse on the collaborative economy is framed in contradictory ways; ranging from a potential pathway to sustainability, to a nightmarish form of neoliberalism. But, when an actor framed in the collaborative economy, they outline at the same time how and why they would like to see it develop (Franceschini & Pansera, 2015).

Martin propose to use the three sub-frames identified by Geels (2014), which are used to re-elaborating the Snow and Benford theoretical contribution (1988): (1) diagnostic sub-frame[7]; (2) prognostic sub-frame[8] and (3) motivational sub-frame[9]. These three frames are useful to understand the point of view of the different actors. Subsequently, he argues that it is necessary to discern between the frames of the actors that want to empower collaborative economy and the frames that connote actors who are trying to resist to the development of collaborative economy models. The ones who support collaborative consumption model

[6] In the scale of sustainability purposed there are 9 points: 1) critical sustainability; 2) bad sustainability; 3) highly unsatisfactory (poor practices) – 4) satisfactory -; 5) satisfactory; 6) satisfactory +; 7) highly satisfactory; 8) good (mid-point/basic equilibrium) – 9) vibrant (highest level of sustainability) (Daunorienė et al, 2015).

[7] The diagnostic sub-frame identifies and defines problems faced by the niche or regime (Geels, 2014).

[8] The prognostic sub-frame offers and advances solutions to these problems in the form of niche innovation or regime reconfiguration (Ibid.).

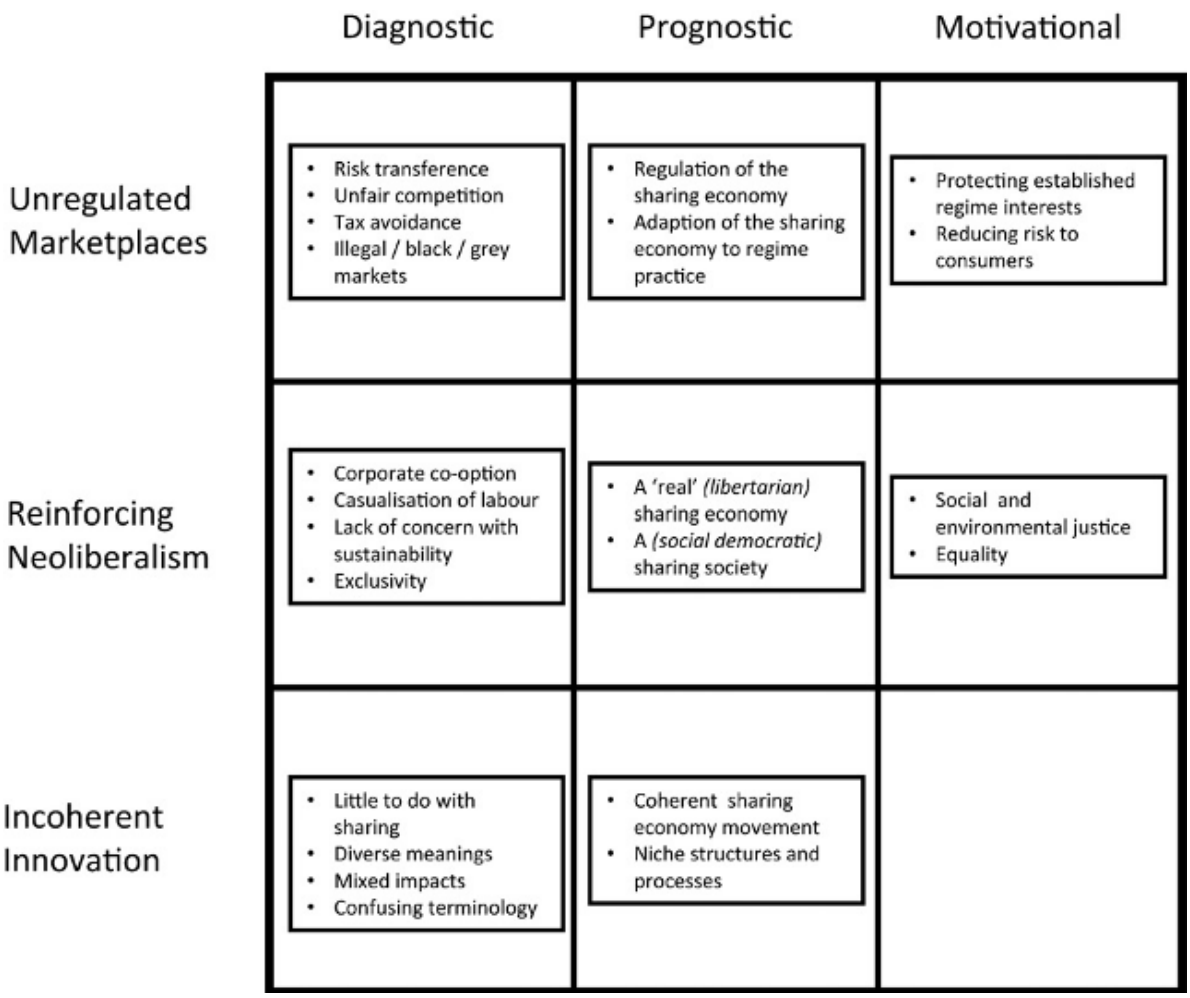
[9] The motivational sub-frame establishes the rationale for taking action to address the problem (Ibid.)

frame do it in three main ways: collaborative economy as (1) an economic opportunity; (2) a more sustainable form of consumption and (3) a pathway to a decentralised, equitable and sustainable economy (Martin, 2016). On the other hand, the resisting agents to the frame of collaborative economy see it as: (4) creating unregulated marketplaces; (5) reinforcing the neoliberal paradigm; and, (6) an incoherent field of innovation (Ibid.).

These different framing are reproduced by Martin in the following synthetic and intuitive table.

Table 2.1: Martin (2016) - Framing analysis scheme

| | Diagnostic | Prognostic | Motivational |
|---|---|---|---|
| Economic Opportunity | • *Promoting economic growth* | • Commercial Opportunity<br>• Micro-entrepreneurs<br>• Monetising underutilised capacity | • Economic empowerment<br>• Inevitable technological change<br>• Changing patterns of behaviour |
| | | • Peer-to-peer platforms<br>• Disruptive innovation | • Efficiency |
| Sustainable Consumption | • Unsustainable consumer behaviour | • Access-based consumption<br>• Trust | • Sharing is fundamental human behaviour<br>• The triple bottom line |
| | | | • Individual empowerment |
| Decentralised, Equitable and Sustainable Economy | • Centralised capitalist economies<br>• Climate change<br>• Inequality | • Decentralising the economy<br>• Digital innovation<br>• *Social innovation* | • Pathway to a new economy<br>• Social and environmental justice<br>• Liberty and democracy |




Through the analysis of the discourses, it is possible understand also how different actors read the relationship between collaborative economy and sustainability.

This approach has been applied by Voytenko et al. (2016) in their study on sharing in the accommodation sector. The authors analyse how sustainability is framed and understood by the operators and users of P2P accommodation sharing platforms. The results emerged by the empirically study show that current framings of environmental (but also economic and social) implications of the collaborative economy in general and accommodation sharing in particular vary between those who formulate them, and between platform types (rental, reciprocal and free). Therefore, any generalisations of sustainability framings to the broad collaborative economy or to its sectors may be misleading.

### 2.1.3 Conclusions

Even with an initially optimistic interpretation of collaborative economy, the arguments here discussed have shown a series of elements that conduct scholars to put in question the positive impacts of the corporate oriented collaborative economy model. On the one hand, sharing is a way to reduce consumes and costs; on the other one, it is a way to saving money that is spent in other goods or services, becoming a driver of hyperconsumption. Substantially, collaborative economy has provided access to consumption to a wide sphere of people before excluded, increasing in general the levels of consumption. At the same time, behind the collaborative label, there are companies oriented to make profit exploiting the environmental sensibility

of many consumers. Regarding the necessity to measure the impact of collaborative companies, some scholars have proposed to quantify the waste generated or the energy saved to estimate the ecological footprint of a business. Others, instead, argue that it is necessary to evaluate the environmental sustainability of collaborative companies through the analysis of discourse/framing studies. If again, there is not a shared method to investigate about the ecological impact of different companies, what result strongly shared is necessary to develop a legal framework to regulate collaborative economy and to address it towards the implementation of an ecological approach.

# 2.2 Gender, Discrimination and Collaborative Economy

Paola Imperatore and Mayo Fuster Morell (Dimmons IN3 UOC)

## 2.2.1 Introduction

In the study of the relationship between collaborative economy and gender, there is currently a significantly gap between what is known and what is wished to be known. (Schoenbaum, 2016). There are few contributions to the debate and the majority of the articles that discuss the issue do it in a more generic framework linked with overall discrimination in the collaborative economy model.

Only in the start of 2016 was a first, more specific paper on gender and collaborative economy published by Naomi Schoenbaum. However, this contribution, focuses on the relevance that gender identity takes in collaborative economy rather than exploring the participation from a quantitative and qualitative perspective.

Since its origin, the collaborative economy was greeted as a more open, inclusive, democratic and ecological model when compared to the traditional economy (Botsman & Roger, 2011; Gansky, 2012). Virtually all exchange sites and digital platforms within the collaborative economy explicitly advocate for open access and equality of opportunity (Schor et al., 2016) and, with a focus on gender dimension, this model has been celebrated as a flexible alternative to traditional employment for those with family responsibilities, especially women (Singer, 2014).

Nevertheless, the collaborative economy presents challenges for gender equality (Ibid.) and different authors argue that this model reproduces gender, race and class hierarchies and biases (Edelman et al., 2014; Schor et al., 2014).

## 2.2.2 Gender identity shaping interaction in the collaborative economy

Different scholars have in fact observed that the presence of photographs and names can reveal identity traits like race and sex, by producing a personalization of the transaction and, in consequence, allowing discrimination (Edelman et al., 2014; Schoenbaum, 2016). Another element that makes the collaborative economy a context liable for gender discrimination is that transactions take place in contexts without structural features (such as laws or social norms[10]) that constrain discrimination (Schoenbaum, 2016).

In this framework, the thesis of Schoenbaum (2016) offers an interesting contribution that analyzes in a more in-depth way the internal dynamic of a collaborative economy. She argues that **in this model, the gender identity takes more relevance** to both buyers and sellers due to the increased intimacy of the economic transactions. The transaction between buyer and seller in a more personal space makes these transactions intimate, giving access to private information that is not typically shared with others (Ibid.). In this way, sharing models contrast with the goal to reduce the salience of gender identity in the labour market while, at the same time, extending existing gender discrimination laws to the collaborative economy may not alleviate these troubles due to the particular contexts in which the collaborative economy takes place[11]

[10] As Schoenbaum (2016) argues, the publicness of interacting in the traditional economy makes buyers and sellers more likely to be subject to the pressures of social norms, including the norm of nondiscrimination while the transaction is online in the collaborative economy, with no one watching, makes it easier to act on discriminatory preferences, without any sense of being monitored.

[11] Collaborative economy transactions often transcend the boundaries of home and market in that they occur in a seller's or buyer's private space. In consequence, there are significative limits to the laws that

(such as homes, cars, etc.).

By assuming that market transactions present more risks and considering that in collaborative economy many of these transactions occur through a digital platform (Ibid.), the **issue of trust** becomes central[12] to explain how gender discrimination operates in collaborative economy. Thus, one of the more usual tools to mitigate the risks is to make the transaction more personal; with this, many companies (such as AirBnb, TaskRabbit, etc.) require descriptions of users and providers, such as photos, names, or characteristics and also, in some case, to post a photo of their own home or car. At the same time, the intimacy of some services can lead consumers to be more comfortable with workers of a particular gender identity (such as for the gynecologist) (Lewin, 2001). This mechanism is reinforced in the collaborative economy where the intimate nature of the transaction makes it more vulnerable to gender identity preferences (Wortham, 2014).

Thus **collaborative economy firms, reproducing gender stereotypes**, such as the image of women as a more reliable, caring and reassuring, **use gender identity as a risk-reducing mechanism** that confers trust and that orients preferences. Intimate workers identities can be represent a powerful signal.

Results show that both males and females prefer a female service provider when the nature of the exchange is more intimate (such as for sharing a home or a car) (Schoenbaum, 2016).

Another study performed by Roy (2016) studied the issue of trust in collaborative economy but from a different perspective. She hypothesized that the reason why there are more men engaged in the collaborative economy is because they are more likely to trust strangers than women. By testing this hypothesis determined the contrary; women are more risk averse than men, as demonstrated also by Borghans, Heckman, Golsteyn & Meijers, (2009). Thus, the lowest percentage of women is not due to feminine features such as their attitude to risk, but, rather, to structural dynamics.

### *2.2.3 Participation of women in collaborative economy platforms*

By speaking about the **participation of women** in collaborative economies we can observe that it **can vary significantly in relation to the nature of the exchange**. A study conducted by Schor et al (2016) on different types of sharing models reveal that the participation of women depends by production area. Take as example the case of CraftWorks, a coworking project. It is possible to observe that several areas of production remain relegated to the boundaries of masculine space, in which women can hardly enter, and the feminine area, revealing the stigma associated with performing **activities traditionally associated with femininity** (Schor et al, 2016). The authors show also a **gendering of practices**: the interviewed participants frequently reference the difference between consuming and making. This difference reflects the traditional cultural opposition between active and passive (Bourdieu, 1999); while the passive trait is associated to woman that in the case of a collaborative economy is often a consumer, the active trait is instead related with man, that, in a sharing model, is the person that produces, that actively engages with tools and materials (Schor et al, 2016).

In the other collaborative economy case studied by Schor et al (2016) and linked with the production of food, the authors observe the prevalence of women in an area that is traditionally considered as feminine. However, in the case of Wintrepreneur, scholars argue that there is a stratification in term of gender, race and class (Ibid.).

This brings back to the discourse of the **gendered division of labour** as a mechanism that divides the

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have the transformative effect that it has had in the traditional economy and to put in place a regulation for gender equality (Schoenbaum, 2016).

[12] Also Botsman and Rogers (2011) cited trust as the primary inhibitor to many participating in the collaborative economy but they have not related this question with gender issues.

production area in relation with the gender identity of one person (Bourdieu, 1999) and that, in a collaborative economy, is reproduced.

There is a significative presence of women in the collaborative economy model but the area in which they are more represented and the role that they hold is, often, an expression of a gender discrimination. Also the analysis of Roy et al (2016) supports this thesis: while the demographic analysis of major collaborative economy services shows that there is no gender disparity when it comes to using the services, from the service provider side instead there is a gender disparity as has been demonstrated by industry analytics.

So, gender discrimination joined with the racial one, leading the authors (Schor et al, 2016) to speak of the **paradox of openness** in relation with the collaborative economy. In fact, observing the racial and gender composition of some sharing models results in what the authors call the "Paradox of openness and distinction" between actual practice and the collaborative economy's widely articulated goals of openness and equity.

### *2.2.4 Instrumentalized gender sensibility*

As for the environmental issues with greenwashing (Demailly & Novel, 2015; Voytenko et al., 2016), it is not to exclude that some firms use and instrumentalize **gender sensibility as a brand** to attract more people.

It could be the example of Uber, or other carsharing services as Lyft and Sidecar. In particular in the case of Uber, the firm has discovered the preference of some consumers for a female car-service and in 2014 has offered a new service specifically with cars driven by females. Despite that Uber has promoted itself as a creator of job and a driver of gender equality, the data shows a different situation. The sex informal segregation is in particularly marked among drivers for ride-sharing services (Jeffe, 2015) In fact, women constitute 30% of Lyft's drivers, 40% of Sidecar's drivers and only 14% of Uber's drivers So, while Uber claims to be a job creator, it has been a job creator almost entirely for men (ibid.).

On the other hand, it is necessary to take into account the considerations of Schoenbaum (2016) about gender discrimination in ride-sharing services. The safety of drivers is a central issue: many female drivers were victims of sexual harassment and physical fondling by riders (Huet, 2015). Thus, the safety concerns contribute to the segregation of ride-sharing services not only because women avoid driving due to these concerns, but also because these concerns—and women's attempt to address them—end up making driving less lucrative for women. In fact, the busiest times of the week for ride-sharing are nights and weekends, when drivers can make more money (Greenfield, 2015). But these are also the times when riders are the most likely to be intoxicated. As a consequence, female drivers who opt not to drive during these times due to heightened safety concerns have a lower income (Schoenbaum, 2016) and also less references that are fundamental to continue to work because firms, routinely remove drivers with a low rating (Greenfield, 2015).

However, for Schoenbaum as for other scholars, more analysis of the situation is necessary to assess the effect of the collaborative economy on female welfare, and their work tries only to illustrate some challenges that the collaborative economy present for gender equality without stigmatizing sharing models.

Until now, the tools to address this model in a more gender equal way are very limited. Scholars agree that market responses alone have thus far been inadequate to constrain the salience of sex in the collaborative economy, and rather have often had the opposite effect.

Schoenbaum (2016), whom analyses the collaborative economy in particular from a legal perspective, is quite a critic in respect to the role of antidiscrimination laws in these specific contexts for the reason already illustrated. However, she purposes to **ban the access to intimate information** both for buyers and sellers when conducting a transaction and avoid any kind of discrimination. (Ibid.)

While, from other scholars there are only more generic proposals to address sharing model in a more democratic and open economy, but there is a lack of ideas on how intervene with gender discrimination.

### 2.2.5 Gender inclusion and commons collaborative economy: Worth a picture more than corporate models?

The commons collaborative economy is older than the corporate modalities of collaborative economy, so it has a longer history. In this regard, it has received more research attention. Gender inclusion and the commons collaborative economy has been investigated in depth, and the results do not provide a very positive picture. For instance, the **proportion of women in FLOSS** is estimated to be less than 5% (Ghosh 2005), while the proportion of female in proprietary software is around 30%. Overall, it has been argued that FLOSS is founded on a **sexist culture** (Reagle 2012). Furthermore, editors at Wikipedia are estimated to be between 12-26% female (Antin et al, 2011; Hill et al, 2013).

The gender gap is not only a growing concern for researchers, but also for the DSI communities themselves. For instance, the Wikimedia Foundation has launched a Grant program (Inspire Grants: Gender Gap Campaign) focused on funding projects that aim to reduce the gender gap in Wikimedia projects (Wikimedia Foundation, 2015). There are multiple initiatives that collaborate with FLOSS communities in order to promote gender equality, such as UNESCO's program (UNESCO, 2014), and grassroot initiatives such as the Ada Initiative (Soper, 2015).

Research on the connection between reward systems and gender inclusion point interesting results. There is evidence that, contrary to other types of rewards, gratitude-rewards are appreciated by female collaborators, and in fact they tend to thank others more frequently (Iosub et al, 2014). Besides, incorporating thanks is considered to be a reason for there being twice the amount of female engagement in Wikihow than in Wikipedia (Fuster Morell, 2010).

### 2.2.6 Conclusions

The birth and diffusion of the collaborative economy put into place several challenges from different points of view. In this section we are focused in particular on the gender dimension of the collaborative model, observing that, nevertheless it's supposed open and inclusive nature, it reproduces gender discrimination. If there is a relevant participation of women in the collaborative sector, it is also true that they are prevalent in production areas traditionally associated with femininity. At the same time some scholars show that women are more relevant in the consumption sphere (passive) rather than in the production sphere (active) in which they are principally men, reproducing a sexist stigma. If there is evident a gendered division of labour in the collaborative economy, it is also a show of discrimination with the role of woman in collaborative businesses. In fact, speaking again of the collaborative sector, the percentages of women to the higher levels of governance is really low and completely unbalanced in favour of male component.

As argued, part of the problem is linked with the limits of a law to intervene to guarantee a legal framework in which collaborative companies can operate and to protect people from every kind of discrimination. On the other hand, there are positive signals in the interest of scholars to investigate the issue and even more frequent programs to address the collaborative economy in a real open and inclusive model.

# Business Models

# 2.3 A Review of the Business Models of the Digital Collaborative Economy: Digital and Digitally-Supported Commons and Open Data

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## *2.3.1 Introduction*

The digital era has opened the way to new ways of organizing production and exchange, and it has also allowed for the creation of new types of commons, such as digital commons or platform cooperatives. Indeed, the commons collaborative economy covers a spectrum of activities wider than those related to the digital ones, since it refers to business models and social practices compatible with the logic of the commons. The latter can be purely physical (e.g. a lake, a shared garden, a building, etc.) and, in that sense, **digital and digitally-supported commons are to be considered as a subset of the commons collaborative economy.** The particularities of the digital dimension, as we will show along this chapter, justify paying special attention to these type of common.

Success stories such as Wikipedia's or Firefox's have shifted the attention of researchers to the (digital) commons collaborative economy. Nevertheless, with the exception of free/libre/open-source software (FLOSS), little attention has been paid to the study of the business models of digital and digitally-supported commons and open data. **The goal of this chapter is to contribute to fill that gap by reviewing the business models of digital and digitally-supported commons and open data**. We believe that it is of paramount importance to understand the business models of these commons in order to be able to act in favor of their development.

In particular, the question of how digital and digitally-supported commons or open data projects can create a sustained revenue flow results puzzling when they are analyzed using the rationale of traditional capitalistic firms. Although the purpose of commons is not to make a profit, in many cases making revenue results imperative for the existence and the development of the commons for it not to be threatened. It would seem, at first glance, that revenue making is hardly compatible with the logic of the commons. For example, if data is opened in an unrestricted manner for people to download it freely, who pays for the collection and the maintenance costs? **As we will show along the chapter, many revenue making strategies are possible for digital and digitally-supported commons. The following ones, which can be structured around some categories, will be identified in the next pages:**

### 'Shifting' revenue making strategies

This category refers to revenue models in which, in order not to charge for the common produced, revenue making is 'shifted' towards the selling of something else related to the common.

The category includes, among others, revenue making strategies such as charging for a physical copy of the content (e.g. a printed book, a vinyl), selling merchandise related to the content (e.g. a band's T-shirt), charging the licensing of a FLOSS software if it is used for commercial purposes, dual licensing, selling complementary goods (e.g. accessories), selling a complementary service (e.g. training, technical assistance, etc.)

### ‘Dissociating’ revenue making strategies

This category refers to revenue models in which a positive externality created by the main output is produced and used to create revenue.

The category includes, among others, revenue making strategies such as advertising, sponsorship or the selling of personal data.

### Reciprocity-based revenue making strategies

This category refers to revenue models in which individuals or organizations make voluntary financial contributions to sustain the production of a common on the basis of reciprocity.

The category includes, among others, revenue making strategies such as memberships, donations, crowdfunding or pay-what-you-want.

### Third-party funding

This category refers to revenue models in which an institution funds the production/conservation/expansion of a common as part of its own mission and/or as part of pursuing commercial interests, as opposed to voluntary reciprocity-based funding.

The category includes, among others, revenue making strategies such as public funding, grants, financing by capitalistic-oriented firms or grants.

### Freemium

This category refers to the selling of an extended/more performant version of the original digital common. It is widely used by the FLOSS community, although it is also used by platforms that offer a paid version that offers more features to users.

### Brokerage

This category refers to revenue making based on matchmaking two parties, such as a driver and rider or a host and a guest. In the case of the commons collaborative economy, it is widely used by platform cooperatives.

It can take different forms such as a transaction fee (either ad valorem or flat) or a subscription fee.

Along this chapter, we will show when each of these strategies makes sense depending on the type of digital, digitally-supported common or type of open data project considered. **In that sense, in addition to an identification of revenue making strategies, the chapter will propose a categorization of business models based on their rationale, the revenue model being one (key) piece of a business model along with the mode of production, licensing and governance.**

In order to fulfill this goal, the chapter will be divided in three sections. Section 1 will set the framework and basic definitions that will guide the study of business models of the two following sections. In particular, Section 1 will explain the specific economic sustainability issues that arise with digital and digitally-supported commons, explain this distinction, and offer a definition of ‘business model’ and ‘open business model’. Section 2 will offer a categorization of business model families based on four main components: mode of production, governance, licensing and the revenue model. The families will be drawn based on the type of common created, namely FLOSS, ‘digital content commons’, open hardware and platform cooperatives. Section 3 will repeat this exercise for a particular type of digital resource: data. Because of the particularities of this type of resource, and because of the special interest it has for the general purpose of the project in which this investigation is framed, we considered necessary to pay special attention to the different business model families that exist around data. Moreover, the distinction between data commons and open data will be made in this section, the latter being the (broader) object of study.

## 2.3.2 - Section 1: Business Models, Commons Collaborative Economy in the Digital Era and Open Business Models: Old and New Challenges to Economic Sustainability

This section sets the framework of the study of the business models of the digital collaborative economy that will be done in the following two sections. First sub-section i.e. 2.3.2.1 will show how the introduction of the digital dimension has added a layer of complexity to the study of economic sustainability of commons. The fact that digital commons are non-rival goods in which the goal is the diffusion and enrichment of the resource rather than its conservation, for example, has created new logics of value creation and business model possibilities that are not present in the natural-resources-based commons studied by Elinor Ostrom and the Bloomington School. Second sub-section i.e. 2.3.2.2 will narrow the scope of our investigation by defining the first object of our study, namely digital and digitally supported commons. These two concepts will be defined and the distinction between the two will be made explicit. After doing so, we will define the concept of business model (a concept for which there is no consensual definition in the literature) as "the distinctive and fundamental principles and mechanisms by which an organization deploys a strategy to create, sell, and use values (of use and change), in order to fulfill its primary goals" (Harracá, 2017). We will show how the concept of *open* business model, which refers to "those models that encourage sharing of knowledge under open licenses, from free to some rights reserved" (Tebbens, 2017), is not a perfect synonym of "digital collaborative-economy-compatible business model" even though most of the times corresponds to the type of business model used by digital and digitally-supported commons.

### 2.3.2.1 The Economic Sustainability of Commons from Natural Resources to the Digital Era

Research on commons has been on the rise since the 1980s. We can trace back three capital reasons (Cornu, Orsi, & Rochfeld, 2017) to understand the surge of a new body of literature around this concept in many disciplines (economics, political science, law, etc.) and, at the same time, account for the direction of its evolution regarding the subject of interest for us, the economic sustainability of commons.

The first one is the pioneer research of Elinor Ostrom and the Bloomington School. This research led her to obtaining the Nobel Prize of Economics in 2009, which in turn sparked the interest of economists for commons. Ostrom's research showed how, in a context of ecological crisis, the management of natural resources as commons could make the resource endure, in contrast to the failure of public-based or exclusive private-property-based management. This meant a departure from the mainstream literature in economics represented by Hardin's famous 'Tragedy of the commons' (Hardin, 2009), which held that shared property rights over a resource would lead to overconsumption and its consequent depletion. The contributions of the Bloomington School have been essential to the economic investigation on commons for two reasons. First, they settled a solid theoretical definition of the concept of 'common' rooted in that of 'bundle of rights'. Second, they elucidated the eight basic governance principles ("design principles" in the Ostrom's words) required for a natural resource to survive over time (Ostrom, 2008). Nevertheless, these principles remain circumscribed to a particular kind of common on which Ostrom's empirical work focused: natural resources managed by middle-sized communities that aim at preserving them in time and quality. Immaterial resources were absent from this first stage of research.

It is precisely after the obtaining of Ostrom's Nobel Prize in 2009 that a body of literature focusing on immaterial commons started to appear to fill this gap. However, its appearance has other historical roots that go beyond its intellectual history. We can identify two of the major ones. First, the process of strengthening and extension of intellectual property rights all over the world in the 1990s alarmed many authors in the economics field (although it also did so in other fields such as culture, for example). Those authors denounced that this new enclosure movement (Boyle, 2003) was damaging innovation: the multiplicity of exclusive intellectual property rights over complementary immaterial assets codifying basic knowledge was blocking the access to the very sources of innovation (Nelson, 2004; Orsi & Coriat, 2006; Shapiro, 2000). This was contrasted to the other historical root of research on immaterial commons, the

free software movement. Software was one of the main preys of the intellectual property rights revolution of the 1990s. In response, a counter-revolution appeared with the legal innovation of free software licenses and other free licenses. These licenses allowed for the first time individual creators or communities that had produced an immaterial good (software, databases, music, etc.) to manage a bundle of property rights that assured shared property *through the use of (strengthened) intellectual property rights* (Mangolte, 2013). In sum, immaterial commons were appearing as a response to the increasing overreach of exclusive property just as natural resources-based commons had been appearing to preserve natural resources in face of an expansion of individual exclusive property rights regimes over them. Just as the latter process inspired the orientation of the Bloomington School's economic research, the second one inspired a new body of literature on immaterial commons. Ostrom's economic research aimed at understanding how should medium-sized communities govern shared property over a natural resource to preserve its integrity and quality in time. The new body of literature on immaterial commons, in turn, was also looking at commons, but ones with very different characteristics. Immaterial commons were not to be protected from over-consumption and preservation. On the contrary, the goal of commoners was to expand the resource in quality and over time, as well as to expand the flow of knowledge to spur innovation where exclusivist intellectual property rights had blocked it. Moreover, in immaterial commons communities were larger and often geographically dispersed. Last but not least, in many cases immaterial commons (contrary to most of the natural resources-based commons that Ostrom studied) were necessarily permeated by the market: in order for the common to be produced, maintained and expanded, communities needed more and more complex monetary exchanges with the market and organization that were rarely based on commons. In this context, it is surprising to note that Ostrom paid very little attention to the role of money in development and governance of commons, also pointed out by Vercellone et al, (2015). In addition, the implications for the commons of attaining a large-scale, as it is often the case with digital commons, was also given minimal importance. These particularities asked for new research to understand the conditions of survival and success of immaterial commons; Ostrom's eight principles were not enough anymore.

The contributions of this body of literature were heavily influenced by the most successful immaterial common, free software, which has inspired practices compatible with the ethos of free software in other domains (free culture, open hardware, open design, etc.), as Chapter 3.3 "Technological Sovereignty and FLOSS trends in Barcelona region" shows. Consequently, the accent of research on the economic aspects of commons was put on four interrelated topics: the organization of labor, licensing, revenue models and the non-monetary motivations of commoners. Empirical studies showed how free software communities organize to coordinate production in a dispersed, decentralized yet not chaotic or lacking hierarchy manner (Raymond, 2001). Modular methods of production coordinated by sub-system architects were identified as a salient form of production belonging to emerging models of peer based production (Benkler, 2006). In parallel, many authors have made much needed cross-overs between the economic and the legal literatures to show how different types of licenses influenced the possible forms of commons-based peer production as well as the possibility of protecting intellectual commons from enclosures and fostering their circulation. Finally, since, as mentioned above, free software had a tighter contact with markets than natural-resources-based commons, the question of what revenue models could guarantee the survival of commons emerged. Four main potentially overlapping families of revenue models were identified within these business models (Broca & Moreau, 2016): the selling of a liked rival good, the selling of a value added service, contributions from a wide range of actors (donations, State contributions, financing by large software companies, user contributions, crowdfunding, etc.) and two-sided markets logics (selling of user data, advertisement).

To this additional complexity that intellectual commons presented in contrast to natural-resource-based commons, we should add the fact that the former are more diverse than the latter in terms of modes of production, licensing possibilities and the variety of forms of exchange with third parties. While natural resources obviously differ in their nature (waterfalls, forests, pasture, etc.), and every common is ultimately unique, the Ostromian principles of coordination of production, distribution of value and governance can be said to be circumscribed to a 'natural resources logic', as the Bloomington School's research has shown. Intellectual commons, on the other hand, are very diverse in terms of the fields they cover (design, music,

software, culture, health, etc.), and each of them is inserted in market and in the production logics of their own.

A third level of complexity that represents the latest historical transformation influencing research on the economics of commons was added with the surge of digital firms and, especially, of new forms of production and exchange such as that of the so-called 'sharing economy'. The 2000s consolidated an array of new enhanced internet and data-based products and business models that permeated industries far away from digital logics. This happened through the expansion of internet giants, among which the GAFA (Google, Apple, Facebook, Amazon) are seen as the most powerful and representative ones in Western countries. In parallel, with the unlocking possibility that the ubiquity of the internet and smartphone created, new forms of organization of production, labor and exchange of both material and immaterial goods through online platforms appeared. The most famous one has been that of the so-called 'sharing economy'. This is a particularly interesting case for research on commons because understanding how commons-based organizations may exist, endure and grow in these types of firms presents all the challenges and complexities mentioned above: the consolidation of traditional firms difficult to compete with, the organization of labor and exchanges between members of a dispersed community, a major role played by data and its property structures and licensing, bundles of rights over both physical (houses, cars, etc.) and immaterial resources (data, software, brands), a multiplicity of domains (accommodation, gig-work, transportation.), etc.

In sum, the digital revolution has reshaped and added complexity to the research on commons. Far from merely creating space for purely digital commons such as free software, complex and differentiated forms of distributed production and exchange appeared in the 2000s. While in some cases we can identify commons in them, in many others distributed production is far from representing a logic rooted in the Ostromian commons-logic. In contrast, as the literature on digital labor has shown (Casilli, 2015; Fuchs, 2015), distributed production and exchanges are often integrated in very exclusivist capitalistic logics of digital firms. Moreover, commons-oriented counter-movements such as that of 'platform cooperativism' in the sharing economy have had limited success in face of capitalistic giants so far. The idea of 'hacking' existing successful models to turn them into cooperatives that would manage 'sharing economy' digital platforms as the solution sponsored by some authors (Gorenflo, 2015; Schneider, 2014; Scholz, 2016), although pointing in the right direction, has proven to be too optimistic. In our view, this is symptomatic of a delay in the state of the art regarding the nature of the new types of organizations that have appeared with the digital revolution of the 2000s, both online and offline, and increasingly imbricating the two.

All of the above-mentioned new complexities in the way commons are produced and managed in the digital era call for a renewed study of their economic sustainability conditions. In order to do so, we need to first understand what types of digital and digitally-supported commons there are, what their production and exchange logics are and how they interact with their environment. In plain words, understanding the success of an immaterial commons such as Wikipedia in its environment is not enough to understand other immaterial and platform-based commons in their respective environments. A theorization effort rooted in the observation of practices of the new landscape the 2000s opened-up in line with that made by the Bloomington School with midsized communities managing natural resources is essential. Here we propose to offer some contributions in that direction based on the study of a major component of economic sustainability: the business model.

#### 2.3.2.2 Business Models and Open Business Models

**Economic sustainability** depends, in a first level, on an organization being able in the long-run to obtain and maintain the main resources (be them monetary or not) that it requires to fulfill its primary goal. This refers to the 'business model' choice of an organization, a concept we will clarify in the following lines. But there is a second level of economic sustainability that goes beyond the choice of a business model and affects it. Organizations exist in an institutional environment that affects their choices and actions. For commons, the need of infrastructures (in the broadest sense of the word) that allow them to exist and expand is also a key factor for their economic sustainability. Access to finance that does not compromise

their commons-nature, to count on some basic physical resources to develop their activities, or to have a legal framework that does not hinder their – sometimes – innovative business models are some examples of infrastructures on which the economic sustainability of commons depends on. As shown in Chapter 3.3, "Technological Sovereignty and FLOSS trends in Barcelona region", commons can act as infrastructures for others, as in the cases of Coopdevs and TimeOverFlow (two open software designed to be used by collaborative consumption organizations and time banks, respectively, illustrate). Let us note that the importance of technological commons go beyond the economical sustainability of other commons, since they are a pillar of technological sovereignty, as explained in the above-mentioned chapter. Then, although highly dependent on developing successful business model, economic sustainability does not depend solely on that. Even though we will remain aware of the importance of the institutional environment for the economical sustainability of commons, in this chapter we will limit ourselves to exploring the first level of economic sustainability of the digital commons collaborative economy: business models.

**The concept of 'business model'** is relatively new in the economics discipline and lacks a consensual definition (Zott, Amit, & Massa, 2011). The academics have only recently taken an interest in a concept that originated in the management practice more as a practical tool to understand a business than as a rigorous consensual concept. With the surge of new businesses linked to digital firms, scholars have renewed their interest in the idea of business models. The appeal of the concept, and the reason why it interests us in this investigation, is that it offers a holistic view of the organization and its key activities, in particular those related to value creation and revenue models (Daunorienė, Drakšaitė, Snieška, & Valodkienė, 2015). Despite the lack of consensus in the literature about the definition of a business model[13], a definition that suits the purpose of this investigation is possible. A broad definition fitting the existing frameworks that we will retain hereafter can be given: a business model "describes the distinctive and fundamental principles and mechanisms by which an organization deploys a strategy to create, sell, and use values (of use and change), in order to fulfill its primary goals" (Harracá, 2017)[14]. It is important to stress two features of this definition. First, the organization can be a firm or not (it could be an association, for example). Second, even in the case it is a firm, it can easily be a non-capitalistic-oriented one such as a cooperative. In other words, the primary goal of the organization can be making profits or not. It could be tackling a societal issue, providing a good for the greater possible accessibility, etc. To take this into account is important since we will be analyzing business models of commons-based organizations that do not follow a capitalistic logic while participating in the market.

Although the renewed interest in business models that digital firms have sparked in the recent years have motivated many case studies, less attention has been paid to the business models of digital or digitally-supported commons, which is the first part of this study.

## Distinction between digital and digitally-supported commons

Before reviewing these contributions, it is important to delimitate what we understand by **"digital or digitally-supported commons"**. This distinction, which draws from the distinction between "digitally based" and "digitally supported" projects done in the P2P Value Project (Fuster Morell, Berlinguer, Salcedo, & Tebbens, 2015), will help us understand the particularities of the 'open' business models associated to these organizations.

[13] Definitions usually differ regarding the boundaries of a business model (e.g. if relations with suppliers should be included or not or how) or the specific content to be included in each 'piece' of the company (e.g. what is to be considered a 'key partner'?).

[14] Harracá's definitions is a slight modification of the definition given by Benjamin Coriat at the conference "Platform Capitalism & Cooperativism" (held in October 7, 2016, at Université Paris 7 – Diderot): a business model "describes the principles and mechanisms by which an organization creates, sells and use values (of use and change). These principles must sustain the long-term survival of the project"

If we think of the above-mentioned Ostromian natural-resources-based commons, in which monetary transactions play a small role, the business model is almost entirely identified with the governance rules assuring that the dynamics of contributions to and consumption of the resource guarantee its conservation, which is the "primary goal" of the organization (the community). No value proposition is made to clients, little interaction (if any) with markets takes place and value distribution and the organization of production are embedded in the governance rules.

The organizations we will study here, digitally-supported commons and/or digital commons present some important differences with the former, the natural commons. What characterizes them is the way in which they combine the following characteristics:

i) Digital common output: the output they produce is an immaterial common that can exist in a digital support (e.g. free software, open design, an mp3 file with an open license, etc.)

ii) Platform-based: the platform serves as a digital infrastructure through which peers coordinate in order to produce, conserve and/or share physical resources (e.g. a community that uses a platform to coordinate the sharing of a garden).

iii) Common platform: the platform itself is held as a common by the community. The platform is itself a combination of three types of immaterial assets: software, databases and (in the case it is registered) a brand.

Table 2.2: Types of digital and digitally-supported commons

| TYPE OF COMMON | FEATURES | | |
|---|---|---|---|
| | Digital Common Output | Platform-Based | Common Platform |
| **Pure Digital Common (Output)** | Yes | Optional | No |
| **Pure Digital Common (Platform)** | No | Yes | Yes |
| **Pure Digitally-Supported Common** | No (but the output is a *physical* common) | Yes | No |
| **Digitally-Supported Common and Digital Common** | Necessary if "common platform" is not met | Yes | Necessary if "digital common output" is not met |

As Table 2.2 summarizes, we will speak of a 'pure digital common' when there is either a digital common output or a common platform, but not the two at the same time. This gives us three possible combinations represented in the first two lines of the table. The first one is in the cases in which the output produced is a digital common and the production is either not coordinated through a platform or coordinated through a platform that is not managed as a common (Row 1 of Table 2.2). An example of this is Flicker, in which individual contributors can produce images and post them under open licenses using a platform that is proprietary and centrally governed by a firm. Another possible case of a pure digital common, represented in the second line of the table, appears when a platform managed as a common by a community is used to coordinate production and/or exchange but the outcome of this process is *not* the production, sharing or conservation of a digital common. This is the case of the platform cooperative Loconomics, which shares the platform as a common resource (i.e. "common platform") but does not produce a digital common output and does not use the platform to coordinate the production of a physical common, but rather coordinate the selling of the different professional services the workers offer through a cooperative. We will speak of a 'pure digitally-supported common' when a community uses a platform not managed as a common to coordinate the production, conservation or sharing of a non-digital common (Row 3 of Table 2.2). An

example of this is a community of neighbours using licensed proprietary software to coordinate the management of a shared garden managed as a common. Finally, when a community using a platform to coordinate the production, conservation or sharing of a resource manages the platform as a common and/or uses the platform to produce, conserve or share a digital common, we are in presence of both a digital common and a digitally-supported common (Row 4 of Table 2.2).

These characteristics of these particular commons impose some restrictions and open some possibilities in terms of the business models that can be developed to assure their economic sustainability. Moreover, they widen the scope of what needs to be included in a business model in what regards to natural-resources-based commons. As we have mentioned above, the business models of open software (a digital common) include other dimensions such as licensing, the organization of labor and revenue models, and the same can be said for other digital and digitally-supported commons. Governance rules, although crucial, are not the only variable to take into account.

## Commons and business models: "open business models"

Business models are also shaped by the type of collaborative production. When the collaborative production is based on commons collaborative economy, this imposes certain restrictions to the type of business model that are compatible with the logic of the commons.

Regarding restrictions, two important features of digitally-supported and digital commons impose **some constraints to the business models they can use**. When it comes to digital commons in which the output is the common, this implies that users can at least download and share the immaterial work created, which makes revenue models based on selling the output incompatible with the digital common nature of the organization. While this might seem like an impossible economic conundrum, we will see in the next section how digital commoners bypass this obstacle and, moreover, use it as leverage to create revenue. When it comes to digitally-supported commons, the governance of the platform (if there is a common platform) and/or the governance rules pre-embedded in the platform (if there is not a common platform) have to assure that there is collective governance by the members of the community. This, in turn, will impact the forms of organization of production (which depends highly on labor in most cases).

This takes us to the concept of "**open business models**". In *Open Models*, the most comprehensive and transversal study of open business models existing up to date, Louis-David Benyayer (2016) defines the latter as "a real or virtual product created wholly or in part by individuals who are free to use (sometimes under certain conditions), modify or distribute it" . Similarly, Wouter Tebbens (2017) writes that "Open Business Models can be understood as those models that encourage sharing of knowledge under open licenses, from free to some rights reserved". The key idea of the nascent concept of "open business model" in these and other leading authors that have been writing about it (Bauwens, 2009; Stacey & Pearson, 2017) meets therefore the features of the digitally-supported commons and digital commons described above to a large (but not full) extent. Indeed, when there is a common digital output or the common is the platform itself, the digital output or the platform are respectively put under licenses that guarantee the right to use, modify or distribute them. Economic sustainability restrictions that shape open business models arise from this. **As mentioned above, when the digital output produced by the community is under an open license, at least some part of it (we will come to this point later) cannot be sold. In turn, when the platform used to coordinate production and/or exchanges is under an open license, it can be easily replicated, which creates a threat to the community that uses it, since other communities (or profit-oriented firms) could replicate it and deprive the original community from its value-creation (and revenue-making) tool. On the contrary, when the common is platform-based and the common produced is material, licensing poses less of a restriction to the business model in terms of revenue models. Moreover, in the case of pure digitally-supported commons (the production of a physical common is coordinated by a platform that is *not* managed as a common), we cannot speak of open business models *stricto sensu*, although their business models are compatible with the principles of commons.**

## 2.3.3 - Section 2: A Review of the (Open) Business Models Families of Digital Commons and Digitally-Supported Commons

The purpose of this section is to provide a systematization of the different existing (open) business models of digital commons and digitally-supported commons. Our systematization will be necessarily incomplete and subject to methodological choices that will highlight some aspects and play down others. Regarding the completeness of the systematization, the reader has to take into account that, as the following lines will show, the scope of digital commons and digitally-supported commons linked to the commons collaborative economy is enormous. Free software, open design, open data, collaborative gig-work platforms, collaborative car-sharing, and peer funding, the domains covered by these kinds of commons are abundant and heterogeneous. This imposes an effort of classification and abstraction, which takes us to our methodological choices.

### Methodological choices

Three methodological choices will structure this section. First, we will categorize these heterogeneous commons based on a reading grid consisting of the nature of what is produced (such as content, data, a physical product, a service, etc.). This classification matches to a great extent that of the authors of *Open Models* (2016), who have done a very fruitful effort of categorization of open business models, although with less of a focus on the digital dimension and without integrating platform cooperatives into the analysis. **We will try to show along this section how the nature of the common produced imposes certain constraints and opportunities that structure choices on business models.**

Second, we will apply the dimensions of the commons balance presented in section 1.1. As mentioned in the previous sub-section, many processes and dimensions can be included in a business model. The most recurrent ones in the literature (e.g. key partners, customer relationships, channels, etc.) are useful to do in-depth case studies of a particular organization. However, our intention here is, in terms of the zooming, the contrary: to systematize the main features that define the business models compatible with digital commons, digitally-supported commons and open data in order to identify what the right choices around a(n) (open) business model depend on. In that manner, we consider an adaptation of the dimensions of the commons balance presented in section 1.1.: economy (revenue model and mode of production), governance and knowledge and technology policies (licensing of data, software and/or the brand). We will not analyse the social responsibility framework for lack of data on the cases. Nevertheless, the reader should bear in mind that business models have an impact on different aspects of the social responsibility framework. For example, as Chapter 2.1, “Social Sustainability. Environmental Sustainability of the Collaborative Economy: An Open Debate” suggests, for-profit collaborative platforms tend to have a negative environmental impact, while the non-for-profit ones tend to have a positive one. Our framework also connects with Tebbens’ (2017), as it considers the mode of production.**.** The ways in which these four qualities combine give us different **business model *families***. Table 2.3 will summarize the main features of the four business model families of digital and digitally-supported commons described in the following subsections, namely: digital content commons, FLOSS, open hardware and platform cooperatives.

Third, we will dedicate special attention to open data and data commons in the next section. This choice responds to two reasons. On the one hand, data is at the core of the DECODE project of which this deliverable makes part. Accordingly, it is to be expected that the business models of open data would receive special attention. On the other hand, as we will show in the next section, ‘open data’ and ‘data commons’ are not synonyms, the former being a subset of the latter most of the times. Moreover, open data can be developed under a variety of business models. Therefore, a special study of open data is needed to be as comprehensive as possible regarding the economic sustainability challenges related to the DECODE project in a following section.

#### 2.3.3.1 Digital content commons

This digital content commons category corresponds to cases in which a dispersed community of contributors or peers co-produces a *content* common (e.g. music, videogames, a book, an audiovisual product, journalistic articles, information, etc.) coordinated through a platform or by uploading the production to the internet without a platform playing a coordination role. As recalled above, in all of these cases, since the final product is a common, an open license guaranteeing the freedom to access and share the content exists. What all these cases have in common is that the output is content. The output being content means that, contrary to other possible digital outputs such as data or software, the value proposition relies on the quality of the content provided understood as how much the audience *appreciates* it, and not in how useful it might be to perform a task, either for commercial or personal use purposes. This, along with the constraint that open licenses impose on revenue models, define the contours of the possible business model families.

Regarding the **mode of production** of the content, three cases can be distinguished:

- A single individual or a non-distributed organization (i.e. a band, a troupe, a cooperative of journalists, etc.) produces the content under following a centralized logic.
- A platform aggregates the content produced by third parties without intervening in the process of production.
- Commons-based peer production (CBPP)

The CBPP mode of production refers to a "socio-technical system with collaboration among large groups of individuals, sometimes in the order of tens or even hundreds of thousands, who cooperate effectively to provide information, knowledge or cultural goods without relying on either market pricing or managerial hierarchies to coordinate their common enterprise" (Benkler & Nissenbaum, 2006). A classic example of this is Wikipedia, which has a community of self-organized peers that contribute in different ways following agreed-upon rules on how content can be added, edited or removed. In CBPP, contributors can either receive monetary compensation or not. The governance of these communities is driven by the community, tends to be flatter than in traditional firms, and is usually defined around projects that implicate a certain sub-community. This means that the contributors working on the production of a particular content common (a video, a song, an article, etc.) co-decide the above-mentioned rules that guide its production, as well as the distribution of the monetary value created if there is any. When these project-defined communities are part of a larger community, the distribution of value may also be discussed with the larger community.

Regarding **revenue models**, the following strategies, which are both compatible with the content nature of the good produced and the right to access and share it, are found (Stacey & Pearson, 2017):

##### Shifting revenue models

Shifting revenue models respond to the incompatibility of selling the content itself and it remaining a common by selling something else *related to the content*. It is for this reason that we will talk hereafter of 'shifting' the revenue making away from what is primarily produced. The main revenue making strategies within this category for digital content commons are charging for a physical copy of the content, selling merchandise related to the content (e.g. a band's T-shirt, pins, etc.), charging for a related service (e.g. a live performance, a seminar, etc.), and charging for a license if the content is used for commercial purposes. In the case of physical copies of the content, the physical copy usually involves superior quality in respect to the digital support of the content (e.g. a vinyl, which has higher sound fidelity) and/or extra content added to the original digital one (e.g. the artwork of a special edition of a book).

The revenue problem is therefore the same as in FLOSS. In the case of digital content commons, the fact that the output is *content* (and not an immaterial tool, as software) facilitates others 'shifted' revenue stream such as the selling of merchandise or charging a related service, because the content can be more or less linked to a physical product, while this is not the case for a purely functional immaterial common such as

FLOSS. When successful, these revenue models make leverage of what might be at first a constraint: the fact that the content resource can be freely accessed and shared makes it circulate more, which in turn provides more possibilities of people appreciating the content (especially in digital environment, where sharing is virtually costless and viral effects take place), and therefore to buy related products.

## Dissociating revenue models

Dissociating revenue models are based on the fact that the content is not only valuable to final users, but also to third parties. If the content can be used for commercial purposes (e.g. using a song for a commercial, selling a book containing articles created by a community, etc.), a license that charges commercial-oriented uses of the content can be a way of capturing value while keeping the content a common. If the content is valuable enough to users, advertisement or sponsorship is also a solution. In this case we will speak hereafter of 'dissociating' revenue models, because they consist in dissociating revenue making from the product; contrary to 'shifting revenue models', the former do not rely on creating revenue from a product or service related to the main output, but rather on **monetizing a positive externality that the main output creates**.

## Reciprocity-based voluntary contributions

Reciprocity-based revenue models are very suited to content commons because final users are benefiting directly from them in that they appreciate their content, and they might therefore want to give something back to the community that produces it. The most common revenue making strategies for digital content commons in this category include donations, memberships, pay-what-you-want and crowdfunding.

As the research and the practical experience of the work done by Palmer (2014) shows, the success of this revenue model in content commons relies heavily on creating community engagement through the content offered in open access, so that the engagement encourages voluntary contributions. A successful example of this strategy is Radiohead's online release of its album *In Rainbows* under a pay-what-you-want scheme in 2007, which allowed for users not to pay anything to download it. Because of the high engagement Radiohead had already built before the release (it was already by then a world-known cult band), and because of the elimination of intermediaries that distribute an album without a label implies, the band made more royalty money with *In Rainbows* than with its precedent album, *Hail to the Thief* (Business Insider, 2008). Similarly, Wikipedia, perhaps the most famous digital content common, is financed through the Wikimedia Foundation, a non-profit organization that obtains funding through public contributions, grants and donations. In both cases strong engagement from the users of the digital content is the key for reciprocity-based voluntary contributions revenue strategies to succeed. In this sense, reciprocity-based voluntary contributions are not very suited for a nascent project that needs precisely to first offer good quality content on which it can build the engagement of its users.

## Third-party funding

There are three main third-party-funding-based revenue models in digital commons: the financing by third-parties commercially interested in the production of the open access content, government funding and grants. The first one follows a monetary logic, while the last two do not.

Third parties might want to finance open-access content creation because they can capture value somehow from it. For example, a record company might want an ecosystem of open-access music to flourish in order to discover new talents or because the creators are also part of this organization, in which case the open-access creation gives the third party notoriety, and eventually will allow it to capture value.

When the government is the funding third party, the logic is different because funding does not follow a commercial logic but rather foster the provision of an open content to society. In most of the cases, this funding relates to cultural content because it is part of the state's role to support culture. For example, the European Union's Horizon 2020 is funding the Audio Commons Initiative, which aims at encouraging the use of audio files under Creative Commons licenses in creative industries by creating an ecosystem

platform that facilitates the process (Audio Commons, 2017). The case of grants follows a similar logic, although the granter is not necessarily a public institution. Nevertheless, in both cases the funding responds to a non-monetary goal such as promoting the development of a certain art or the spread of a language or culture. Grants are traditionally found as a relevant source of revenue of digital content commons in cultural industries.

#### 2.3.3.2 FLOSS

The business models of free/libre/open-source software (FLOSS) are the most studied ones in the literature about commons. This responds to the fact that, as mentioned above, FLOSS has been one of the earliest and perhaps the most successful digital common. Two main features of the nature of software shape the family of business models associated to FLOSS. First, software can be produced in a modular way. This means that the different components or modules of a certain software can be developed independently and then aggregated by a system architect that has a general understanding of the whole project. This makes of software one of the domains of CBPP *par excellence*. Second, software is *in itself* a digital good whose functionality for final users consists in (assisting in) performing a task, either for their individual use or for commercial purposes. This imposes certain restrictions and opens up some possibilities regarding revenue models, as we will show in the following lines.

As we have just mentioned, the production of FLOSS is modular. While the production of some FLOSS is coordinated sometimes in a managerial way by a firm, in some other cases it is coordinated through CBPP. **There is a clear correspondence between the production mode and the governance in the case of FLOSS**. When modular production is managerially coordinated by a firm, the firm is (logically) in charge of the governance of the project. This is the case of, for example, Open Office, a project led by Sun until 2010, or WordPress, led by the firm Automattic. This does not mean that every module has to be produced by firm employees or subcontractors subject to a hierarchical coordination process in hands of the firm, but that the firm always retains the role of project leader and system architect. On the contrary, when modular production is coordinated through a CBPP logic, there is community governance. Contributors form a community that self-organizes to conduct the project. Hierarchical positions are usually occupied on meritocratic bases and a foundation or association, usually (but not always), looks after the project (Broca & Moreau, 2016). For example, Debian is led by the association Software in the Public Interest and Linux is led by the Linux Foundation.

For any software to be considered free, it must respect the **four basic freedoms** of free software, namely the freedom of using, studying, sharing and modifying it. These freedoms are embedded in the free license of the software. The implication is that there can be a fork at any time, i.e. the code of the project can be used by anyone to create a different version of it that will evolve independently. This puts pressure on the leader(s) of the project to coordinate its production in a way that accommodates the interests of the contributors and that results in the best possible software. Otherwise, competing forks that aim at developing a version of the software performing the same task might jeopardize the project, including its capacity to capture value. Regarding this last point, licenses vary in terms of the commercial uses they allow (if any) depending on the revenue model adopted by the project.

##### The freemium revenue model

One of the most common revenue models in FLOSS is the freemium model: the basic software is open, but a proprietary extension that improves the user experience is sold. In this case, two different licenses would apply to the core software and its extended or “pro” version. The success of the strategy depends on the balance made between the value proposition of the core software and that of the extension. The former has to be good enough for people to use it in the first place, but the value added by the extended version has to be attractive enough for them to be willing to pay. This strategy works better in software that can offer extra functionalities attractive to a niche of users willing to pay, usually because it gives them a competitive advantage. In some cases the software is open for non-commercial use but licenses are sold when the software is used for commercial purposes. It should be noted that this revenue mode, by

restricting the use that may be done of the software, takes it out of the FLOSS category. This strategy is particularly interesting for software that is both used by individual consumers and companies: the openness of the software fosters its adoption by the former, which creates demand for the latter, where monetization takes place.

### Shifting revenue models

The most common revenue strategy is nonetheless the selling of a service that complements the use of the software, such as technical assistance or training. This revenue model relies on the tacit knowledge of software creators, which know better how to use it, fix it or implement it.

### Funding by third parties

Other traditional revenue model (as well as a mean of financing the project) is funding by third parties, which are most of the time software companies that sell proprietary software. These companies usually fund foundations in charge of the governance of a project and/or pay their employees to work for a FLOSS project for two reasons: gaining expertise and benefiting from free software they will use. Following this logic, Google has been offering grants and stipends to develop open software through its Google Summer of Code since 2005.

It should be noted that while this revenue model does not threaten the commons status of open software, in many cases the practices carried on by firms funding these projects is far from following the logic of the commons. Sometimes the funding of the commons allows these firms to gain knowledge or expertise exploited to develop proprietary strategies on other software (Vercellone et al, 2015).

### Reciprocity-based voluntary contributions

Finally, reciprocity-based voluntary contributions (either in the form of donations, pay-what-you-want or crowdfunding campaigns) are also common in the FLOSS domain. The Mozilla Foundation, which is in charge of one of the most popular web browsers in the world (the open-source Mozilla Firefox) led a fundraising campaign to fund the launch of Firefox 1.0. This revenue model takes place mostly when the project is governed by the community, since users decide to contribute motivated by the idea of contributing to a common, which is more difficult to associate with financing a firm that decides unitarily how to conduct the project, even when it produces FLOSS.

### Advertisement monetary sources

A rarer source of revenue in FLOSS is advertisement. For example, AdBlock Plus, the most popular browser ad-blockers, receives payments from Google to whitelist certain websites.

### 2.3.3.3 Open hardware

Open hardware refers to the production of hardware based on designs, diagrams, tutorials and 3D files (in the case of 3D printable hardware) under free licenses guaranteeing the four above-mentioned freedoms that apply to free software. While the logic of these types of digital commons collaborative production might seem very similar to that of FLOSS at first, **the fact that the design itself is useless if not translated into a physical object gives open hardware some particularities that shift the possible business models** that might be used to produce it. As Tincq and Benichou (2016) recall, this creates three “layers of complexity” in regard to FLOSS. First, unlike in software, the production and distribution of physical goods entails non-negligible marginal costs, which is something what impacts the revenue models. Second, the competences required to carry on the full process from design to delivery requires a set of complementary skills that are usually dispersed geographically and in terms of the organizations involved. Finally, the selling of physical products requires passing mandatory certifications, quality tests and compliance with several norms.

The last two items have a direct impact in terms of the **mode of production**. Decentralized production in the form of CBPP is only possible at the design stage, where individuals can contribute in different ways in self-organized cooperation-based groups like software communities do, co-designing or modifying other people's design and sharing the result on the internet. But the complexity of the manufacturing, delivery and quality-control phases involved in the rest of the value chain, as well the multiplicity of actors (mainly firms) needed to carry on the project require managerial coordination by firms that concentrate certain competences. The degree of vertical integration might vary. Some firms like Arduino focus on design and sub-contract manufacturing to other firms. Others, such as Sparkfun, distribute their own design, but also those of other companies independently of if they assemble them or not. Others, such as Open Source Ecology, manufacture, assemble and deliver their open source agricultural machinery in order to benefit from economies of scale and have a competitive advantage over price. In sum, the choice of the design of the value chain depends on the competences of the different firms (which, when it comes to manufacturing, assembly and delivery have an impact on marginal costs) as well as on their revenue model. The exception is certainly 3D printing, where the capacity to easily produce an object using a digital design produced with this technology makes it possible for the production process to also organize following a CBPP logic. Nevertheless, this poses limitations in terms of scale. Again, **there is a correlation between the mode of production and the governance mode**. When all the stages of the production process from design to delivery are carried on by one firm, governance is centralized. When, as in the most common case, several firms intervene in different stages, there is a multi-firm governance of the value chain, although a firm usually plays the role of the lead firm that coordinates the key stages of the process. Finally, when CBPP takes place, there is community governance, usually through a non-profit foundation that carries on the project. CBPP and non-CBPP governance modes can mesh at some points. Typically, CBPP communities dedicated to the design stage can provide design other firms would assemble, deliver and/or produce.

The logic of open hardware **licenses** follows that of FLOSS and, usually, the four basic freedoms of the design are guaranteed by an open license. But, in some cases, restrictions on commercial use are imposed to create revenue sources: some projects have licenses with non-commercial clauses. Others, like in software, use a dual-licensing model where users wanting to use the design without respecting an open license with compulsory identical sharing (including spin-off products) have to pay. Finally, proprietary licenses may apply to some products of an open-hardware firm. The materiality of hardware does not allow for the freemium strategy that FLOSS recurs to. For that reason, some firms produce product A with a free license and product B with a proprietary license, the two products being unrelated. The sale of product B allow the firm to earn a revenue that will finance the production of the open hardware whose production would have been, otherwise, going in loss. This contrasts with the freemium strategy used in FLOSS, where the proprietary extended version is necessarily related to the original open software because it increases user experience.

Nevertheless, **the materiality of open hardware opens an opportunity of revenue making what FLOSS does not allow for: selling the hardware**. As mentioned above, some firms or communities do not engage themselves in the manufacturing process, but are still able to make revenue in other ways. One that can also be found in the FLOSS domain is selling complementary services (training, technical assistance, expertise, courses, etc.), which is something some fablabs do. But the materiality of hardware allows also selling *goods* that are complementary to the open design hardware such as accessories. Mostly in the case of fablabs, the production of open hardware is financed by third parties, be it the state or other organizations that fund research projects that provide communities with funding to buy materials and machinery. Finally, voluntary contributions in the form of donations and crowdfunding campaign are also found among revenue models in open hardware projects. This revenue strategy is mostly found in conjunction with CBPP projects.

#### 2.3.3.4 Platform cooperatives

The last category of business models to be studied corresponds to what, lacking a better term, we will label "platform cooperatives". The term is taken from Scholz and Schneider (2016), as it has perhaps become the most identifiable way of designating the type of platforms we will analyze here such as Loconomics, Peerby, Goteo or Green Taxi Cooperative. Nevertheless, in this chapter we provided a different definition

than the one given by Scholz and Schneider (cf. "Platform cooperativism" in Annex 1) in order to understand the business models of these platforms[15]. As we will show, regardless of the wide variety of domains that these platforms might cover (carpooling, peer funding, house sharing, gig-work, etc.), the particularity of the role they play as coordinating tool narrows them down to a single and singular family of business model for digitally-supported and digital commons.

We define platform cooperatives as platforms that channel the production and/or distribution of goods or services (either in exchange for money or not) based on network interactions between mainly private individuals, and where most of users' participation is not driven by managerial hierarchy relationships based on an employment relation[16]. Platform cooperatives have the following characteristics:

a) They set the conditions of network exchange and/or production (including labor conditions and value distribution) through algorithmic coordination
b) They create a digital support that not only serves as a virtual matchmaking space that allows network interactions to take place in physical space *stricto sensu*, but also incorporates mechanisms such as reputation systems and third-party identity verification that make these interactions viable.
c) The platform is governed as a common and/or the outcome of the coordination it enables is a common.

## a) Algorithmic coordination

Point a) shows the specificity and the novelty of this type of firm regarding its nature from a competence-based theory of the firm. According to this theory of the firm, firms are a device for coordination and knowledge treatment through routines that form their core capabilities (Nelson & Winter, 2004). The latter can be defined as "a particular way of associating and combining fragmentary competences embedded in individuals in order to perform a task"[17] (Coriat & Weinstein, 2010). Following this theory, we argue that **collaborative platforms are characterized by the fact that their core capability is algorithmic coordination** (Lee, Kusbit, Metsky, & Dabbish, 2015; Rosenblat & Stark, 2015; Schildt, 2017)[18] of network interactions of private individuals located outside of the legal boundaries of the firm**.** Indeed, regardless of the wide range of markets in which these firms participate (transportation, accommodation, gig-work, etc.), the routines that form their core capabilities always consist in coordinating production and/or exchange between private individuals through algorithms embedded in the platform that are 'fed' by different types of data generated by users. Data on inventories, billing, payment, geo-localization, within-platform interaction between individuals and so on are collected by the platform. The platform offers an automated response to the situation described by these different pieces of data in order to coordinate production and/or exchange between individuals both in a 'soft' manner (by giving them incentives) and in a 'hard' manner (by giving

[15] The definition of "platform cooperative" that we will provide is based on a previous study (Carballa Smichowski, 2016)

[16] Individuals might have an employee status with the legal entity of the platform in order to benefit from social security. Nevertheless, regardless of the legal status of workers, their work is not coordinated through the authority derived from an employer-employee relation.

[17] The translation is ours.

[18] Our concept of 'algorithmic coordination' resembles that of 'algorithmic management' of the papers just quoted. Nonetheless, the two differ in that, while 'algorithmic management' refers to the coordination and control of work from the platform to workers, 'algorithmic coordination' takes into account a broader spectrum of agents because it also includes coordination between the platform and consumers, between consumers and workers and between all types of users of the platform and third parties.

them instructions). In other words, the algorithmic coordination routines of the collaborative platform firm "combine fragmentary competences embedded in individuals" *that do not have a contractual relationship with it beyond the terms and conditions of use of the platform* "to perform a task". These routines constitute the core capabilities of the collaborative platform firm. It is important to stress that algorithmic coordination goes beyond matchmaking. In collaborative platforms, algorithms not only put in touch two sides of the market: they embed the conditions of exchange and/or production between individuals so that a series of tasks can be performed *in a particular manner*. While matchmaking platforms such as e-commerce websites limit themselves to offering a digital environment that facilitates matchmaking between two sides of a market, collaborative platforms also coordinate the performance of the tasks that take place after the matchmaking and/or direct the matchmaking: Uber sets the route and makes sure drivers stick to it; Deliveroo coordinates the logistics between deliverers and restaurants in real time; Airbnb gives more visibility to listings that comply with certain criteria (instant booking setting, good reputation, activity rate, cancellation rate, etc.) and gives automatic regular 'advice' to hosts on their behavior towards guests and their listings so they will get more bookings, inducing the users to interact in a certain manner, which exceeds mere matchmaking. In sum, collaborative platform firms' algorithms are hierarchical exoskeletons that pierce the legal boundaries of the firm, reaching the market sphere where individuals interact between each other *through and coordinated by algorithms*.

As crucial as algorithmic coordination is, to characterize collaborative firms is not sufficient. If we were to limit ourselves to this part of the definition, we should include all platforms where network production or exchange is somehow automatically coordinated in the collaborative platform firm category. In that case, the online peer-to-peer encyclopedia Wikipedia should be included, since it contains all the features described above: based on data on contributors' past experience and the content of a particular article, the platform gives them differentiated rights to contribute to the article (editing, erasing, adding, etc.), coordinating so network-based production of knowledge in an automatized manner. The same could be said of online games that allow for algorithmically coordinated network interactions between players.

## b) Reputation systems and third-party identity verification

This leads us to the second part of our definition expressed in point b). Collaborative platforms are not simply a digital space that allows individuals to interact in a certain manner coordinated by the platform. They also offer mechanisms that make interactions between individuals in an online platform viable. The two main ones are **reputation systems** and **third-party identity verification**. For certain interactions to take place, individuals require a minimum amount of trust without which they would never engage in the transaction[19]. In traditional firms, trust is assured by the firm itself, as it is solely responsible for the services its workers (independently of their contractual status as employees of the firm or individual contractors) provide in their name. Nevertheless, in collaborative platforms, services are provided between individuals that are not part of the firm and for whose performance the firm is not responsible. Then, in order to supply trust, firms recur to reputation systems and third-party identity verification of individuals. While in some network interactions-based platforms such as dating apps or some online games engaging in network interactions do not require trust, in others, this element is crucial. In effect, collaborative platform firms do not algorithmically coordinate any kind of network interaction; they coordinate those that require trust to take place. For example, people would hardly rent their houses to total strangers using Airbnb instead of a certified agency if it was not for the reputation system set up by Airbnb and its identity verification screening process. These mechanisms work as a signal to hosts that tells them if the users wanting to rent their houses are trustworthy. Reputation systems are therefore a condition for collaborative platforms' business

[19] In the PwC Report "The Sharing Economy" (2015), 89% of the respondents agree that the sharing economy (a term equivalent to "collaborative platforms" regarding this aspect) is based on trust between providers and users.

models to work (Sundararajan, 2016), and they are very effective in proving users with the trust required for them to engage in certain network interactions with each other[20].

It is important to point out that the development of the nascent technology blockchain, which might enable decentralized trust-creation mechanisms and provide automatic and secure coordination of network interactions through smart contracts, might radically transform the very nature of platform cooperatives (including their business models), as the development of the first decentralized autonomous organizations (DAOs) and blockchain-based platform cooperatives seems to indicate. For detailed definitions of these terms ("blockchain", "smart contracts" and "DAOs") and to learn about the impact that blockchain might have on the collaborative economy refer to glossary and Chapter 3.1 and 3.2.

### c) Commons governance

Finally, point c) circumscribes our analysis to digital commons and digitally-supported commons, excluding so other capitalistic-oriented platforms that comply with characteristics a) and b) such as Uber or Airbnb. In that manner, point c) distinguishes collaborative platforms from platform cooperatives. While the latter are always identified with the former, the reasoning does not apply in the inverse sense. Collaborative platforms that are not digital commons or digitally-supported commons are not platform cooperatives.

Because collaborative platforms are a coordination tool for *dispersed individuals to interact on sporadic to regular levels*, and because we have circumscribed our analysis of collaborative platforms to digital commons and digitally-supported commons (i.e. platform cooperatives), the mode of production that corresponds to these platforms is that of CBPP and governance is, by definition, community governance. In less informal projects, this governance usually takes the legal form of a cooperative, although not necessarily.

As recalled above, the platform is the combination of three different immaterial assets: software, databases and a brand. In some cases we find free licenses applying to software and/or databases and loose or no protection of the brand. Nevertheless, in most of the cases software is proprietary, data is closed and all rights regarding the brand are reserved.

### Revenue models

In terms of revenue models, the crucial coordinating role collaborative platforms play opens up the possibility of capturing value in a way other digital and digitally-supported commons can rarely do: **brokering**. Indeed, the use of the platform can be monetized in order to finance the activity supported by the platform. The most common scheme consists in charging a transaction fee. Because peer-to-peer transactions happen through these platforms, a **transaction fee** (either fix or *ad valorem*) is the most common way of obtaining revenues. This is for example the case of the e-market platform cooperative Fairmondo. It is interesting to note that the development of blockchain, a technology with the potential of decentralizing trust-creation mechanisms, might either jeopardize or reinforce this revenue model. A performant blockchain infrastructure could be controlled by a for-profit firm or a consortium of firms that would use its gatekeeper position to extract revenue. On the contrary, an open and neutral blockchain infrastructure managed as a common or as a public service by the State could eliminate the possibility of brokerage. Examples of these two approaches and a discussion on the potential of blockchain to transform the can be found in Chapter 2.3, "An assessment of blockchain potential to transform the collaborative economy".

[20] A recent study by the leading ridesharing platform BlaBlaCar shows that the level of trust its users have in each other is close to the one they have in friends. See: https://www.blablacar.com/wp-content/uploads/2016/05/entering-the-trust-age.pdf

Other models of monetizing the use of the platform are **subscriptions** (pay to be able to use the platform in the first place) and the **freemium model**, in which users that pay have access to more features. In the case of subscription fees, they have to be kept low enough to avoid discouraging participation, as these platforms benefit from network effects and, therefore, have an interest in scaling the size of their communities. As with many digital content commons, the fact that the community has to go through a platform (in this case not to access a content but to coordinate a process) makes it also possible to obtain revenues from people's attention by **selling advertisement space and sponsorship**. Moreover, since platforms are circumscribed to a particular domain (housing, carpooling, etc.), they are attractive to advertisers that can find there a targeted audience. Another way of capturing money through the activity of a targeted audience is by **selling personal data**: the more people use a platform, the more digital traces they leave. If the platform is the sole owner of that data, it can sell it to data brokers. Finally, **state funding** and **grants** are sometimes found in platform cooperatives, especially in those dedicated to collaborative consumption with a positive ecological impact, as it has already been the case in car-sharing platforms (Cohen & Kietzmann, 2014).

Table 2.3 summarizes the main features of the four business model *families* of digital and digitally-supported commons we have described in this section (FLOSS, digital content commons, open hardware and platform cooperatives). Each column corresponds to a family, while each line represents a dimension of a business model (mode of production, governance, licensing and revenue model). The different possible combinations of the items of the columns result in specific business models within the family.

Table 2.3: business models of digital and digitally-supported commons

| | **DIGITAL CONTENT COMMONS** Design, Information, Music, Videogames, Publishing, Audiovisual, Photography | **FLOSS** | **OPEN HARDWARE** | **PLATFORM COOPERATIVES** i.e. trust-based algorithmic coordinating of offline interactions platform that follow the logic of commons |
|---|---|---|---|---|
| **Mode of Production** | CBPP<br>Centralized in an individual or organization<br>Aggregated by a platform that does not intervene in the process of production | Modular production through CBPP<br>Modular production centralized in a firm | CBPP (only during the design phase or in the stages in the case of fablabs)<br>Centralized in a firm (with varying degree of vertical integration) possible in every phase from design to delivery | CBPP |
| **Governance** | Community governance (For CBPP)<br>Centralized (if production is centralized in an individual organization)<br>Community governance or centralized (in the case of aggregating platforms) | Community governance (e.g. Debian, Libre Office) usually through a foundation (when CBPP)<br>Centralized (e.g. Word press, Open Office) when production is centralized in a firm | Community governance (for CBPP, only in the design stage or in the case of fablabs; usually piloted by a non-profit foundation)<br>Centralized in a firm or individual<br>Multi-firm governance through the value chain (with lead firms) | Community governance (usually through a cooperative) |
| **Licencing** | Always give right to access, distribution and non-commercial modifications<br>It may impose restrictions on commercial use | Always protect the four essential freedom of free software<br>Proprietary license covering extension of the original software may exist | Always give right to access and distribution of at least the core design<br>It may impose restrictions to commercial use (NC Clause, dual licensing, protected extensions) | At least one of the licenses on the assets constituting the platform (software, databases and brand) are open licenses<br>No open licenses on the assets constituting the platform |
| **Revenue Model** | **Shifting revenue model**<br>- Charging for a physical copy of the content (when its adds value to users, as in a book or a vinyl)<br>- Selling merchandise related to the content (a band's T-shirt, pins, etc.)<br>- Charging a related service (e.g. a live performance, a seminar, etc.)<br>- Charging licensing if the content is used for the commercial purposes<br>**Dissociating revenue model**<br>- Charging advertisers or sponsors<br>**Reciprocity-based voluntary contributions**<br>- Memberships and donations<br>- Pay-what-you-want<br>**Third-party funding**<br>- Financing the work of contributors by third-parties interested in the production of the open access content<br>- Government funding (especially in cultural industries)<br>- Grants (especially in cultural industries) | **Freemium**<br>- Selling an extended version of the software<br>**Shifting revenue model**<br>- Selling a complementary service (training, technical assistance, etc.)<br>- Charging licensing if the software is used for commercial purposes<br>- Charging licensing fi the software is enclosed (dual licensing)<br>**Dissociating revenue model**<br>- Advertising<br>**Reciprocity-based voluntary contributions** (mainly when there is a community governance)<br>- Donations<br>- Pay-what-you-want<br>- Crowdfunding<br>**Third-party funding** (mainly software firms)<br>-Financing the work of contributors by third-parties interested in the production of the open software | **Shifting revenue model**<br>- Selling the physical product using the open design<br>- Selling a complementary service (training, technical assistance, expertise, etc.)<br>- Selling a complementary good (e.g. accessories)<br>- Charging licensing if the software enclosed (dual licensing)<br>**Reciprocity-based voluntary contributions** (usually linked to non-profit models piloted by a foundation)<br>- Donations<br>- Crowdfunding<br>**Third-party funding** (mainly in the case of fablabs)<br>- State funding (when there is a societal issue involved)<br>- Grants | **Freemium**<br>- Charging for a version of the platform that offers more functionalities to the user.<br>**Brokerage revenue model**<br>- Transaction fee (ad valorem or flat)<br>- Subscription<br>**Dissociating revenue model**<br>- Selling personal data<br>- Advertisement<br>- Sponsorship<br>**Third-party funding** (usually in collaborative consumption with positive ecological impact)<br>- State funding<br>- Grants |

## 2.3.4 - Section 3: The business models of open data

When data is open, there is freedom to use it, access it, and share it. As with FLOSS, it would seem at first glance that these freedoms make it very difficult for economic sustainability to be assured in that they are incompatible with selling the data. But, as with FLOSS, this is not the case. Moreover, the particular ways in which the combination of the four qualities that give value to data (size, scope, interoperability and quality) can combine depending on the use given to data, and the variety of motivations behind open data projects (both monetary and non-monetary) give place to a variety of open data business models that deserve particular attention.

In this section we will describe these business models. As the reader will appreciate, there is a variety of revenue models compatible with open data and many of them are not found in FLOSS, digital content commons, open hardware or platform cooperatives. In this section we will identify the following revenue models: state budget, (open)-data-related services, freemium, gaining knowledge and expertise, creating business opportunities, donations, financial contributions from stakeholders, public funding and revenue-making from related products or services. As we have done in the previous section, we will explain how each of these revenue models fits within the logic of a particular business model family. In order to do so, we will begin by explaining the four qualities that give value to data on which revenue models rely.

### 2.3.4.1 The value of data: size, scope, interoperability and quality

In order to understand the business models of open data, we need to start by understanding how the particularities of data make it valuable, since these business models are built around creating valuable datasets for diverse reasons and involving a variety of actors (private firms, government agencies, citizen collectives, NGOs, research institutions, etc.).

The value of data depends on **four qualities** and how they interrelate:

- Size
- Scope
- Interoperability
- Quality

#### Size

The larger a dataset is, the more valuable it becomes as it allows to find more patterns. Many of the useful usufructs of data consist in extracting insightful patterns using statistical models. The results of the latter being more precise and robust with a larger sample, the more data there is, the better the conclusions that can be drawn from it are. Moreover, when it comes to training algorithms, on which digital firms and other firms largely rely on, the size of datasets is of paramount importance. Algorithms work by processing large amounts of data and they improve due to it. Once an algorithm (or, more generally, a model) is correctly designed to fit its data (once the right questions are asked in the proper way)[21], the more data that an algorithm can work on, the more likely it will be that it will improve over time. Once the team of developers is good enough, the “algorithm race” becomes a matter of who has more data. As the famous quote by Google’s Chief Scientist Peter Norvig goes, “we don’t have better algorithms than anyone else; we just have more data” (Cleland, 2011).

#### Scope

The scope of data refers to how many different domains it can link. Datasets that can create links between apparently unrelated domains are valuable as they enrich the comprehension of a phenomenon that is not circumscribed to a single domain, and hence the possibilities of acting on it in the ‘right’ way. For example,

[21] For a more detailed explanation of under which conditions does more data improve a model, see Amatriain, X. (2015), “Machine Learning, What is Better: More Data or better Algorithms.” Available at http://www.kdnuggets.com/2015/06/machine-learning-more-data-better-algorithms.html

the value of Google's data on individuals lies to a large extent in that it allows to 'know' them better because it links where they go (Google Maps), what they want to know (Google search), what they write about (Gmail), etc. This allows it to have a better understanding of the person, and therefore to sell more accurate ads.

### Interoperability

The interoperability of data refers to the technical easiness of circulating and using it. It relies mostly on how standard the format of data is. The easier it is for different agents to use data, the more it will circulate, and, hence, the more possibilities there are of enriching and/or exploiting the dataset. This does not mean that every agent has an interest in making its data circulate. Most private firms have an interest in *not* circulating their data to conserve a competitive advantage (Chignard & Benyayer, 2015). In those cases, the social value of data is in conflict with its economic value for certain actors. Nevertheless, even in cases where firms have no interest in opening their data, they might share momentarily data with other agents (subcontractors, partners, regulators, etc.) and benefit from interoperability to do so.

### Quality

Finally, the quality of data refers to any characteristic of a dataset that makes it easier to extract meaningful information from it. The meaning of quality is therefore very dependent on the domain the data refers to. Filtered data has a higher quality than non-filtered data. Interpreted data, which can be very important for scientific data, too.

It is important to stress that these four pillars of the value of data can have different relative importance depending on the domain to which the data refers to. For example, in datasets about rare genetic diseases, size is of paramount importance because findings depend on correlations, and there has to be as many rare diseases as possible for robust correlations to appear. In other datasets such as one about the schedule of the buses of a city, quality in terms of preciseness plays a more important role: there is a great difference between knowing that the bus will arrive at 17:22 and knowing that will arrive between 17:00 and 17:30. Therefore, the value of data, although always based on the interaction of these four factors, will depend on how they combine on a case-by-case basis.

## 2.3.4.2 The distinction between open data and data commons

Keeping in mind the drivers of the value of data, we will now study the different business models of open data. The reader should keep in mind that open data refers to data that "anyone can access, use or share" (Open Data Institute, 2017). This means that the license applying to it, if any, should guarantee those rights. Open data, as we will see in the following sub-sections, is not the same as a data common. **Although most data commons have licenses that guarantee the above-mentioned rights that make them also open data, it is not necessarily the case**. For example, The Good Data allows people to pull the personal data they generate when they navigate the internet and manage it as a common, but without opening it. Moreover, not all open data is *produced* as a common, although that, once opened, the dataset becomes a data common.

In the next subsection we will present the five families of existing business models for open data following the methodology employed in the previous section consisting in analyzing the articulation between licensing, the mode of production, the governance and the revenue model.

## 2.3.4.3 Government open data

Government open data is possibly the most well-known business model of open data. The rationale behind this form of open data is that the government decides to open a part of the data it holds because it considers it a public utility and a citizen right in terms of access to information and accountability of the government's action. The nature of this data is therefore linked to the State functions, which takes us to the mode in which it is produced. Government open data is (co)produced by the State bureaucracy (e.g. data on parking

tickets, macroeconomic statistics, etc.) and is collected by the State from third parties (e.g. the state might demand electrical companies to provide information about energy consumption and open that data). In that, this data is produced or collected by the State, which is responsible for its opening, the governance over these datasets is centralized in the State. Because the State, as mentioned above, opens data to provide public infrastructure and guarantee citizen rights, its intention is to make certain datasets equally accessible to anyone for any use. Therefore, the licenses applying to government data are very permissive and allow for commercial use. The revenue model is detached from the dataset itself and consists simply in financing the production, collection, storing and maintenance of open datasets by using the State' budget.

#### 2.3.4.4 Private firm standalone open data

Private firm standalone open data refers to cases in which a single firm decides to open a certain dataset it owns. Two objectives motivate this decision. The first one is the enlargement (increasing value through *size*) and/or enrichment (increasing the value through *quality*) of the original opened dataset. The second one is creating business opportunities related to the dataset.

The original dataset is produced either by an intra-firm data collection (e.g. crowdsourced data about the location of bus stops) and/or production (e.g. intra-firm data about clinical trials carried on) and, once opened, through the enlargement/enrichment of the data provided by third parties. The governance of private firm standalone data is resumed to the firm simply opening a certain baseline dataset and letting others enrich it and eventually modify it. No collective governance takes place in this case. Licenses, besides being open in the sense we have given to open data above, vary regarding the revenue model of the firm that has opened the data. When the **freemium model** is chosen, a core dataset is kept open but an extended one (usually useful for commercial purposes) is sold. In these cases, licenses distinguish commercial from non-commercial use of data. Another possible revenue strategy consists in **developing data-related services around the open data** such as paid data visualization toolkits to analyze the open dataset. An example of this is HERE's Open Location platform, which provides open cartographical data and offers cartographical licenses for firms that want to use their maps. Finally, a third way of monetizing private firm standalone open data is **creating future business opportunities by gaining knowledge and expertise through the study of the dataset**. This helps companies develop capabilities they can monetize in the future by creating new products, offering new services or getting better at what they already do. As said above, the larger the dataset, and the higher its quality, the more it can be learnt from it. Opening data increases the possibility of third parties augmenting its size and quality and, therefore, of being able to provide (data-related) services, which provide the source of revenue.

#### 2.3.4.5 Non-commercial standalone open data production

Non-commercial centralized open data production refers to open datasets *created* (as opposed to already existing opened datasets) by a single organization or individual, usually motivated by contributing to a cause and not for commercial purposes. Examples of this are the datasets provided by Wikileaks, the datasets produced by Inside Airbnb through web scrapping of Airbnb's website, or the data on different topics published by the famous blogger Nate Silver.

These datasets are produced by an organization or individual using their expertise in a certain domain that allows them to create new open data over already-existing open and/or crowdsourced datasets. Because a single organization or individual produces it, the governance is centralized: the organization/individual is in charge of the production and the storing of the open dataset. Because these datasets do not have commercial motivations, they usually have permissive open licenses allowing for commercial use and only demanding recognition of authorship. In terms of revenue model, for the same reason, **donations** are the most common way of financing the time dedication required to produce these datasets, although the extent of voluntary labor must not be overlooked. Finally, another (sometimes unplanned) revenue strategy consists in **gaining notoriety through the production of open data, which might result in future business opportunities**. In this case, interoperability plays an important role: the more the data can easily circulate and be used, the more notoriety the creator will get, and the more opportunities they will have of

obtaining business opportunities related to the expertise used to produce that data. The fact that open licenses over these kinds of datasets tend to require the recognition of authorship is consistent with this revenue strategy.

### 2.3.4.6 Multi-stakeholder data pooling

Multi-stakeholder data pooling consists in, at least, two agents of any sort (private firms, governments, NGOs, collectives of citizens, private individuals, etc.) creating a dataset through pooling data they already own or create and applying an open license to it. For actors other than profit-oriented firms, the logic of this data pooling consists in being able to fulfill better their noncommercial mission. For example, the regional governments of Bretagne and Pays de Loire in France contribute to an open data pool about energy called PRIDE to be able to design better policy using the more accurate and exhaustive information that comes from an enlarged and enriched dataset that open data allows for. For profit-oriented firms, there are many commercial motivations**: creating a related business, good publicity (when their opened data helps to tackle a societal issue), gaining expertise and increasing interoperability.**

The **mode of production** of this type of open data consists in, in the first place, stakeholders pooling complementary data. In the second place, some stakeholders might provide their expertise to increase the data's quality and interoperability, the latter being essential for the data pool to be useable. Accordingly, governance is multi-partner and shared between the different stakeholders, although most of the times there is a leading entity in charge of coordinating the pooling and maintenance of the data. When the State intervenes, it usually takes the role of the leader. Because this type of open data business model relies on stakeholders pooling data, **financial contributions from stakeholders is a traditional source of revenue**. When the State is involved, **public funding**, which follows the logic of government open data for one of the stakeholders, generally takes place. While financial contributions might seem like an unjustified expense to profit-oriented firms at first, they make sense commercially for different reasons. Sometimes the data pooling, because it forces stakeholders to generate a dataset in the same format, is **a way of coordinating interoperability**, which, as we have seen, increases the value of data for all the actors involved. By contributing to an open dataset in a certain format, all the actors increase the possibilities that future contributions will follow that format and, therefore, coordinate on a certain standard. Moreover, firms can also **provide data-related services** using an open dataset that, precisely because of its openness, becomes larger, increases its quality and its scope.

Scope is the main way through which multi-stakeholder data pools increase their value through opening in cases where each stakeholder provides data and/or expertise on a domain and the linkage of previously unrelated data reveals valuable information. An example of this is the Open, Improved Settlement Data project carried on by CIESIN, Facebook and the World Bank. Facebook has shared commercially purchased satellite imagery data with CIESIN, which in turn has census data of the places to which the satellite images correspond. In addition, Facebook has shared "state of the art computer visioning techniques" (i.e. an increase in the quality of data) with CIESIN to identify buildings. The pooled dataset, which has been opened, helps understanding how human settlements are distributed across landscape. The resulting scope of this pooled dataset makes it valuable because it allows for many different applications such as research, humanitarian planning or crisis response. For Facebook, this information is valuable because it helps it create technologies to improve connectivity, a business line in which the company is engaged.

Firms can also use that more valuable open dataset to gain expertise and knowledge, which can result in positive economic returns to all the actors. For example, Transfermuga, an open dataset about transportation in certain regions of the south of France and north of Spain, allows incumbent transportation providers to provide a better service by linking their data to other stakeholders'. At the same time, it gives regulators a better picture of transportation in the region and allows for the creation of a platform that tells users what the best itineraries are. It also opens business opportunities for start-ups. Because the ultimate goal of pooled open datasets is to increase interoperability and reuse of data by diverse actors, licenses

are usually permissive and allow commercial use, which is not to be hindered but actually fostered, since it brings value to the open dataset by increasing its use and, eventually, generating contributions to it.

### 2.3.4.7 Commons-based data crowdsourcing

Commons-based data crowdsourcing consist in a community crowdsourcing data to create an open data common in order to tackle a societal issue (e.g. crowdsource environmental data) or to provide a use value (the dataset) that it wants to keep open to the benefit of all. Examples of this are OpenStreet Maps, Open Food Facts, OpenSideWalks or the Barcelona citizen sensing project Making Sense.

As the name indicates, the **main mode of production** consists in data crowdsourcing by individuals. Nonetheless, as it is the case with OpenStreet Maps, the data is usually enriched by adding other open data. Commons-based data crowdsourcing datasets are governed following a community governance scheme where contributors have a say in the development of the project. It is for this reason that we can speak of data commons and, more precisely, because of the way in which they are produced, also of CBPP. When these projects attain a certain critical mass, they are generally governed through a foundation that serves as the legal environment to develop community governance as a tool to manage revenue sources. Regarding the latter, **donations** are a common source of revenue making. Because these datasets are fed by a community engaged in the open data philosophy where professionals work on topics related to the nature of the common dataset, related-business-based revenue models are not suited. Donations on the base of reciprocity for the work done to feed the common open data pool are therefore more in line with the rationale of these projects.

Another common source of financing is **public funding**, usually in the form of research grants, as in the case of the citizen sensing project Making Sense. Because the primary goal of commons-based data crowdsourcing is to tackle a societal issue or to provide an open dataset that benefits the general population, it is common and logical for the State to contribute to these projects as they fulfill some of its missions.

Another not so common revenue capture strategy is the **selling of products** related to the common open dataset. For example, Open Street Maps sells merchandising with its logo (shirts, jackets, mugs, etc.). It also gets commissions from the selling of products related to cartographical data collection (GPS, mapping books, batteries, mobile phones, etc.) from certain retailers with which they have passed contracts. This example is interesting not only because of the relevance OpenStreetMap has among common-based data crowdsourcing projects, but also because of what we can learn in terms of the structuration of business models for data commons from it. While the purchase of merchandising is closer to voluntary contributions in that what motivates the sale is reciprocity (although the actual purchase of an object with the logo fosters contributions because people feel they are not just giving away money), the purchasing of a GPS, for example, shows that commons-based crowdsourced data commons can create business opportunities for third-parties. The logic behind this business opportunity creation is related to the domain to which the project refers to, and it might therefore take place more easily in some projects than in others. HarrassMap, “an advocacy, prevention, and response tool that uses crowdsourced data to map incidents of sexual harassment in Egypt” (Young, 2014), for example, has no regular revenue sources. One could imagine that selling products related to sexual harassment (pepper sprays, for example) is more difficult than selling products related to digital cartography (GPS, apps, maps, mobile phones, batteries, etc.).

Table 2.4 summarizes the five different business families of open data identified in this section.

Table 2.4: Open data business models

| | Governemtn Open Data | Private Standalone Open Data | Non-Commercial Centralized Open Data Production | Multi-Stake Holder Data Pooling | Commons-Based Data Crowdsourcing |
|---|---|---|---|---|---|
| **Mode of Production** | (Co-) produced by the state bureaucracy and/or collected by the state from third parties | Intra-firm data collection/production and/or crowdsourced enlargement/enrichment of the initial dataset | Data is produced by applying a certain expertise to already-existing open and/or crowdsourced datasets | Complementary data is pooled by different stakeholders. Some partners provide their expertise to increase the quality and interoperability of the data | Mainly crowdsourced contributions from a dispersed community. Open data from third parties can also be integrated to the dataset |
| **Governance** | Centralized | The firm simply provides the baseline dataset (no collective governance) | Centralized in one entity or individual | Multi-partner shared governance with a leading entity | Collective governance by the community, usually coordinated through a foundation |
| **Licencing** | Very permissive licenses | Varies regarding the commercial use depending on the revenue model | Open licenses allowing commercial use | Open licenses allowing commercial use | Open licenses allowing commercial use |
| **Revenue Model** | Financed by the state budget | - (Open-) data related services<br>- Freemium<br>- Gaining knowledge and expertise<br>- Creating business opportunities | - Donations<br>- Notoriety → Business opportunities | - Financial contributions from the stake holders<br>- (Open-) data related services<br>- Gaining knowledge and expertise<br>- Public funding | - Selling related products or services<br>- Donations<br>- Public funding |

### 2.3.5 Conclusion

This chapter has investigated the business models of digital and digitally supported commons and open data based on four key components of a business model connected to four of the dimensions of the commons balance: economy (revenue model and mode of production), governance and knowledge and technology policies (licensing of data, software and/or the brand).. We have offered a systematization of business model families based on the nature of the resources produced that has been useful to understand the rationale of the business models that are compatible with the logic of the commons. In the case of digital and digitally-supported commons, four business model families have been identified: FLOSS, digital content commons, open hardware and platform cooperatives. In the case of open data, the singularities of this resource and the fact that not all open data is necessarily a common have resulted in the identification of several business model families for this particular resource when opened, namely: government open data, private firm standalone open data, non-commercial centralized open data production, multi-stakeholder data pooling and commons-based data crowdsourcing. We have found that in the case of open data, these business model families are defined by both the purpose of the opening of the data and the way in which it is produced.

Contrary to what a first approximation to the subject might suggest, **we have shown that there are many possible business models compatible with the digital commons collaborative economy. In terms of revenue models, we have identified six types of revenue making strategies, namely 'shifting' revenue models, 'dissociating' revenue models, reciprocity-based revenue models, third-party funding, freemium and brokerage**. Beyond the identification of these strategies, our categorization of business model families has allowed us to have a better understanding of which revenue models are more suited for each type of digital common, digitally-supported common or open data project, which represents to our understanding a step forward in the comprehension of the economics of the commons collaborative economy.

Nevertheless, as crucial as having the 'right' business model is for the economic sustainability of commons, the reader should bear in mind that, as we have mentioned above, the latter also depends on other factors apart from the business model. For example, legal regulation or competitive dynamics with capitalistic firms can profoundly affect the economic sustainability of a common. It is therefore important to point out that further research on the non-business-model-related economic aspects of the commons collaborative economy is needed. Moreover, although economic sustainability is crucial for the endurance and expansion of the commons collaborative economy, it does not guarantee by itself that the qualities of these types of organizations will flourish. The social and gender inclusion or environmental impact dimensions of commons, for example, fall outside of the scope of business models and, more broadly, of economic sustainability altogether. For these reasons, a multidisciplinary approach to the study of the commons collaborative economy is essential to fully understand it and, so, foster its development.

# Legal and Public Policies

# 2.4 A Legal Analysis of the Collaborative Economy

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## *2.4.1 Introduction*

In these last years, "sharing" and "collaboration" are increasingly becoming a critical modality of production, and sharing-based solutions are developing fast at the very core of the economy, both at local and global level. As a result, more and more valuable resources are allocated by relying on social relations, in ways that coexist with, and in some cases outperform, price-based and government-funded systems (Benkler, 2002; Benkler, 2004).

However, despite the scale of the phenomenon, with the rise of commercial peer-to-peer platforms (so-called "unicorns"), the legal debate on the "collaborative economy" has come to focus almost exclusively on those for-profit business models facilitated by online platforms for the temporary usage of goods and the provision of services by private individuals.[23] In its early days, the collaborative economy has made its entry in the public discussion almost exclusively for the conflict between new entrants and those incumbents which are mostly affected by the ongoing changes (e.g. taxi companies and hotels against ride-sharing services and short-term rentals). In all these cases, the dispute is broadly the same. Taxi drivers and hoteliers blame collaborative companies for operating illegally, and for not guaranteeing the quality of the service provided and the safety of consumers, so enjoying an undue competitive advantage over those ones who must comply with the rules. The most frequent reply is that the collaborative economy offers tech services fundamentally different from conventional ones, and that applying rules for professionals to casual and amateur activities would penalize these new wave of wealth-generating economy. And even if the bipartisan appeal is to "level the playing field" – to review the regulatory framework by establishing fair rules - it is far from clear how such a field should look like.

However, more recent years have seen a growing awareness on the fact that the advent of the so-called collaborative economy is having a more profound impact on many regulatory issues. Accordingly, **the legal debate has broadened beyond the clash between incumbents and new entrants, to tackle societal challenges arising from collaborative practices**.

Along this path, this chapter aims at identifying the emerging legal issues stemming from the advent of the collaborative economy, in order to categorize the wide array of competing and sometimes conflicting

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[22] (*) Author of § 2.5.6.

[23] In its 2016 Communication, the European Commission defined it as "business models where activities are facilitated by collaborative platforms that create an open marketplace for the temporary usage of goods or services often provided by private individuals". See Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions "A European agenda for the collaborative economy" {SWD(2016) 184 final} (hereinafter referred to as "Communication"). "The term collaborative economy is often interchangeably used with the term 'sharing economy'. Collaborative economy is a rapid evolving phenomenon and its definition may evolve accordingly". See Communication, p. 3, ft. 7. In addition, a plethora of other expressions is used in the current discourse as synonyms or with slight changes in their meaning: not only sharing or collaborative, but also peer-to-peer (p2p), on-demand or gig economy, and the list could be even longer.

aspects that regulators should be considering when facing these new innovative practices. The chapter first describes how the advent of the collaborative economy challenges the current legal framework, at both local and global level; then, it addresses the main legal issues related to market regulation; in its second and final part, it analyzes those aspects of the collaborative economy that go beyond market regulation, in order to categorize different models of collaborative economy and their respective positioning with regard to a commons oriented economy.

The content of this chapter constitutes an introduction to a deeper analysis on the legal dimensions which will be presented at the D 1.8. This refers particularly to the section 2.4.6 regarding data analysis. D 1.8 will expand and deep this legal analysis, and provide an overall data analysis.

### *2.4.2 The Collaborative Economy and the City. Towards a Sustainable, Inclusive and Participatory Collaborative Economy.*

One reason why the wave of innovation connected with the rise of the collaborative economy significantly differs from previous ones is that it heavily relies on distinctly urban conditions. As the very scale, proximity, amenities, and specialization that mark city life is precisely what enable collaborative practices to flourish (Davidson & Infranca 2016), the collaborative economy is having an overwhelming impact on cities, transforming urban environments in many ways. Collaborative services not only put into question how urban transportation and tourist accommodation are planned, but also disrupt traditional local services, influence housing affordability and redesign city spaces, putting into question land-use regulation, zoning laws, licensing, local taxes, and so on thus making existing local rules obsolete. Ride-sharing and short-term rentals are just the most noticeable examples of a more general trend.

From a legal perspective, while market regulation is primarily for European and State law, local authorities may play a pivotal role with special regard to those aspects of the collaborative economy that go beyond the mere market efficiency to take into account other relevant societal goals. First of all, it is fundamental to take distributional effects seriously, by regulating the collaborative economy in ways that do not create a disparate impact on different segments of population or lead to discrimination or unequal access to products and services. Further, while promoting collaborative practices, it is also crucial to avoid the risk of commodifying a growing share of municipal collective resources, thus considering city services, and the city itself, as a simple objects of consumption. Finally, a central issue in the local governance of collaborative economy is fostering active participation in decision making, with cities encouraging and supporting people to cooperate together over the long run, helping them to overcome collective action problems, through practices and tools developed to enrich this inclusive decision making process. Only if cities will play such an active role, it will be possible to realize a truly sustainable, inclusive and participatory collaborative economy (Smorto, 2016).[24]

However, this distinctive impact of the collaborative economy on cities raises fundamental concerns about the allocation of regulatory responsibilities. While it has been observed that such a distribution across thousands of local governments is generating a kind of natural experimentalism, where local variations are the natural byproduct of how the collaborative economy is being shaped (Davidson & Infranca, 2016), current literature too often assumes that cities have legal power to rule these markets, and that the

[24] A Declaration for a commons collaborative economy was approved in Barcelona in March 2016, that aims first to highlight the importance to distinguish several models of collaborative economy, to define a commons-oriented model within the collaborative economy, and to provide policy recommendations for the public administrations. For the complete version, see http://procomuns.net/en/policy/. A set of recommendations has been proposed by the Barcola group (Barcelona Col·labora) and the collaborative peer production initiatives under its umbrella, informed by the research developed by the Dimmons.net group at IN3-UOC and the P2Pvalue European Project.

regulation of the collaborative economy is largely a municipal issue. Yet, this description does not always reflect what cities can really do. The degree of choice enjoyed by local authorities significantly differ from a legal system to another, as it depends on many variables, from the level of decentralization of each legal system to the existence of supranational constraints, such as in European Single Market. In most legal systems, rules governing collaborative practices are not municipal, leaving little room for effective intervention by local authorities. And even if local governments generally enjoy a regulatory capacity in significant fields - zoning, local transportation, licensing, and the like - other important features of the collaborative economy are in large part subtracted to them, such as contract and labor law, competition regulation, data privacy protection, and to a large extent taxation.

### 2.4.3 The Collaborative Economy and the European Single Market

The collaborative economy deeply affects not only urban environment but, at a supranational level, the effective functioning of the European Single Market. For this reason, in these last years the European institutions have being working at a common framework for the collaborative economy. The Single Market Strategy was adopted in October 2015, announcing that the Commission would have developed "a European agenda for the sharing economy, including guidance on how existing EU law applies to collaborative economy business models" as part of the Commission's Digital Single Market Strategy.[25] From September 2015 to January 2016 a public consultation was carried out within the Internal Market Strategy for Goods and Services, to gather the views of public authorities, entrepreneurs and individuals.[26] In March 2016 an Eurobarometer survey on collaborative platforms was also published.[27] In June 2016 the European Commission published its Communication on "A European agenda for the collaborative economy" with the aim to provide legal guidance and policy orientation to public authorities, market operators and interested citizens. And in June 2017 the European Parliament adopted a Resolution on the collaborative economy.[28]

As stated by the Commission, the difficulties so far faced by European collaborative platforms vis-à-vis their US counterparts can partly be justified by cultural and linguistic differences and unequal development in different countries, but are also exacerbated by a fragmented regulatory environment and divergent regulatory approaches. And this divergence, both at national and local level, results in a high degree of confusion that still surrounds rights and obligations, thus deterring people from participating in the collaborative economy and discouraging investments for the dangers of future legal challenges.[29] For these reasons, the European Commission identified the development of a harmonized legal framework for the collaborative economy as a priority for the Single Market and published its Communication to offer legal guidance and policy orientation to public authorities, market operators and interested citizens, on how existing EU law should be applied to the collaborative economy, in order to reap benefits and to address

[25] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. "A Digital Single Market Strategy for Europe" {SWD(2015) 100 final}. Brussels, 6.5.2015. COM(2015) 192 final.

[26] Public consultation on the regulatory environment for platforms, online intermediaries, data and cloud computing and the collaborative economy, 24/09/2015.

[27] Flash Eurobarometer 438 - March 2016. "The use of collaborative platforms".

[28] European Parliament resolution of 15 June 2017 on a European Agenda for the collaborative economy (2017/2003(INI)).

[29] See European agenda for the collaborative economy - Supporting analysis {COM(2016) 356 final}, Brussels, 2.6.2016 SWD(2016) 184 final: While societal drivers play an important role in the development of the collaborative economy (e.g. population density), internet technology is the most essential driver of the new economy. Thus, the collaborative economy appears to be developing more quickly in EU Member States with high levels of internet access and usage, but less in others.

concerns over the uncertainty about rights and obligations of those taking part in the collaborative economy, and to encourage a balanced and sustainable development.

**Notably, despite the strategic role played by European institutions in defining the rules for the collaborative economy, when dealing with regulating the collaborative economy at the local level the European legal framework for the collaborative economy is often ignored. As a result, in quite a number of cases measures taken by cities to regulate the collaborative economy may result at odds with supranational law**.[30] In order to avoid these risks while taking effective measures at local level to control the impact of the collaborative economy on the urban environment, a multi-layered analysis is strongly desirable, in order to to help local authorities to develop an effective legal strategy in tune with European law.

## *2.4.4 A First Challenge. Market Regulation*

### a) Distinguishing Peers and Professionals

The first challenge for regulating the collaborative economy is related with the massive provision of services, traditionally offered by professionals, by a wide range of very diverse individuals who offer their good and services, thanks to online collaborative platforms. Usually described with different neologisms (produser, prosumer, pro-am consumers), a new economic agent is emerging, who accumulate in itself production and consumption, in a gradual overcoming of the distinction between producer and consumer (Bruns 2008; Lastowa & Hunter 2006; Leadbeater, 2008; Tapscott & Williams, 2008).

Since the line, once very clear, between producers and consumers is more and more confused, it is increasingly difficult to define distinctive rules for professionals and non-professionals. Many traditional rules governing markets are deeply challenged, as laws designed to regulate sales of goods and provisions of services by professionals are, in most cases, inadequate when these activities are carried out by non-professionals. The constant emphasis, placed by collaborative platforms, on the emergence of a new economy based on social ties, where the economic return plays a marginal role, not only responds to a marketing strategy that aims to enhance the orientation to a community-oriented p2p service (so called "sharing washing"), but it also helps to point out the differences and distance so-called peers from professional services and their rules. The widespread conclusion is that lighter rules for those people who, occasionally and non-professionally, exercise an economic activity should be adopted. However, a case-to-case assessment is needed in order to assess the true nature of the provider. If a lighter regime is surely reasonable for those who occasionally rent their house or car, making some extra money, the same cannot be said for organized economic activities with considerable economic returns, as in the case of who "shares" hundreds of premises, or works full-time for a collaborative platform.

Under European Union law, such a debate between professionals and amateurs should be viewed in the context of Treaty fundamental freedoms and the Service Directive, which prescribe that any national measure on market access requirements which prohibit, impede or render less attractive the exercise by EU nationals of the freedom of establishment in any European country must be regarded as a "restriction".[31]

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[30] In preparation of its Communication, the European Commission contracted a number of "Analytical Papers" to scrutinise the existing regulatory framework for the collaborative economy in Europe, in order to to give a view on its compatibility with EU law, in relation to both the peer providers and the online platforms. All these papers can be downloaded at http://ec.europa.eu/growth/single-market/services/collaborative-economy_en.

[31] Consolidated version of the Treaty on the Functioning of the European Union (2012) C-326/49, art. 56 (ex Article 49 TEC) and art. 49 TFEU (ex Article 43 TEC); Directive 2006/123/EC on services in the internal market ("Services Directive"). According to the Court's case-law, art. 56 TFEU". See Case C-544/03 Mobistar v Commune de Fléron [2005] I-07723; Joined Cases C-369/96 and C-376/96 Arblade

As such, restrictions are permitted only if it is equally applicable to the national and the foreign, justified by some legitimate public interest objective and proportionate to that objective.[32] In sum, any restriction to the free provision of services must be appropriate for ensuring attainment of a clear objective, should not go beyond what is necessary for that purpose, with a link between the national measure and the invoked justification.[33]

Following these principles, Member States must avoid any overt or covert discrimination when regulating the collaborative economy. This requires not only the elimination of all discrimination on grounds of nationality for providers of services who are established in another Member State, but also the abolition of any restriction, which is liable to prohibit or further impede the activities of a provider of services established in another Member State where he lawfully provides similar services, even if it applies without distinction to national providers of services and to those of other Member States.[34]

Further, the call for proportionality not only points to distinctive and less restrictive rules for peers. At the same time, it imposes a drastic revision of rules for professionals. While private individuals offering services via collaborative platforms on a p2p and occasional basis should not be automatically treated as

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[1999] I-08453; Case C-165/98 Mazzoleni and ISA [2001] I-02189; Case C-49/98 Finalarte [2001] I-00787; Case C-350/07 Kattner Stahlbau [2009] I-01513.

[32] The Services Directive contains a long sequence of what may constitute an "overriding reason relating to public interest" and well-established case-law of the Court of Justice mentions many others - consumer protection, the protection of (urban) environment, town and country planning, and adequate supply of housing, especially for the less affluent local population and socially weak individuals. Thus leaving the room to Member States to take into account such objectives in regulating the collaborative economy.

[33] "National measures liable to hinder or make less attractive the exercise of fundamental freedoms guaranteed by the Treaty must fulfil four conditions: they must be applied in a non-discriminatory manner; they must be justified by imperative requirements in the general interest; they must be suitable for securing the attainment of the objective which they pursue; and they must not go beyond what is necessary in order to attain it": Case C-55/94 *Gebhard v Consiglio dell'ordine degli avvocati e procuratori di Milano* [1995] I-04165. See also Case C-79/01 *Payroll and Others* [2002] I-08923; Case C-442/02 *Caixa Bank France* [2004] I-08961; Case C-157/07 *Krankenheim Ruhesitz am Wannsee-Seniorenheimstatt* [2008] I-08061; Case C-140/03 Commission v Greece [2005] ECR I-04505; Case C-243/01 Gambelli [2003] ECR I-13031.

[34] On the conformity to European law of different legal treatment on the basis of residence, which may be liable to operate to the detriment of nationals of other Member States, see Case C-224/97 Ciola v Land Vorarlberg [1999]. Art. 20, Services Directive, provides: "1. Member States shall ensure that the recipient is not made subject to discriminatory requirements based on his nationality or place of residence. 2. Member States shall ensure that the general conditions of access to a service, which are made available to the public at large by the provider, do not contain discriminatory provisions relating to the nationality or place of residence of the recipient, but without precluding the possibility of providing for differences in the conditions of access where those differences are directly justified by objective criteria". Before Services directive explicitly took into account residence, European Court of Justice ruled on this point: "National law of a Member State cannot, by imposing a requirement as to habitual residence within that State, deny persons established in another Member State the right to provide services, where the provision of services is not subject to any special condition under the national law applicable." Case 33/74 Van Binsbergen [1974]. The ECJ concluded that "by retaining rules requiring patent agents established in other Member States to be enrolled on the Italian register of patent agents and to have a residence or place of business in Italy, in order to provide services before the Italian Patent Office, the Italian Republic has failed to fulfil its obligations under Articles 49 EC to 55 EC". Case C-131/01 Commission v. Italy [2003].

professionals, since such an extension would produce a disparate impact on the latter, the Commission also urged national authorities to review existing national legislation and to simplify procedures and formalities for professionals, in order to avoid unfair competition among comparable categories of economic agents.

## b) Assessing Platforms Liability

A second crucial aspect for regulating the collaborative economy in Europe is assessing the nature of online platforms that connect peers, in order to appropriately identify who provides the service - whether the peer or the platform itself. On this note, it is worth noting that most collaborative companies depict themselves as networks or "marketplaces" that facilitate the exchange of goods and service by providing so-called "transactional services".[35] Such a definition bears important legal consequences, since rules for service providers are dismissed as immaterial and public authorities are supposed to enforce regulation only against individual providers: only peers would be subject to these legal obligations and responsible for ensuring safe and reliable services. Thus excluding that the platform is part of the p2p transaction or otherwise responsible for the conduct of the parties.[36]

Nonetheless, the narrative of platforms as marketplaces not always accurately reflects their true role in the transaction. In some cases, platforms are truly open infrastructures that facilitate the matching of supply and demand among its users. But in many other cases they maintain a tight control on the transaction, lay down the rules of the exchange, exercise a strict supervision on information and communication, often influencing or even deciding the price.

Under EU law, the assessment on whether these p2p platforms are service providers or not, thus enjoying a liability exemption, must be based on the e-Commerce Directive. This important piece of legislation establishes a special liability exemption when online platforms deliver an "information society service", and limit themselves to "providing an intermediary service, neutrally, by a merely technical and automatic processing of data".[37] While the ordinary regime for service providers applies in principle when they play "an active role".[38] Given the variable nature of online collaborative platforms, the development of well-

[35] Airbnb defines itself as *two-sided market*, http://designairs.com/designing-two-sided-markets. *Cfr. also* Uber Guidelines for Law Enforcement Authorities: "Uber is a technology company that has developed an app that connects users (riders) with driver partners who provide transportation to the user.", https://www.uber.com/it/legal/data-requests/guidelines-for-law-enforcement/en/. Even when platforms provide tools to reduce risks and offer guarantees (insurance, security deposits, alternative dispute resolution mechanisms) such remedies are always presented as voluntary, with no formal assumption of legal obligations.

[36] *Cfr*. Uber Terms and Conditions (8-4-2015), art. 5 (Disclaimers; Limitations of Liability; Indemnity), https://www.uber.com/legal/usa/terms; Airbnb Terms of Service (6-7-2015), (Disclaimer) https://www.airbnb.com/terms/.

[37] In this case, platforms cannot be subject to prior authorisations or any equivalent requirements for the underlying services, and enjoy a limited liability regime. See art. 4(1) of the e-Commerce Directive. Internet intermediary service providers should not be held liable for the content that they transmit, store or host, as long as they act in a strictly passive manner. The Directive distinguishes: "Mere conduit" service providers (art. 12), "Caching" providers (art. 13) and "Hosting providers" (art. 14).

[38] According to C-324/09 *L'Oréal/eBay* [2011] I-06011, the service provider plays an active role if "it provides assistance which entails, in particular, optimizing the presentation of the offers for sale in question or promoting them".

defined principles is essential for a case-by-case appraisal on the nature of the collaborative platforms.[39] On this note, the Communication issued by the European Commission in June 2016 states that the intermediary responsibility must be assessed with greater rigor when it exercises a strict control on private parties' bargain to mitigate it in case users enjoy greater autonomy.[40] On the contrary, collaborative platforms are subject to market access requirements applicable to relevant sector-specific regulation, including business authorisation and licensing requirements, only if deemed as providers.[41]

## c) Protecting Consumers

As illustrated above, peers who occasionally provide services or share their goods are not full-time, large scale professionals, and since professionals are radically different from peers, extending rules which were originally conceived for a professional provision of goods and services, to peer-to-peer services would determine a disparate impact at the expense of new business models, erecting insurmountable barriers to entry in these growing markets.

On the other hand, the emergence of a peer-to-peer economy, where private, non-professional individuals provide services to customers, may lead to safety, health, environmental concerns. Balancing the two somehow conflicting aspect –having rules different than those applicable for professionals and protecting consumers- is one of the most challenging aspect of the collaborative economy.

The combination of these two aspects – a lighter regime for both peer providers and for platforms – is a central issue with regard to customer protection. Under European law, consumer and marketing legislation is based on the distinction between "trader" and "consumer", as EU consumer law applies only to those who qualify as "trader" and engage in "commercial practices" vis-à-vis consumers.[42] This means that while EU consumer and marketing legislation clearly applies to traditional business-to-consumer transactions, in addition to sector specific legislation, things may be radically different in collaborative economy, thus leading to the need to conceive new ways of protecting customers in the collaborative economy.

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[39] *See* Communication, p. 8: "Whether or not collaborative platforms can benefit from such liability exemption will need to be established on a case-by-case basis, depending on the level of knowledge and control of the online platform in respect of the information it hosts."

[40] *See* Article 2(a) of Directive 2000/31/EC (e-Commerce Directive) and Article 1(1)(b) of Directive 2015/1535. *Cf.* Communication, p. 5.

[41] Along these lines, the Commission lays down several factual and legal criteria that can play a role in this ad hoc assessment, based on whether the collaborative platform: a) set or recommend the final price to be paid; b) set key contractual terms, other than price; c) own the key assets used to provide the underlying service. In addition, other relevant factors are also mentioned by the Communication, based on whether: the collaborative platform incurs the costs and assumes all the risks related to the provision of the underlying service; an employment relationship exists between the collaborative platform and the person providing the underlying service. When most criteria are met, there are strong indications that the collaborative platform exercises a significant influence or control over the provider of the underlying service, thus acting as a service provider employing peers to performs the offered services. While the contrary is true when a small degree of influence and control are exerted.

[42] Directive 2005/29/EC on Unfair Commercial Practices; Directive 2011/83/EU on Consumer Rights; Directive 93/13/EEC on Unfair Terms in Consumer Contracts; Directive 2013/11/EU on alternative dispute resolution for consumer disputes; Council Regulation (EU) 524/2013 on online dispute resolution for consumer disputes. A trader is a person "acting for purposes relating to his trade, business, craft or profession"; a "consumer" is a person acting "outside his trade, business, craft or profession". See Article 2 Directive 2005/29/EC ("Unfair Commercial Practices Directive").

### *2.4.5 Beyond Market Regulation. Who Wins and Who Loses in the Collaborative Economy?*

The legal consequences of the collaborative economy are not limited to market regulation, and other relevant issues must be taken into account to tackle those aspects of the collaborative economy which affect crucial societal goals. In this paragraph we briefly address the most relevant ones, before making a few comments and suggestions in the final remarks.

#### a) Workers' Protection

When dealing with the legal treatment of the collaborative economy a widely recognised concern is worker's protection. Collaborative services typically rely on an indefinite number of peer providers - contributors that are formally external to the firm. And while some observers underline the new opportunities for complementing income with maintaining flexibility, on the opposite side many accuse collaborative economy of relying on underemployed job-seekers in order to pay very low wages, exploiting economic vulnerability in times of crisis and deepening existing inequality.

Service providers are usually deemed as independent contractors, not eligible for benefits reserved to employees (e.g., minimum wage, hours regulations, insurance, health benefits, retirement plans, vacations). And quite predictably, this has lead to a number of litigation on the classification of peer as employees or independent contractors. While several arguments have been formulated for or against each of the two cases, it has been widely observed that none of the known categories appears to comply fully to the economic reality of the collaborative economy. As famously stated by a Californian judge called upon to decide one of the first cases in this issue, asking the jurors to decide whether ride-sharing drivers are employees or independent contractors of the platform means handing them a square peg and ask to choose between two round holes.[43]

While labour law falls under State law, the European Union has developed certain minimum standards in the field of social policy and the Court of Justice has defined the concept of worker for the purpose of applying EU law. In principle, whether an employment relationship exists or not has to be established on the basis of a case-by-case assessment, considering the facts characterizing the relationship between the platform and the underlying service provider, and the performance of the related tasks, looking cumulatively in particular at the following three essential criteria: the existence of a subordination link, the nature of work and the presence of a remuneration.[44]

#### b) Wealth Distribution

The collaborative economy has significant effects on wealth distribution even if, so far, its impact has not been investigated enough and evidence is mixed. Some studies conclude that peer-to-peer activities

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[43] Both decisions are issued by the *District Court Northern District of California* on March, 11th 2015: Douglas O'Connor *et al.* v. Uber Technologies, Inc. *et al.*; Patrick Cotter e*t al.* v. Lyft Inc. For a first comment see. *Judges say labor laws outdated to deal with sharing economy firms*, R Street Institute, 12-3-2015, http://www.rstreet.org/2015/03/12/judges-say-labor-laws-outdated-to-deal-with-sharing-economy-firms/. J. BOUDREAU, *We Need to Move Beyond the Employee vs. Contractor Debate*, Harvard Business Review, 8-7-2015. https://hbr.org/2015/07/we-need-to-move-beyond-the-employee-vs-contractor-debate.

[44] *Cf.* COM(2010) 373 Reaffirming the free movement of workers: rights and major developments. Point I.1.1 http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1453133735571&uri=CELEX%3A52010DC0373. See also COM(2010) 373 final, pages 4-6.

potentially benefit the below-median-income part of the population, as they would allow people to avoid buying capital goods, by instead renting or borrowing from strangers, and give the opportunity to non-owners to affordable access goods and services. Further, they would offset purchase costs by allowing goods to be shared and borrowed in new ways, so helping economically-distressed owners (Fraiberger & Sundararajan 2015; Dillahunt & Malone 2015). Others emphasizes that the growth of platforms have contributed to an intensification of the trend toward inequality, both as it relates to the 1-99% split and to shifts within the broad middle class and working classes. Platforms are said to have increased the incomes of the upper portion of the bottom 80% of the income distribution in two distinctive ways. Well-off and highly educated providers are using the platforms to increase their earnings, doing manual work that is traditionally done by people of low educational status (so called “blue” and “pink” collar), thus determining a “crowding-out” effect, thus disproportionately and providing earning opportunities for people who are already well-educated and relatively well-off (Schor, 2017).

### c) Discrimination

Collaborative practices may also determine a disparate impact on different segments of the population. Empirical findings show that most of these providers are racially “white” and native-born, in contrast to the people of color and immigrants who disproportionately do this manual work in the conventional economy (Schor 2017). Similarly, customers of p2p services are often young, skilled, educated, upscale consumers, as the technological feature of the new economy may create a potential technological hurdle that impede or deter access to a significant part of the population, leaving these opportunities to an elite of digitally connected young citizens, while excluding the rest.

A related concern regards denial of market access to disadvantaged individuals or groups. While traditional services are often required to serve poor areas and disadvantaged people (e.g. taxies must be equipped to accommodate customers with disabilities, and to apply the same rate based on distance regardless of the area) collaborative firms are largely responsive only to market forces: they accept rides only if profitable, they do not take expensive steps to accommodate customers, and they often limit their operation area to the city center, leaving the unprofitable suburbs to traditional public services and loss-making collaborative services to the city. The risk is that many collaborative services may be unavailable to poor urban residents, people with disabilities, underserved communities.

### d) Housing affordability

Housing affordability is another question for the collaborative economy, as in many urban areas the rising short-term rentals are diminishing the availability of long-term rental houses in the market, especially affordable ones. The collaborative economy is giving rise to the commodification of goods that were not sold on the market until the recent past, from spare rooms to cars and tools (Bauwens 2014), with visible consequences on urban environment, creating a challenge for those cities that intend to maintain their decision power over the destination of its areas (residential, touristic, etc.) instead of just being subjected to market forces due to the distribution of “guests” via short-term rentals. Blaming short-term rentals to take apartments off the market, many cities – from Barcelona to Berlin – have imposed rules to limit the possibility to rent on short term basis.

### e) Big data

Finally, many data-driven collaborative companies gather a vast amount of information in order to coordinate supply and demand and to monitor and sanction conducts. This enormous ability to collect personal data has not only obvious consequences for the personal privacy of users and customers, but it also raises important concerns for the dominance exercised by online platforms, as these companies may leverage their users to pressure local authorities to obtain political influence. And cities run the risk of depending on new collaborative firms to provide essential city services or to obtain relevant data.

### 2.4.6 Free Licences and Digital Commons

At the hearth of the debate about digital commons and collaborative economy free software and other digital works available to all play a special role. Free software and other digital commons were shaped by the collaboration practises and tools (including legal tools, particularly, free licenses) created and refined by the communities of human beings, companies and other entities during the past decades, starting from the 80s, when digital technologies begun to spread.

Such practises and tools were carefully designed to foster collaboration, distribute wealth and minimize the risk of value extraction by entities exerting an unfair level of control and influence on other subjects. Free software and other digital commons come from the communities of people trained in their creation and from the practises and tools created by such communities. Such digital commons, practises and tools became unavoidable terms of reference for the creation of new digital commons.

Looking at the issue from a legal perspective, it's useful to start from the beginning that is from free software communities: the first communities that shaped practises and tools (including legal tools) fostering the creation of digital commons. "Free software" means software that respects users' freedom and community. Roughly, it means that the users have the freedom to run, copy, distribute, study, change and improve the software. Thus, "free software" is a matter of liberty, not price"[45]. The fact that the free software is eventually distributed for a price does not change its nature.

"A program is free software if the program's users have the four essential freedoms:

- The freedom to run the program as you wish, for any purpose (freedom 0);
- The freedom to study how the program works, and change it so it does your computing as you wish (freedom 1). Access to the source code is a precondition for this;
- The freedom to redistribute copies so you can help your neighbor (freedom 2).
- The freedom to distribute copies of your modified versions to others (freedom 3). By doing this you can give the whole community a chance to benefit from your changes. Access to the source code is a precondition for this.

A program is free software if it gives users adequately all of these freedoms".[46] The availability of the source code (that is, the version of the software that can be analyzed and modified by developers) is central to the notion of free software. To run on computers, the software has to be translated into machine language capable of running on computers. This is made by an interpreter program or by a program that compiles the "object code" (the software version that can be interpreted by the computer but that is impossible to understand for developers).

Free software licenses are the legal tools that have been used since the 1980s to promote free software development and distribution: they are legal acts by which the author licenses copyrights (and patent rights) to allow users to enjoy the freedoms provided by the free software definition. Therefore, for a program to be free software, it is enough that the right holder distributes it under the terms of a suitable license: a free software license.

In 1989, Richard Stallman wrote the first version of the GNU-GPL license[47], unifying similar licenses he used for earlier versions of his programs. Nowadays the GNU-GPL license is adopted by a large number of projects and it is at the heart of the free software movement. Wide adoption of this license is partly due

[45] See https://www.gnu.org/philosophy/free-sw.en.html

[46] See https://www.gnu.org/philosophy/free-sw.en.html

[47] That was followed by a second version in 1991 and a third version in 2007.

to historical reasons (it's the license created by Richard Stallman, the founder of the Free Software Movement) but also to practical reasons: the engineering of this license favored for the spreading of free software.

In fact, the GNU-GPL provides that the user is allowed to modify and redistribute software licensed under this license provided that the modified version is in turn licensed under the terms of the same license. It is the "copyleft" effect[48] that proved to be very attractive and favored the spreading of free software[49].

To put it briefly, copyleft licenses foster sharing: whoever wants to modify the software and distribute it (or, sometimes, allow its remote use) can do so provided that he in turn gives the users the same freedoms that were granted to him. This is a hacking[50] of law that triggers virtuous spreading of free software by protecting users' freedom.

In 1998, a group of developers founded the Open Source Initiative[51] with the express aim of avoiding the emphasis on the ethical aspects of free software which, in their view, hampered the understanding and use of free software by IT companies. They used the term "open source" and adopted the Open Source Definition[52] that, substantially, reproduces the free software definition with a different formulation.

The term open source focuses on the requirement of access to the source code of the software: the Open Source Initiative does not mention ethical aspects and focuses on the development model of free / open source software. Nowadays there are many free software licenses (although the most commonly used are relatively few: the 10 most common licenses are adopted by more than 90% of free software projects[53]).

As a whole, the free software socio-technological system consists of a large number of programs[54] and the range of relationships that are built with these programs between a large number of people (developers and users), companies, public and non-profit organizations. People who develop and use free software can do it on their own or in the interest of companies or organizations they work for. It is unusual for companies to choose to develop or use free software for ethical reasons. It is more typical with people who act on their own and (assuming that their goals can qualify as ethical goals) with public and non-profit organizations.

It is a fact that in the early '80s the creation of free software was based on ethical reasons as a reaction to the emergence of the new paradigm of proprietary software. Richard Stallman says: "My work on free software is motivated by an idealistic goal: spreading freedom and cooperation. I want to encourage free software to spread, replacing proprietary software that forbids cooperation, and thus make our society better"[55].

Free software is not just an alternative to proprietary software: free software, unlike proprietary software, is part of a digital commons available to everyone. The software is to the emerging information and knowledge

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[48] Copyleft as opposite to copyright.

[49] The copyleft effect is not essential to the notion of free software. Actually, there are free software licenses that are not copyleft licenses.

[50] A hacker is a person that finds (and enjoys finding) creative solutions to problems. This term is popular among developers.

[51] See http://www.opensource.org.

[52] See http://www.opensource.org/docs/definition_plain.php.

[53] See http://www.blackducksoftware.com/oss/licenses#top20.

[54] On the website https://www.openhub.net/explore/projects more than 650.000 projects are listed.

[55] See https://www.fsf.org/licensing/essays/pragmatic.html.

society as water[56] is to the agricultural and pre-industrial society: a fundamental *res communis omnium* that needs to be fostered and protected to ensure the flourishing development of society. The free software materializes a social and cultural ideal shared by an important part of developers and users: it is a tool that eliminates access barriers to IT resources for all human beings.

But it is a fact that starting from that original ethical drive, free software socio-technological systems have evolved. Today entities with very different goals from those who gave birth to the original design of free software are participating in these systems. Certainly free software licenses played a key role in the growth of free software socio-technological systems. Free software development projects (sometimes institutionalized within a legal entity, sometimes not) have been organized around free software licenses, and such free software development projects interact among themselves and exchange data, functions and code, sometimes in an organized way, sometimes not.

It is therefore possible to suppose that free software licenses work as means of communication apt to foster stigmergic behaviors: the free software licenses have been the generative/genetic code of the socio-technological system that self-organized around them and that, as a whole, are not centrally coordinated (Elliot, 2006). Why did this happen with free software? Certainly, the answer to this question is a matter of reflection that requires assessments from different perspectives and disciplines. From the mere legal perspective, however, it is possible to contribute some reflections.

Free software licenses have been effective in solving problems typically handled by legal acts (laws, contracts, etc.); that is, they can be used to eliminate uncertainty, minimize transaction costs and reallocate risk:

- Free software licenses are well known and recognized in the communities of free software developers and users (the fact that a program is available under the terms of a certain free software license makes it easy for the users to identify their rights and obligations);
- Use of a free software license, instead of a license drafted *ad hoc*, reduces the costs associated with the adoption of the license;
- If a program is available under the terms of a free software license, the user can reasonably assume that the distributor did not deliberately include code in violation of third party rights.

In short, free software licenses are efficient in producing trust among the people involved in the socio-technological systems that are built around them and from the legal efficiency of the free software licenses arise social, economic, and other relevant effects.

Some further considerations from a legal perspective could be useful.

Even if it seems reasonable to assume that copyleft clauses are desirable for communities of developers particularly motivated by ethical goals of protecting users' freedom and encouraging sharing, such ethical goals are not shared by all developers in all circumstances. The interest of some stakeholders to avoid the copyleft effect led to creation and adoption of different non-copyleft and weak copyleft licenses.

In some cases, it has been found that free software licenses did not effectively solve problems resulting from the use of free software: when this has happened, communities have sought solutions and adaptations

[56] The evocative image should not induce to forget the differences between water (which, although it is a public good, is a material asset and therefore subject to exclusive use) and software that, as an intangible asset, can be used by anyone without limiting the use by others.

that could continue to guarantee the growth of the socio-technological system of free software. For example, free software licenses are objectively inappropriate to radically solve the problem posed by patent rights[57].

For this reason, a few years ago a patent pool involving the major players in the industry that awards all Linux kernel users a license on the patents held by all the members of the pool was established[58].

There are other legal frameworks that may be involved with use and distribution of free software (such as trademark rights, right to technological protection measures, or right on secret information). In some cases, a solution for the management of these legal frameworks was found within the free software licenses or with the adoption of new legal acts.

In other cases, communities of developers and users adopted and refined community practices and technologies that maximize freedom and collaboration: software versions management systems, bug reporting systems, open formats, license compliance and enforcement practices, etc.

The free software model has inspired attempts to reproduce its dynamics in other areas of human activity and has led to the creation of new licenses for digital commons made of non-software works (newspapers, books, music, videos, databases, electronic designs, etc.). For example, the Creative Commons Attribution Share Alike license[59] is currently used for Wikipedia[60] and the Open Data Commons Open Database License[61] is used for the Open Street Map project[62]. More recently, efforts are being made to create digital commons related to the production of material objects (electronic cards and other material objects). Fostering the creation of digital commons that include *inter alia* personal data, requires taking into account the rules on the protection of personal data, particularly the Regulation (EU) 2016/679 of the European Parliament and Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Directive), which will take effect on May 25, 2018.

One of the main aims of new General Data Protection Directive is to empower subjects to have full control of their personal data. The new regulation develops data protection rights as “informational self-determination”, in such a way that privacy become more closely connected to freedom of expression and to the idea of autonomy of individuals. The General Data Protection Directive defines rights and recommends tools fostering a vision of an individual who can control his own data deciding the context in which share it, tailoring the data life-cycle for his own purposes, taking it private and confidential, sharing it within a closed context or group, or deciding to share it as common good in a privacy-aware environment.

Working for the creation of digital commons including personal data will require shaping new legal tools that comply on one side, with the free software community's values, and, on the other, with the provisions of the General Data Protection Directive. Shaping of such new legal tools would benefit from considering the

[57] Free software licenses provide for express or implied license of patent rights. Some licenses provide for additional legal techniques of some effectiveness. For example, the MIT license provides for a retaliation clause in case the user claims patents; or, the GPLv3 license provides for clauses to prevent patent-related agreements.

[58] It refers to the Open Invention Network (see https://www.openinventionnetwork.com/).

[59] It’s one of the Creative Commons Public Licenses, made by the Creative Commons Corporation, a US non profit corporation.

[60] See https://www.wikipedia.org/

[61] See https://opendatacommons.org/licenses/odbl/

[62] See http://www.openstreetmap.org/copyright

economical structure of personal data markets and shaping incentives to foster individual behaviors converging towards the collective creation of new digital commons that include inter alia personal data.

### 2.4.7 Conclusions

The collaborative economy can be a powerful tool of economic inclusion and opportunity and developing peer-to-peer schemes to encourage people to connect with each other may have a profound positive impact on the urban environment. On the other side, the unprecedented opportunity to create new commercial services, with little or no control by the city, may result in a massive disregard of local regulation and expose the urban environment to the risks of congestion and overconsumption. Accordingly, cities should decide on a case-by-case basis to promote or discourage different causes of action, incentivize certain directions or limit or even prohibit directions that are deemed detrimental to society.

Market regulation is the first step of such a strategy, with the aim of preventing market failures and, even more deeply, of avoiding the profound readjustment of the rules of the game that is taking place on the role and the limits of self-regulation, thus escaping the risk that these changes may result in a massive deregulation (Cohen & Sundararajan 2015; Koopman, Mitchell, Thierer 2014; Baker 2015; Sundararajan 2016). However, addressing market failures is clearly not enough and other crucial aspects must be taken into account.

As growth strategies themselves may contribute to inequality (Elkin 1987), it is also vital to evaluate the impact of the collaborative economy on different social groups, geographical areas and gender in order to promote a collaborative economy that is also inclusive. In this perspective, regulation must be provided in ways that grant effective, equal access, putting collaborative firms under public obligation to accommodate every customer, do not create a disparate impact on different segments of city inhabitants, thus preventing diminution in house affordability, discrimination or unequal access to products and services that are essential to the city and its inhabitants. Free software and other digital commons can play a significant role in fostering collaboration, distributing wealth and minimizing the risk of value extraction by entities exerting an unfair level of control and influence on other subjects. Thus also enhancing data protection rights as "informational self-determination", where individuals gain full control over their own data.

Finally, policies for the collaborative economy must be crafted in collaborative ways. Fostering active participation in decision making is another central issues for the collaborative economy and cities should find ways to involve as many citizens as possible in policy making and urban planning, especially those segments of the population more directly affected by a certain course of action. Having this in mind, local governments should adopt ways to encourage and support people to cooperate together, reaching the vaster and involved audience. Also collaborative platforms may play an active role in this process helping to create an appropriate legal framework.[63] Improving regulations for a commons collaborative economy, by exploring new forms of legislation that promote participatory governance, and enhance its social mission and environmental sustainability, is the first of the ten measures which received more support by participants in Procomuns.[64] In fact, only through the full involvement of all actors the full potential of the innovative value that collaborative practices can bring in a specific environment will be finally captured.

[63] A few months ago, Airbnb announced for the first time that it would enforce a legal limit on the number of nights a year a host in London and Amsterdam can rent out a home. *See* Airbnb regulation deal with London and Amsterdam marks dramatic policy shift, The Guardian, Dec. 3rd, 2016, https://www.theguardian.com/technology/2016/dec/03/airbnb-regulation-london-amsterdam-housing.

[64] See Summary: procomuns statement and policies for Commons Collaborative Economies at European level, http://procomuns.net/en/policy/.

# Part 3 - Empirical analysis: Barcelona case

## 3.1 The Stage of Development of Blockchain in Barcelona in 2017

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### *3.1.1 Introduction*

This chapter details the stage of development and a holistic view of the Blockchain ecosystem in Barcelona. The information collected is classified into different areas, with one or two examples presented in each area. The examples provided are illustrative but not exhaustive. Although the most important players in each one of the various established areas are discussed here, the ecosystem is very dynamic, and new players appear every day. The different covered areas are the business environment, split into three different subcategories, startups, big corporations, and technological consultancy firms; the social and solidarity economy; non-profit associations, particularly into a non-profit association called Blockchain Catalunya which was founded with the mission of developing Blockchain and introducing its technology to the Catalan population; the meetups organized around Blockchain, Bitcoin, and Ethereum, which constitute an important medium for communicating issues related to this technology; some events in which Blockchain has presence; public administrations; and the role of the academia and local universities.

### *3.1.2 Business*

In the business sector, the ecosystem of companies implementing services over Blockchain is still small in Catalonia and Spain. However, what is happening in Barcelona around Blockchain matches what we observe around the world. On one hand, we find startups that are developing new models of business that derive profit from one or more Blockchain's intrinsic characteristics, in a plurality of areas such as the financial sector, or in regulation. On the other hand, large companies in areas that are under the threat of significant disruption are trying to adopt the technology through consortia in order to protect themselves against any disruptive changes that would erode their value chains by controlling the implementation of Blockchain (or an equivalent private ledger) into their vertical channels. Then, there are technological consultancy firms that provide the same type of services with Blockchain, such as strategic management and technical development, as they do with any other technology.

Some Blockchain adoption is public, and some private. The main difference between them arises from the consensus mechanism for generating blocks. Most public Blockchains use a consensus mechanism called "Proof of Work" (PoW), based on a competition between miners in which they must solve an energy-demanding puzzle, generate the ensuing block, and to get the corresponding reward. Others use "Proof of Stake" (PoS), which seems to be turning into the new standard. It uses round-robin mechanisms based on the amount of cryptocurrencies that miners owe. Private Blockchains, also called Permissioned Blockchains, don't need these complex mechanisms, although some of them may use, for example, PoS, because their governance is not distributed. All the Blockchains developed by consortia are private, or rather, permissioned. The miners are those companies within the consortium.

## Where finance and technology intersect: Verse - A payment-sharing solution

One of the first key sectors in which Blockchain has been utilized is the financial sector, or, better said, the area where the financial and technological sectors intersect: the fintech sector. Here, one Catalan startup called Verse (https://verse.me), founded in 2015, is using Blockchain, even if they are not publicizing it. Verse has developed a Blockchain-based solution for sharing payments which works in the same way as that of the more well-known American company Venmo (http://venmo.com). Both services allow clients to manage shared bills when going out as a group. One person within the group pays the bill to the merchant, and the rest of the group uses a wallet app to transfer them the money needed to cover their part of the bill. Blockchain is the tool used by Verse for transferring funds from one user's wallet to another, a process that is totally transparent to the user.

## Disintermediating regulations: Aragon - Creating and maintaining companies

On May 2017, the Spanish organization Aragon (https://aragon.one) raised $25M in just 15 minutes. At the time it set a new record (now obsolete) in speed-raising funds. Aragon offers to disintermediate the creation and maintenance of companies in response to the complex and bureaucratic processes that governments, intermediaries, and third parties usually impose in form of regulatory frameworks for business development.

## Intellectual property registration: Creativechain - Tracing creative work

Creativechain (https://www.creativechain.org/project/), based in Barcelona and funded in 2017, was the first organization to launch an Initial Coin Offering (ICO) in Spain. Creativechain is a tool for intellectual property registration on Blockchain. It allows users to demonstrate the provenance of creative works, trace following derivative works, and get paid for them if ownership of the IP is established.

## Private ledgers for corporate business value chains

Some corporations in Catalonia and Spain are also integrating Blockchain services into their private ledgers. At least two of the most important Spanish legal offices (Roca Junyent and Cuatrecasas); and three of most important Spanish banks (LaCaixa, BBVA, and Banco Santander), are creating specialized departments that will research how Blockchain could be utilized in their business value chains.

## Permissioned blockchain for a corporate consortium: Red Lyra

In June 2017, twenty-one large Spanish companies (Banc Sabadell, Banco Santander, Bankia, BBVA, BME, Caja Rural, Cajamar, Cepsa, Correos, Ejaso, Endesa, Everis, Garrigues, Gas Natural Fenosa, Grant Thornton, Iberdrola, Icade, MásMóvil, Momopocket, Roca Junyent y Scytl) in sectors such as the banking, consultancy, legal, oil, energy, and communications sectors, created Red Lyra (http://redlyra.es). The consortium was born with the aim of developing a semi-public Blockchain, based on Ethereum, in order to host any vertical application its partners would want to develop. Some partners are Catalan companies based in Barcelona, such as Roca Junyent, Banc Sabadell, Everis, Garrigues, Gas Natural and Scytl.

## Blockchain development and consultancy: Atraura and Tarsys

Atraura is a Catalan company born in 2013 out of an accelerator program in Catalonia Polytechnic University. Atraura Blockchain (https://www.atraurablockchain.com) is the part of the company focused on the development of Blockchain. They offer training and consultancy services to any company or organization.

Tarsys (http://www.tarsys.eu/) is a well known Catalan consultancy firm specialized in offering solutions for the ICT sector. They currently offer Blockchain consultancy services throughout Europe and, to that end, have established an Estonian subsidiary company.

### 3.1.3 Social and solidarity economy

The economic activity of Blockchain in Barcelona is not only related to the classical capitalistic economy. Some of its activities are beginning to be developed under the scope of the economic and solidarity economy.

The intrinsic characteristics of Blockchain make it a good fit for the development of the social and solidarity economy, but there is still a huge gap between its stakeholders and the knowledge, adoption, and implementation of systems based on Blockchain. Examples as Fair.coop and Bank of the Commons, discussed below, remain the exception. Blockchain allows the development of systems of governance based on the Commons, as well as the evolution of social coins and the development of projects based on the intersection between the proximity of producers and the scalability that the use of the technology allows.

#### Integral global cooperative: Fair.coop

On September 2014, Enric Duran created Fair.coop (https://fair.coop), a cooperative promoted by people who have a long history with integral cooperatives, p2p society, hacker ethics and cryptocurrencies and who are still accumulating experience. Fair.coop defines itself as "an open global cooperative, self-organized via the Internet and remaining outside nation-state control. Its aim is to make the transition to a new world by reducing the economic and social inequalities among human beings as much as possible, and at the same time gradually contribute to a new global wealth, accessible to all humankind as commons".[65] In order to implement its mission, Fair.coop launched Fair.coin (https://fair-coin.org), a cryptocurrency based on Blockchain, initially using proof-of-work but transitioning to proof-of-cooperation on July 2017.

#### Banking system: Bank of the Commons

Another project cofounded by Fair.coop is the Bank of the Commons. Bank of the Commons defines itself as "an open cooperative initiative whose objective is to transform banking, payments and currencies in order to support the economy used in cooperative and social movements both at a global and a local level"[66]. The project offers multi-currency wallets and virtual bank accounts that allow members to perform operations both in cryptocurrencies and in fiat currencies.

#### Organizations considering Blockchain: Goteo, Coopdevs, eReuse

Other organizations from the social and solidarity economy are assessing the possible adoption of solutions based on Blockchain in a near future. This is the case for Goteo**,** a crowdfunding platform for social projects, Coopdevs, a non-profit organization focused on the development of platforms that help communities to jump into the digital world, and eReuse, a platform for recycling computer equipment.

### 3.1.4 Associations

On July 2017 a non-profit association called Blockchain Catalunya was created, with the mission of promoting the knowledge and use of Blockchain among both companies and citizens.

This is a basic first step for the development of Blockchain in Catalonia, but it has to be oriented towards establishing links with other non-profit organizations, as well as other key players, in order technology for

[65] *What?* (2014, February 9). Retrieved from https://fair.coop/faircoop/

[66] *Who We Are* (2017). Retrieved from https://bankofthecommons.coop/who-we-are/

the technology to be developed for the common good, instead of only for channeling the interests of the industry, as so many non-profit associations currently do.

### 3.1.5 Communities and meet ups

Globally, Blockchain is a synonym for full meetups and plentiful events. There are a lot of expectations about what this technology is going to bring us in the next following years, and therefore a lot of interest in the technology.

In Barcelona, there are several meetups focused on Blockchain, Bitcoin, or Ethereum. The older and biggest one is the Barcelona Bitcoin Community. Created in 2013, it has close to 1,800 members. It has so far organized 56 meetups over a period of four years, all related to general aspects of the technology. The most recent ones discussed DAOs, digital identity, energy, cryptocurrencies, and ICOs. Between 100 and 150 people attend.

Barcelona Blockchain, is a quarterly meetup with close to 1,000 members that presents some Blockchain related projects. Created in 2016, it has organized five meetups so far. The latest ones have attracted more than 200 attendees.

Ethereum Dev Barcelona, founded in 2016, is a meetup mainly for developers, but its organizers alternate microtraining workshops with social meetups that usually involve between 50 and 100 people. It has more than 300 members.

Finally, Blockchain Intros is a meetup group also founded in 2016, with close to 400 members. The concept here is completely different: the only aim of the group is facilitating a nice conversation about Blockchain with other interested people in a coffee shop. There are typically 25–30 attendees per meetup.

Other communities are also currently being created, but they are linked to companies that use the events as promotion for their business.

It is also necessary to mention Bitnation, which has an ambassador living in Barcelona. Bitnation bills itself as the world's first virtual nation over Blockchain. Powered by Ethereum, it provides services such as world citizen IDs and public notaries.

These communities are a good indicator of the extent of knowledge about Blockchain. Only some months ago, the majority of their audience had no previous knowledge about Blockchain, and the meetups had mainly educational goals. Now, they have evolved towards more specific issues, in some cases quite technical, but still attracting a good number of attendees, which indicates that the level of knowledge about the technology is growing. However, there are still three challenges to overcome through these meetups. First, it's necessary to develop an inclusive discourse that everyone can understand in order to fight against the technological gap. Second, it's necessary to combat the current gender bias, by including a balanced number of men and women as speakers. Third, it's necessary to organize meetups to discuss the potential social transformation behind Blockchain.

### 3.1.6 Events

Blockchain has been incorporated into two important events occurring in Barcelona during this spring and summer in 2017.

At the 4th International Conference on Social and Complementary Currencies, organized by Universitat Oberta de Catalunya (UOC) in Barcelona and taking place from 10th to 14th May 2017, Blockchain had an important presence. This presence is likely going to grow at future conferences, with the challenge of approaching the world of social coins in the world of cryptocurrencies.

The second edition of the Commons Collaborative Economies Forum, which took place on June 27th and 28th 2017, co-organized between Dimmons at UOC and Barcelona City Council, hosted an event about

Blockchain under the title “Technology Infrastructure and Blockchain for a Common Collaborative Economy”.

Although there are no official or published statistics, probably less than 1% of population knows what Blockchain is. It is therefore necessary to develop mechanisms of dissemination and communication. Public events are excellent opportunities to put experts in contact with general audiences, in order to allow a participative learning process in both directions.

### 3.1.7 Public sector Administration

Both Generalitat de Catalunya and Barcelona City Council seem interested on the development of Blockchain and its impact on the local and regional economy.

On March 2017, Mr. Jordi Puigneró i Ferrer, Secretary of Telecommunication, Cybersecurity and Digital Society at the Government of Catalonia, announced during the opening act of BECON Barcelona[67] that Barcelona would host the first World Blockchain Congress. The event is called Blockchain Solutions Forum (http://www.blockchainsolutionsforum.com) and will take place from October 3 to October 5, 2017.

The Barcelona City Council is a major partner in the European project DECODE[68], which provides tools based on Blockchain for the sovereignty over the control of personal data. Under the scope of this project, two pilots will be developed during 2018 in Barcelona. One of them is focused on open democracy, which refers to the ability to participate in various aspects of the democratic process. It ranges from providing transparency to citizens about government and political processes, to providing ways for people to actively participate in policy making and decision-making. The pilot is going to develop an existing platform, Decidim Barcelona (https://www.decidim.barcelona), through the implementation of some Blockchain-based modules. The second pilot, focused on Internet of Things (IoT), will develop decentralised systems that enable access to IoT devices with data owned by citizens. The pilot is significative because it will enable the protection of people’s data and privacy, but at the same time without encapsulating the insights provided by the data from IoT devices into private silos.

Public policies from public governments must bring the technology to the population through applications that improve their citizens’ lives. Therefore, it is important that any action can be measured in terms of social impact, instead of according to the model of external economic promotion and the development of profit-based models that exclude citizenship.

### 3.1.8 Universities

To our knowledge, specialists in at least three universities in Barcelona are researching Blockchain. Dr. Jordi Herrera-Joancomartí is researching cryptocurrencies at Autonomous University of Barcelona. Dr. Vanesa Daza and Dr. Lluïsa Marsal are developing research projects based on the relationship between Blockchain and Internet of Things; and a sustainable development of cities (Blockchain4cities) at Pompeu Fabra university, and Dr. Mayo Fuster is director of the Dimmons research group, which studies Blockchain and the collaborative economy as part of the European Commission project DECODE, and Blockchain researcher Marc Rocas is working towards a PhD at the Open University of Catalonia (UOC).

It is probable that, over the following months, more and more researchers will focus on the different aspects of Blockchain. It is necessary to boost collaboration between these communities, no matter the linked university, in order to develop complementary strategies and sum resources.

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[67] http://www.becon.global/conferences/barcelona/

[68] https://decodeproject.eu

# 3.2 Assessment of Blockchain Potential for Transforming the Collaborative Economy towards Commons and Platform-coop Models

Marc Rocas (Dimmons IN3 UOC)

## 3.2.1 Introduction

Blockchain promises to bring us huge transformations during the next following years. But, what are the roots for those transformations? In order to figure them out, we need to analyze Blockchain's main characteristics. As Andreas Antonopoulos, the author of "Mastering Bitcoin: Unlocking digital cryptocurrencies" states, Blockchain is an open, neutral, borderless, censorship resistant, and distributed network (Antonopoulos, 2017). In our opinion, the inherent power of transformation of Blockchain lies on four concepts: the spread of trusting a trustless system; the governance of distributed systems; the adoption of cryptocurrencies as the killer app; and the development of smart contracts. These features of Blockchain open up a unique opportunity for collaborative economy. This technology is able to provide connectivity between peers without today's dependence on the platform providers, and to promote a commons-based collaborative economy. In other words, get rid of the platform intermediaries and empower peers. **But to what extent is a shared and present statement of the collaborative economy ecosystem and of the platform cooperativism linked to social and solidarity economy unified?**

On May 26th, 2017, more than 20 participants[69] from academia, startups, organizations, and communities somehow involved with Blockchain, or considering the adoption of Blockchain for their activities, took part in a workshop for discussing the connections between the collaborative economy and blockchain. The starting point and main motivation for the activity was matching and creating an encounter between people and organizations from different trajectories. It can be observed that, on the one hand, the Blockchain community is trying to research and establish new systems of governance in order to develop and implement its projects, and, on the other hand, that cooperativism is looking for a transformation towards a higher adoption of technology, and the development of more democratic processes of decision-making.

In 2014, Trebor Scholz coined the term "Platform Cooperativism" to describe a movement that advocates for the creation of platform cooperatives: cooperatively-owned and democratically-governed businesses that use a platform's business model in order to sell goods and services. Platform Cooperativism can be seen (or not) as part of the "Open Cooperativism" movement, led by Michel Bauwens and the P2P Foundation, which defends a new generation of coops that truly include all stakeholders in the governance of the organization.

Distributed Autonomous Organizations (DAOs), Platform Cooperativism (PC), and Open Cooperatives (OP) share a need for developing governance rules that allow the participation of a large number of decision-makers. But, although Platform Cooperativism and Open Cooperatives are based on a list of principles, there is no manifesto for DAOs.

## 3.2.2 Description

The activity proposed was inspired by this question: "What's the vision of PC and OP's principles from the point of view of Blockchain, in the context of the collaborative economy?"

[69] https://tinyurl.com/y9pktfaj

As it was assumed that the concepts of PC and OP, as well as their principles, were unknown by the participants, the designed activity consisted of reacting to 14 statements from four different perspectives. The suggested statements were 10 statements derived from the 10 principles of Platform Cooperativism[70] and the four principles for Open Cooperatives (http://commonstransition.org/open-cooperativism/).

This is the list of provided statements:

- Collaborative economy has to be oriented towards the common good.
- The distributed ownership of collaborative economy platforms has to be promoted.
- "Everyone needs fair pay and benefits to make a living" (decent pay and income security).
- Platforms need to be transparent (related to platforms' data collection).
- Collected data belongs to users.
- Workers at the same platform are fellows, not competitors.
- Platforms need to implement decision making processes in order to allow participation and governance from as many different stakeholders as possible.
- A protective legal framework is needed in order to fight against monopolistic behaviors from sharing-economy incumbents.
- As collaborative economy platforms are borderless, the rights of their workers must be the same no matter where they are physically located.
- Trust and reputation systems for performance assessment are needed in order to replace excessive workplace surveillance.
- A reputation's ownership belongs to the worker, and, as such, it has to be decentralized and exportable.
- Any worker is free to decide when to work or not.
- Platforms need to create both immaterial and material commons.
- "Glocal" strategies ("think global; act local") are needed to better develop platforms both socially and politically.

For each one of them, participants reacted from four different approaches:

- I agree / I disagree / I don't care.
- The current collaborative economy allows this.
- Suggestions about how Blockchain can allow this.
- Threats and opportunities related to this.

### *3.2.3 Results*

The collected data are public and can be accessed through a shared file (https://tinyurl.com/yazfhaz7). It is not the aim of this work providing a quantitative analysis about the presented activity. This is why qualitative expressions are used for describing the collected data, such as "most participants", "the majority of the participants", "some participants," etc. Curious reader looking for concrete results can go through the provided link.

These are some interesting aspects to be discussed:

[70] Scholz, Trebor. (2016). *Platform Cooperativism: Challenging the Corporate Sharing Economy*. Retrieved from http://www.rosalux-nyc.org/wp-content/files_mf/scholz_platformcoop_5.9.2016.pdf

### 1. Collaborative economy has to be oriented towards the common good.

Most participants agreed on this statement. One of them pointed out that what “common good” is can be defined in several ways. They also established a dichotomy between common good and capitalism, and defended the idea that the current collaborative economy is oriented to common good only through the Commons models.

### 2. The distributed ownership of collaborative economy platforms has to be promoted.

Participants concluded that although they agree with this statement, the current collaborative economy doesn’t allow it. They pointed out that Blockchain could help to promote the distributed ownership of platforms by the implementation of systems based on meritocracy.

### 3. “Everyone needs fair pay and benefits to make a living” (decent pay and income security).

Participants agreed on this statement and said that the current collaborative economy doesn’t allow it. They concluded that Blockchain could help reinforcing distribution thanks to its inherent transparency. In addition to this, they saw a need for clear political action, and pointed out the threat of a technological gap that could appear if the created solutions are not used by everyone, and some people are consequently left behind.

### 4. Platforms need to be transparent (related to platforms’ data collection)

Everybody agreed on this statement, and on the fact that the current collaborative economy doesn’t allow this. Participants suggested that the DECODE project could be a nice starting point for solving this issue. One of the participants stated that the technology is perhaps not mature enough to implement transparent systems.

### 5. Collected data belongs to users.

The same happened here. Everybody agreed on this statement, and on the fact that the current collaborative economy doesn’t allow this. Participants pointed out how Blockchain could be useful here via entitlements and smart contracts.

### 6. Workers at the same platform are fellows, not competitors.

As the majority agreed on this statement, it was also said that cooperating and competing for the user are two complementary behaviors when dealing with collaborative economy platforms. In other words, they are not exclusive.

### 7. Platforms need to implement decision making processes in order to allow participation and governance from as many different stakeholders as possible.

Most of the participants agreed on this statement. And, again, this was perceived as something currently not happening on the collaborative economy platforms. Three ideas arose when talking about how Blockchain could change this situation. The first one was related to the concept of Distributed Autonomous Organizations (DAOs) as alternative organizations able to allow more participative decision system processes. The second one was related again to the risk of Blockchain becoming a technology only available to part of the population. The third one was related to reflecting on whether the Internet has been a good model for inspiring future Blockchain developments.

### 8. A protective legal framework is needed in order to fight against monopolistic behaviors from collaborative economy incumbents.

Although most people agreed on this statement, one participant stated that instead of solving monopolistic behavior through the development of legal norms, it would be better implementing systems of trust based on reputation. Some suggestions related to how Blockchain could be useful here involved boosting transparency and integrating "coding" platform laws into the Blockchain. Two threats were identified as a result of this statement: the abuse of centralized power; and the development of legal frameworks that prevent the development of the real collaborative economy.

### 9. As collaborative economy platforms are borderless, the rights of their workers must be the same no matter where they are physically located.

Here, participants showed a diversity of opinions. Some agreed about the divergence between the rights of the collaborative economy workers and their location, especially if those working rights are the same as in the Nordic countries; despite others stating that we must respect local regulations. There was consensus about the lack of borderless character for the current collaborative economy platforms. Here, Blockchain could help providing visibility and transparency in order to compare different labour rights. Participants detected the friction with local laws as the main threat regarding this issue.

### 10. Trust and reputation systems for performance assessment are needed in order to replace excessive workplace surveillance.

Here, participants pointed out interesting issues. There is a diversity of opinions on whether trust and reputation systems are needed or not. They agreed on Blockchain allowing the implementation of this kind of systems, but warned about three important issues. These systems have to be flexible, revisable, and democratic. In addition, participants pointed out that once something is registered on the Blockchain, it is forever. In some cases related to building a reputation, it faces some important issues, as the right to be forgotten, or the creation of governance systems based on the assessment of everything and the monetization of relationships.

### 11. A reputation's ownership belongs to the worker, and, as such, it has to be decentralized and exportable.

There was a consensus about the ownership of the reputation by workers, and, at the same time, participants agreed that this is not currently happening on the current collaborative economy platforms. Blockchain is seen as a technology that could allow a reputation's ownership through a universal public registry. But, again, participants warned that mistakes cannot be deleted on the Blockchain.

### 12. Any worker is free to decide when to work or not.

There is a division of opinions about this statement. Some participants thought that the freedom of the worker is a complex issue. The worker must fulfill his or her commitments. There is a partial agreement about the fact that current collaborative economy platforms allow this. Blockchain could help solve this by enabling workers to select if they are skilled enough for the work. Another participant pointed to some kind of traceable basic income that would give the worker the ability to decide when to work.

### 13. Platforms need to create both immaterial and material commons.

Most of participant agreed on this statement. Some pointed out that it also depends on the case, and that those created commons must be protected. They agreed on the current collaborative economy platforms allow this sometimes. Blockchain could help through the development of full traceability and transparency.

### 14. “Glocal” strategies (“think global; act local”) are needed to better develop platforms both socially and politically.

All participants agreed on this statement. They also agreed on that the current collaborative economy doesn’t allow that, and one participant pointed out that it’s necessary to define scenarios to avoid conflicts between those two areas. Participants expressed that Blockchain may be useful here as a global technology able to develop local governance systems.

## *3.2.4 Conclusions*

One of the main goals for this activity was exploring the distance between the principles of both Platform Cooperativism and Open Cooperatives, and exploring the way that Blockchain community thinks, in connection with the collaborative economy.

We can summarize all the contributions made as a result of the activity in the form of some general conclusions:

- There is, in general, a high degree of consensus on most of the statements. In other words, the principles of Platform Cooperativism and Open Cooperatives are well accepted by the Blockchain community, although both models were quite unknown before the session by the participants.
- There is, in general, a high degree of consensus on the incapacity of the current collaborative economy platforms in order to achieve these goals.
- In general, Blockchain is perceived as a technology that could help the achievement of these statements. From an aggregated point of view, the sum of all the answers to the question about how Blockchain may help achieve these goals reveals a list of the main properties of this technology, i.e., transparency, traceability, immutability. The answers also indicate some mechanisms natural to the state-of-art of Blockchain’s technology that can be implemented as tools for achieving these goals, i.e., smart contracts, the development of systems of governance such as DAOs or local ones, reputation systems, and systems based on meritocracy. The participants also detected some threats that Blockchain implies, linked mostly to its property of immutability, such as the problem that arises when mistakes are permanently recorded on the Blockchain, the danger of not allowing the participation of the whole society because of the technological gap, or the danger of developing meritocratic systems based on the tyranny of reputation systems.
- Participants pointed out the need for developing public policies in order to help PC and OC, but at the same time emphasized the coincidence between the borderless trait inherent to Blockchain and the transnational character of some of some of the statements.

As a result of this activity, it seems confirmed that there is a field of study for the development and implementation of Platform Cooperativism and Open Cooperatives principles through technological models based on Blockchain.

# 3.3 Technological Sovereignty and FLOSS trends in Barcelona region

Manel Rebordosa (Dimmons IN3 UOC)

## *3.3.1 Introduction*

It is commonly accepted that software can be qualified as "Free Software" (FS) when it complies with Free Software Foundation's liberties: (1) The freedom to run the program as the user wishes, for any purpose, (2) the freedom to study how the program works and to modify it, (3) the freedom to redistribute copies and (4) the freedom to distribute copies of modified versions to anyone. Accessing to the source code is a necessary precondition for freedoms 2 and 4. The Free Software Foundation (FSF) maintains a catalogue of software licenses[71] which complies with all FS freedoms in order to facilitate on the one hand that developers could publish software as FS without legal complications nor restrictions and on the other hand to protect the label FS and to grant that all software published under the FS label complies with its principles and obligations. By the 90's, some developers created the Open Source movement (OS) in order to differentiate themselves from FS. Unlike FS, OS is more centered on organizational and business models, developed along an application's code-sharing practices, than on ethical considerations. OS sustains that those models are more efficient than traditional non-sharing practices of the software industry. In fact, the great majority of software complying with OS Initiative code sharing principles is also listed by FSF as complying with FS principles, as anybody can see comparing both foundation's websites. FLOSS acronym of "Free/Libre and Open Source Software" is actually used by developers and authors when talking about both FS and OS.

**When we talk about FLOSS communities, we are not just talking about the "four liberties" or about code sharing, but the way FLOSS is produced**. Even if there are no norms or mandatory specifications to produce FLOSS software, FLOSS production has generally adopted a collaborative model of production based on independent, open, distributed and non-lucrative entities. This model helps in regulating code sharing processes. These entities are usually based on meritocracy and allow all developers, users and investors to participate in decision-making processes and to improve software capabilities in one or another way. Business models of contributors related in any way with the outputs -the software-, if they exist, are not generally based in licensing the software, but mainly on providing services.

**Instead of talking just about FLOSS, it would be more accurate to use the term "FLOSS practices"**. We must take conscience that a lot of "new" practices based on sharing knowledge are based on FLOSS. We can retrace some of the most fast-evolving research fields as FLOSS rooted phenomenons and, in most cases, they appear to be built directly onto FLOSS principles. In Kelty's words: "*Every day, from here to there, new projects and ideas and tools and goals emerge everywhere out of the practices that I trace through Free Software: Connections and Creative Commons, open access, Open Source synthetic biology, free culture, access to knowledge (a2k), open cola, open movies, science commons, open business, Open Source yoga, Open Source democracy, open educational resources, the One Laptop Per Child project, to say nothing of the proliferation of wiki- everything or the "peer production" of scientific data or consumer services—all new responses to a widely felt reorientation of knowledge and power."*(Kelty, 2008: 302)□.

Referring to FLOSS, actually we must take into account that the FLOSS ecosystem is an enormous source of wealth where small and large businesses find the basis for their development, where authorities have access to tools and consolidated knowledge from other governments and where start-ups find the

[71] http://www.fsf.org/licensing

necessary code which allows them to continue the process of creating innovative value. FLOSS means large amounts of code in which students from around the world can base their learning processes and where states, regions and communities can base their ICT infrastructure without the economic, knowledge or technological dependencies which characterizes proprietary software. *(Programari lliure i de codi obert Societat lliure i govern obert, 2016)*.

### 3.3.2 FLOSS and Technological Sovereignty

Some countries are working in order to make FLOSS practices the axis of some kind of technological sovereignty. Major examples, founded mainly on the introduction of FLOSS regulation on a wide scale at a national level, are not coming from Europe, but from BRICS countries (Bria, 2016[72]; Polatin-Reuben & Wright, 2014).

Technological sovereignty could be defined as "*the capability and the freedom to select, to generate or acquire and to apply, build upon and exploit commercially technology needed for industrial innovation"* (Grant, 1983: 1). This definition appears to be rather restrictive from an anthropological point of view because technology is not just about industrial innovation but also about culture, education and all society's dimensions. But it offers a wide perspective which allows not to restrict technological sovereignty to technological self-sufficiency, which is "*the possession of, or the ability to generate readily, all technology required*" (Grant, 1983: 239). Even if the term Technological Sovereignty is frequently used to include both perspectives -self-sufficiency & capability and freedom to select- the legal side, that means, **the capacity of a state to pass some kind of legislation to assure that the "*freedom to select*" exists in a permanent basis, is probably the main issue**.

Some other authors have their own definitions following this approach. For example "*As it is used by European policymakers, (technological sovereignty) resembles terms like "data sovereignty," which has been defined as "a spectrum of approaches adopted by different states to control data generated in or passing through national Internet."* (Maurer, Skierka, Morgus, & Hohmann, 2015: 54). Following this approach we could talk about technological sovereignty as a *"subset of cyber sovereignty, defined as the subjugation of the cyber domain to local jurisdictions"* (Polatin-Reuben & Wright, 2014: 1).

But we could also define technological sovereignty as opposed to technological lock-in. From a classical perspective the concept of "technological dependence" or "technological lock-in", developed since the 1980s by Paul David (David, 1985) or Brian Arthur (Arthur, 1989), can be summarized as "*co-produced by two dynamics: first, technological paradigms, which determine a shared set of skills, habits and points of view about the nature and direction of technological progress; And second, the increasing costs to adoption, whose impact is to create generalized incentive structures that reinforce these paths"* (Perkins, 2003: 3). In the case of software, the situation of technological dependence is evident as "*markets emerge in which a single leading company reaches an overwhelming predominance. Consumers are dependent on a single technology that all use as a consequence of the high cost of change and learning to use alternative products"* (Proenza, 2005: 1). Moreover, in the field of software the widespread use of proprietary formats

[72] *"If we're seeing some sort of technological sovereignty, it's not coming from Europe at this point, but definitely it is coming from BRICS countries. They're building their own technology industry; they're building their own software, hardware, cloud system; they have their own regulation and data localisation regimes — meaning it applies some kind of jurisdiction that is decided by citizens."* - Panel discussion: "what place does technology have in the decline of neoliberalism, and the rise of populism? As social dependency on the Silicon Valley increases, how should we fight for our technological sovereignty?" with Evgeny Morozov, Francesca Bria, and Richard Barbrook at the conference "Unboxing: Algorithms, Data and Democracy" organised by Rosa-Luxemburg-Foundation on December 13 2016 in Berlin.

leads to new forms of dependency which make increasing costs enormous leading to a scenario of zero interchangeability of technologies (proprietary lock-in). In that case, **determining the technological sovereignty of a state or community could be done by finding or evaluating the feasibility of change in terms of economic, social or human costs**.

If we consider technological sovereignty either from a legal perspective as based on freedom and capability to select between technological solutions or on the feasibility of change in terms of economic, social or human costs, **FLOSS seems to be a good practice which many authors link to increasing technological sovereignty when endorsed**.

### *3.3.3 Public Sector initiatives*

The main trends in FLOSS development in Barcelona actually pass through public lead initiatives. Regional and national legislation include dispositions to favor FLOSS development in the public sector and, even if FLOSS is not mandatory in public projects at regional or local levels, its use is strongly encouraged[73]. At the same time, even if it is not broadly used in public services, there have been some efforts to include FLOSS applications in public services working practices. But until now, these efforts have been fruitless and proprietary solutions compose the bulk of software solutions used in Public Services facilities. As an example of an institution which has made some efforts to include FLOSS apps into the catalogue of Apps offered to their departments and municipalities, we find a provincial body, the Diputació de Barcelona, which offers services to municipalities. Some other institutions at a regional level are also encouraging FLOSS use or even developing their own FLOSS initiatives. That's the case of the Catalan education department with Linkat[74], a Linux distribution developed by a regional government agency to be used in education facilities.

But those projects fail in achieving a full FLOSS governance schema. In some cases, they are just advocacy centered initiatives. In the other cases, even if they include software development initiatives, they are being led by government IT departments under Public Administration specifications and do not involve a community driven environment and usual FLOSS project features, like an independent decision making structure, a meritocratic governance schema populated mainly by project developers, or an accessible public repository. That would be the case of Linkat, which is just distributing its Linux distribution by allowing downloads from their site, but limiting community participation to some internet forums.

Probably the **most interesting trends in FLOSS development in the public sector in the Catalan context are taking place in smart cities and urban participation** fields. Recent years have seen some efforts by the Barcelona City Council to place Barcelona software development efforts under a full FLOSS development schema. Even if public institutions are backing FLOSS projects through funding full time

[73] Revised text of the Law on public sector agreements (Royal Legislative Decree 3/2011) in article 301, determines that in service contracts commissioned for software development or other materials or products with property rights, the rights will pass to the Contracting Authority; It is foreseen that, even in the event that the contract documents reserve rights in favor of the contractor, "the contracting body can always authorize the use of the corresponding product to entities belonging to the public sector (. ..) ". Article 45 of Law 11/2007, of June 22, on Citizens' Electronic Access to Public Services, first of all insists on making "any Administration has the right to dispose any application developed under public contract without compensation and without the need for further agreement with the contractor" and, secondly, proposes that these applications be "declared open source, when this results in greater transparency in the functioning of the public Administration or in the incorporation of citizens ICT technologies." (Matas, 2016)

[74] http://directori.p2pvalue.eu/explore/cbpp-communities/community/datasheet/linkat

developers, those developers are not just following public institutions specifications but those of the FLOSS projects they are embedded in.

We must take in account that Catalan institutions can choose legally between different options in order to develop their software solutions (Estapé, 2016):

1) Personalized solutions

2) Market solutions

3) Market solutions with open source access granted to the contracting part

4) To adhere to solutions offered by public entities like Diputació de Barcelona, Consorci AOC or Public Services.

5) To create collaborative initiatives to develop collaborative solutions to be used by other institutions with similar needs.

Catalan public ICT environment depends strongly on personalized solutions (type 1) at the point that the bill for personalized software solutions is far more expensive than that of licensing costs. In this sense, the **public sector must take conscience that FLOSS does not mean just reducing licensing costs but, above all, an increase of efficiency,** allowing personalized developments to be used and improved by a lot of actors with similar (but not forcibly equal needs) (Rambla, 2016) .

Two of the main projects able to bypass Barcelona as their natural habitat and become actually regional and internationally oriented are Sentilo[75], a monitoring platform for smart cities sensors networks, and Decidim.Barcelona,[76] a digital platform for creating and managing participation processes. Both projects are actually developing their governance schema in order to allow new actors like cities, private actors and other entities to fully participate into the community. In the case of Sentilo, first steps were made with the expansion of the platform to some other cities of the metropolitan Barcelona region and the involvement of regional level institutions (Diputació de Barcelona). Decidim.Barcelona is following the same pattern with five neighbouring cities actually deploying the platform and with the involvement of regional level institutions like Diputació de Barcelona and Generalitat de Catalunya as well as other institutions like universities or private sector operators.

**Sentilo and Decidim.Barcelona are examples of a FLOSS production schema not based on voluntary contributions by individual developers nor on private sector investment, as is usual on most important FLOSS projects, but in public sector investment**. Their governance schema include private corporations or organizations in both cases, but until now those organizations appear to be entering the project basically as beneficiaries willing to employ the proposed software solutions but letting public institutions lead (and pay for) major developments.

### *3.3.4 Private sector initiatives*

Outside the public sector there are some other significant FLOSS initiatives, but they generally appear to have a limited impact on the ICT sector. While public sector initiatives seem to boost private sector service providers, private FLOSS initiatives, in the local context of Barcelona, appear to have a more limited impact. Actually, **we can find initiatives axed around two main trends:** on one hand, we have some initiatives axed along **advocacy and promotion of the Catalan language**; while on the other hand, there are initiatives centered on **developing FLOSS for a collaborative economy and social movement environments**.

[75] http://directori.p2pvalue.eu/explore/cbpp-communities/community/datasheet/sentilo

[76] http://directori.p2pvalue.eu/explore/cbpp-communities/community/datasheet/decidim

The first one is probably the most important trend. It is centered on developing Catalan versions of the most important FLOSS packages (Linux, LibreOffice, Mozilla, etc.) and also on increasing the presence of Catalan on the Internet (Wikipedia, OpenStreetMap, etc.). It works mainly on a voluntarily basis and has achieved some important impacts. Nowadays, Catalan is available as idiomatic option in the vast majority of FLOSS projects, and Catalan Wikipedia is the first Wikipedia repository in the world by the quality of the sample of 1000 Wikipedia must have articles[77], far beyond some important Wikipedia repositories like the Spanish or the French ones. Softcatalà is the platform which agglutinates the great majority of those initiatives. But those projects are not FLOSS motivated, and Softcatalà is also working on Catalan versions for the great majority of most popular privative software packages.

The second trend appears to be a more incipient one. Barcelona appears to be one of the global centers of collaborative economy and this is generating some FLOSS initiatives focused on providing services to collaborative economy environments. But the majority of those initiatives appears to have a local character, to be not internationally focused and, above all, to be conceived as an alternative to the formal economy. The economic impact of that kind of FLOSS initiatives would be, until now, limited. Some interesting examples would be the Coopdevs projects. Coopdevs is a developer's association centered on facilitating and promoting the social economy and right now it is working in projects like Katuma[78], a tool for collaborative consumption group administrators, members and providers, or TimeOverFlow[79], a software package designed to manage Time Banks. Other examples, though deprecated, were Lorea, a distributed social network widely used by 15M social movements and developed by a pool of developers close to Cooperativa Integral Catalana, a local collaborative economy initiative.

### *3.3.5 Conclusions*

FLOSS projects and communities in Barcelona are not a broadly extended software development model. **FLOSS practices are generally not being approached from the point of view of their efficiency** or their functionalities and they are rather seen as a politically motivated alternative to privative software. **They are not considered the "normal" way of developing software, but a politically motivated one**. A consequence of this situation - and symptomatic of the low development of local FLOSS environnement - is the low profile of local FLOSS projects in World Mobile Congress, the major global ICT event organized every year in Barcelona (where global FLOSS causes like Ubuntu and Redhat are widely represented) and even in the alternative events organized as a political response to the WMC by local social movements. **Even if FLOSS solutions are given some kind of priority by law, the reality is that this priority is broadly bypassed by other elements, probably related to proprietary lock-in**. The irruption in this scene of projects like Sentilo or Decidim.Barcelona will be perhaps be a breaking point but it is too early to say if it is just a momentary phenomenon which won't endure political change or if we are facing the first stages of a new model in public sector software development models.

[77] https://meta.wikimedia.org/wiki/List_of_Wikipedias_by_sample_of_articles
[78] http://directori.p2pvalue.eu/explore/cbpp-communities/community/datasheet/katumaorg
[79] http://directori.p2pvalue.eu/explore/cbpp-communities/community/datasheet/timeoverflow

# 3.4 The Transformation of Urban Space between AirBnb and Urban Movements. The Case of Barcelona

Paola Imperatore (Dimmons IN3 UOC)

## *3.4.1 Introduction*

Since 2016, several groups in Barcelona started to mobilize against the negative impact of Airbnb on the urban context, especially against the worsening of the housing problems that are, for the actor of the protest, strictly connected to the increase of house prices. As a matter of fact, more owners have started to rent their flats and houses at a higher price through Airbnb resulting in a recent raise in the general prices of houses. This issue was finally appropriately addressed through mobilization. This experience resulted in the instigation of a wide discussion among citizens, social movement's organizations, scholars and local institution. Nevertheless, there is absolute lack of studies on this issues in the literature of digital platforms. Gentrification, reconversion of local economy to a tourism economy, and displacement of residents to the periphery are major problems currently linked to neoliberal policies and AirBnb-supported massive tourism which needs further investigations.

On the other hand, the urban contest is increasingly gaining relevance in the social conflict and the urban social movements in Barcelona that claimed the right to the city have included the struggle against AirBnb as part of their mobilization.

The paper could have as a goal to investigate the social mobilization around the urban impact of digital platforms in particular observing the AirBnb case in Barcelona. In order to realize this research, the paper wants to analyse three main aspects: 1) the debate around the impact of AirBnb on the urban transformations of Barcelona city, 2) the social mobilization against this impact, 3) the strategy of AirBnb to organize and mobilize its community in order to push for its interests.

So, the first research question incites a thorough investigation of the urban transformations brought by AirBnb in the city of Barcelona. In order to do this, I shall be referring to press, leaflets, documents, brochures and the articles published by concerned actors and scholars. The second issue that this paper wants to explore is related to the social movements which, from a quarter to a city level, oppose the speculation and gentrification reinforced by AirBnb. The mobilization will be observed and analyzed through in-depth interviews to the actors of the protest and by collecting the documents and dossier produced by the movement. In the end, a brief part will be reserved to mention the current AirBnb strategy to finance clubs of residents to lobby on the decision makers, in particular about the legal controversy linked with the taxation of AirBnb, and to oppose social movements on their field. Not much information is available about this last area of interest at the moment. However, ideas of some press articles and few scholars are considered in a more generalized manner.

Firstly, the paper makes a review based on the academic debate about the impact of digital platforms and on the urban social movements. In a second part, the article discusses the case of Barcelona: the effects of AirBnb on the urban transformations on one hand and the protest campaign of urban movements against AirBnbification on the other. In the end, the paper shortly explains the AirBnb strategy to create and finance clubs of residents that can support the company from below.

## *3.4.2 State of the art. The redefinition of urban contest by the sharing economy and the social mobilization around it*

Since its origin, sharing economy was greeted as a sustainable alternative to the current unsustainable

economy (Martin, 2016) and portrayed as a more open, inclusive, democratic and ecological model as compared to the traditional economy (Botsman & Roger, 2011; Gansky, 2012). However, not all scholars agree with this optimistic interpretation of sharing economy and recent works conclude that sharing economy does not necessarily exhibit these qualities (Bardhi & Eckart, 2012).

This new economic model based on the role of digital platforms have already shown significant challenges from different perspectives. In fact, it redefines the work and substitutes the figure of worker with the figure of free contractor (Smorto, 2017) with a consequence on labour condition[80] (Fuster Morell, 2016a). By creating labour out of the traditional workplace of people, the anti-discrimination law does not protect people from gender and race discriminations (Schoenbaum, 2016). Some studies show that these platforms augment the discrimination connected with gender-identity and race (Edelman et al, 2014; Schoenbaum, 2016; Schor et al., 2016; Schor 2014) without the possibility of legal intervention. The largely claimed role of digital platforms, as the instruments to reduce consumption by sharing, has been put into question when considered from an environmental point of view. Several scholars [3] [4] have argued that sharing economy has become a phenomenon of hyper-consumption with negative effects on the environment. Due to the low prices, it stimulates and accelerates consumption and provides access to those goods to people which they could not afford before (Demailly & Novel, 2014; Denegri-Knott, 2011; Felländer et al., 2015; Schor & Fitzmaurice, 2015). Finally, serious challenges derive from the absence of a legal framework[81] in which sharing economy and digital platforms can operate (Smorto, 2017). Fundamentally, platforms as Uber or AirBnb creates unregulated marketplaces and unfair competition, enabling tax-avoidance and transferring risks to the consumers (Martin, 2016).

By considering in particular the specific **sector of accommodation**, scholars have observed negative impact on environment, despite the fact that the home sharing was greeted as an opportunity to save resources and to avoid the construction of new hotels. In fact the low price of accommodation in relation to those hotels which have attracted people and consequently increased the volume of carbon emissions, have created an extra local pressure on environment (Schor, 2014), while the consumption of resource in P2P platforms kept invariant compared to the pressing hotel industry (Voytenko, 2015).

Even though there is a number of studies that focus on the impact of sharing economy and digital platforms from different perspectives, the **aspect of urban transformations remains neglected**. Only in January 2017, in a publication called "Protest and resistance in tourist city", some scholars analyzed the effects of sharing accommodation platforms, AirBnb in particular, on the life of residents of Santa Monica for the first time, showing the social cost of the AirBnbification[82] (Peters, 2017). However, the focus of this study are not digital platforms but rather the effects of large-scale tourism on the cities. Since the studies so far mentioned do not quite identify the problem in its entirety, there is a need to concentrate more on the relationship between home sharing and urban frame.

To observe the mobilization from below against AirBnb, it is necessary to introduce our readers to the literature on urban social movements. Surely, during the past years, the **urban context has become a relevant space in which social conflict can be performed** (Colomb & Novy, 2017).

The concept of “urban social movement” has given rise to a long and ongoing debate since it was introduced

[80] The transition from worker to free contractor produce significant consequences: loss of minimum wage and overtime, lost protection of anti-discrimination labour law, insurance, healthcare (Fuster Morell, 2016) and others rights linked with the figure of worker.

[81] Scholars argue the urgency of a legal framework for digital platforms to regulate the different sector, protect the workers and the consumers, impose a taxation and to redefine an antidiscrimination law that take into account the gender and race discrimination in sharing economy model (Smorto, 2017).

[82] The term AirBnbification has been used for the first time in academic field by Deike Peters in her research on the impacts of AirBnb business on the city of Santa Monica.

in social sciences following the movements of the 1960s and 1970s. The work of Lefebvre (1968) and Castells (1983) represented the first critical contribution to the study of the urban context. On the one hand, Lefebvre gives to the debate a fundamental concept linked with the "right to the city" not as an extension of the social rights sphere but, rather, as right to participate from below in defining city as a space in which social conflict can be performed (Biagi, 2017). As Harvey (2008) argues, the right to the city refers to a common rather than an individual right based on the exercise of a collective power to redefine the process of urbanization. On the other hand, with her publication "The city and the Grassroots" (1983, p.305) Castells introduced the social science the first definition of urban social movements as collective mobilizations around demands for collective consumption, cultural identity, and political self-determination “that influence structural social change and transform the urban meaning”. More recently, Pruijt (2007, p.5115) have defined urban movements as "social movements through which citizens attempt to achieve some control over their urban environment".

In the course of 90s, the transformation in the economic and political fields have changed the structure of the conflict making the role of urban dimension crucial. The emergence of a new hegemonic model of urban development has taken place aiming to be more competitive into the neoliberal economy. As a consequence, in the same years, the relationship between space and social conflict has been a fast growing sub-field in social science (Leitner et al., 2008; Routledge 2003; Slater, 1997). It is in particular with the economic crisis that the city became the epicenter of contradictions of neoliberal economy, intensifying the activism of urban social movements (Mayer, 2009).

So, the sharing economy and digital platforms represented the opportunity to face crisis by sharing (Schor, 2014). However, many platforms have been co-opted by capitalist large corporations by fundamentally changing their nature to a for-profit one (Ibid.).

Nevertheless, AirBnb emerged as a peer to peer accommodation platform but the current situation is very different. With an income of 13 billion of dollars, more than every big hotel owners (Bradshaw, 2014), **AirBnb is connoted as a capitalist platform rather than a cooperative one**. In particular AirBnb has had a significant role in attracting tourists (Saman, 2015) and, in consequence, in intensifying the mass tourism in cities already exposed to the negative impacts of it. As Saman (2015) argues, **AirBnb has created a nexus between tourism and housing that hurts renter**. In fact, by incentivizing the reconversion of residential units into tourist accommodations, AirBnb produces a wide range of negative effects which are ultimately borne by the city and the local residents (Ibid.). Similarly, AirBnb alters the neighborhood character and the urban space in an incisive way.

Novy & Colomb (2017) identify and list a wide range of effects produced by large-scale tourism from economic, physical, socio-cultural and psychological perspective. By making profit through the exploitation of tourist accommodation demand, AirBnb reproduces and reinforces the negative impacts of tourism on the city and on residents. Here, we report only the more relevant effects in particular on an economic and physical dimension. The role of AirBnb in attracting more tourists has already been proved. The introduction of AirBnb has resulted in several consequences; from an economic point of view, it is evident that the market based on residents’ need has been converted into a tourist-oriented market. With the increment of tourists the market offers souvenirs, bars or others attractive shops rather than services useful for the local citizens (Ibid.). As consequence, there is reduction in the number of independent shops and the growth of chains, an increase in the consumer prices and a loss or displacement of resident-serving businesses. These phenomena combined are regarded as "the commercial gentrification" (Ibid.). In parallel, the increase of visitors produces an expansion of the tourism accommodation industry while the sharing accommodation seems to reduce it (Ibid.). By observing the aspect of housing, AirBnb intensifies the problem linked with **gentrification**: the platforms offer prices more competitive with the hotel's ones, but at the same time higher for a family or local residents. If a tourist, on holiday, has a higher purchasing power, the AirBnb accommodation prices appears convenient to them. On the other hand, same prices are unsustainable for a major fraction of the residents. In this way AirBnb accelerates the loss of housing units for long-term residents and the displacement of low income residents (Ibid.) from their quarter to peripheral areas. From a physical perspective, the authors mention these phenomena as the privatization and/or commodification of public space and community resources. Similarly, the concepts of an increase in the

environmental pressures as already proved by Voytenko (2015) and the proliferation of land-use conflicts linked to the tourism are also used to refer to these phenomenon.

Apparently, the **win to win rhetoric used by AirBnb** is to legitimize its activity, it is evident that this platform is only profit-oriented while the social costs are actually borne by the local population. By considering the relevance that AirBnb has gained in the tourism industry and in redefining urban space, the urban social movements have put the issues linked to digital platforms and in particular with AirBnb in their political agenda. To oppose the gentrification process, reclaim the right to have a house and to have living space in the city it has become necessary to articulate a protest-campaign against AirBnb.

## *3.4.3 Methodology*

The research will be conducted through a qualitative method to investigate the protest campaign against AirBnb in Barcelona. With protest campaign we refer to a "*thematically, socially, and temporally interconnected series of interactions that, from the viewpoint of the carriers of the campaign, are geared to a specific goal*." (della Porta & Rucht, 2002, p.3).

Firstly, the data about the impact of AirBnb on urban Barcelona context were collected through the analysis of documents redact by scholars, movement actors and local press. To observe the mobilization, the protest actions, the reclaims and the frames put in place by the movement actors were realized with an in-depth interview with a coordination group of the campaign to collect specific information about the protest (della Porta, 2014) and also about the known data on a process currently in evolution (Blee, 2013). To further build on our databases, the local press reviews and the collection of movements' leaflets and documents were found to be very useful to analyse the campaign[5] [6]. In the end, the strategy of AirBnb to finance clubs were investigated through the analysis of the platform website and the press review.

## *3.4.4 The case of AirBnb in Barcelona*

### The Airbnbification of Barcelona. The impact of AirBnb on the urban space

Even though sharing economy was generally greeted as a collaborative and social model, the data collected in Barcelona and other cities has apparently put into question the collaborative nature of several platforms. Sharing through digital platforms became more attractive after the crisis, however, shortly it was accused to be a predatory and exploitative model, since people were more interested in making profit rather than sharing (Schor, 2014). The more valued platforms are highly integrated into existing capitalism economy and co-opted into the large corporations (Ibid.). As arguing by Scholz (2016), the corporate sharing economy is not merely a continuation of pre-digital capitalism because there are significant elements of discontinuities linked with the levels of exploitation and concentration of wealth. By using data, platforms became a new way to accumulate capital, arriving to the so called capitalism platform.

The case of Barcelona confirms this thesis. Although a rhetoric that underlines the value of sharing accommodations and adventures by saving energy, the data related with AirBnb in Barcelona shows a very different situation. In the city, other than the traditional accommodations, the hotels or bed&breakfast, there are big offers of accommodation on the platforms. However only 9.606 announces are legal while the majority of the offers are illegal. In this sector AirBnb keep a relevant role: the platform in fact offers 17.370 accommodations (ABTS-1) by making of **Barcelona the 5° market for AirBnb** (Ciccarelli, 2016). In this way AirBnb does not contribute to saving energy but, rather, expands the tourist demand and, in consequence, creates an extra-local pressure on the city as already argued by Voytenko (2015).

Despite the Catalan Tourist Act urging that the houses used for tourists' accommodation have to be registered to the Catalan Tourist Office prior to the commencement of the operation, the 78% of AirBnb accommodations in Barcelona have no license to operate (InsideAirBnb). At the same time, as denounced

by Daniel Pardo member of ABTS[83], the Municipality does not have the effective tools to supervise the matter according to law. In fact, Municipality have inspectors to keep a check on the implantation of the Catalan Tourist Act, they have to go to door to door to all the houses they want to be regulated. So the platform gives instructions to the tourists to not open the door to avoid a municipal check (Interview ABTS). This is quite frustrating for the inspectors.

By exploiting this system, the **majority of AirBnb announces are illegal** and evade the laws on taxation. In addition, through a more depth analysis, it is possible to observe that **the market of AirBnb accommodations in Barcelona is monopolized by few people**. Although the company affirms that by sharing accommodation several families can sustain throughout the month stressing the social nature of the platform, the reality is completely different. The offer of tourist accommodation is represented for 2/3 by people that have more apartments and the first thirty administrators in Barcelona manage more than 25 tourist accommodations[84]. More than 50% of announces is related to entire apartments while the shared rooms are only the 1,2% (InsideAirBnb[85]). At the same time the 71.7% of AirBnb accommodations have high availability (Ibid.). This means that the platform is not used for sharing but, rather, to make property speculation that guarantee big profit i.e. around 10 million/year - for few people (ABTS-1). Thus, by exploiting a convenient tax regime AirBnb can make profit by speculating on housing and can add increments to their already high income.

If these data reveal AirBnb as a business model oriented to profit in which the social and ethical nature is only showed to sell the brand, it also becomes important to ask: who has to bear the costs for the AirBnb business?

## The social cost of AirBnb business in Barcelona

The phenomenon of touristic apartments started to gain relevance during the 90s particularly in Ciutat Vella, the historic center of Barcelona. Starting from 2000 the market of touristic accommodation expanded by involving the investors and the enterprises of hotel whit in this exchange with their chief objective to put in place a new business on touristic apartments (Cocola-Gant, 2016). With the birth of AirBnb in 2008 and its success in Barcelona (the city represents the fifth market for the platform) the phenomenon of touristic apartments has witnessed a rapid and strong expansion which on one hand increased the possibilities for the investors, companies and owners to make more profit, and on the other hand gave more visibility to the renters (Ibid.). Related to this process, Barcelona has experienced an invasive gentrification resulting in significant displacement of residents.

In a city already strongly affected by the phenomenon of hypertouristification, AirBnb represents a new tool to attract visitors (Saman, 2015) further expanding the market of tourist accommodation and intensifying the effects related to the gentrification. In a study realized by Cocola-Gant during 2015 about the relationship between touristic accommodations and involuntary displacement of population, there emerged two different kinds of displacements operational in Barcelona. First being the “direct displacement” which represent the more evident process in which residents were expelled to create touristic accommodation. Secondly, there was the phenomenon of “indirect displacement” which is less visible and involves a general increase in rents, ultimately limiting the ability of continued living in a specific area for several people (Marcuse, 1985).

The combination of these processes is conceptualized by Cocola-Gant (2016) speaking of **“collective**

[83] ABTS – Assemblea de Barris por un Turisme Sostenible- is the group that joins and coordinates the different actors of the city (https://assembleabarris.wordpress.com/about/)

[84] See https://assembleabarris.wordpress.com/2017/03/29/desmuntant-airbnb-algunes-dades-a-barcelona/

[85] See http://insideairbnb.com/

**displacement"** which describes the substitution of resident life with tourism through a gradual loss of local population, a phenomenon observed in Barcelona (Cocola-Gant and Gay Lopez, 2016).

In the last two years, several actors of the city and from quarters, reunited into the **"Assemblea de Barris per un Turisme Sostenible"**[86], continue to denounce the embitter of the housing question raised by accommodation platforms as AirBnb, Booking, Homeaway and others. AirBnb has a more significant role in the market of tourist accommodation and, at the same time, it represents an icon for sharing economy model (Interview ABTS). These considerations explain why urban movements have chosen to focus the campaign on putting AirBnb to question as the representative of the speculation system on housing through accommodation platforms.

The protest has drawn attention on the **social costs of AirBnb** on local community and on the transformations in the urban frame. By offering accommodation through competitive prices with respect the original prices of the hotels, AirBnb has gained success in the tourist accommodation market. On the other hand, the prices resulting from targeting the tourists with a higher purchasing power are really unsustainable for the local residents. The transformations of several apartments into touristic accommodations has created several problems. The housing issues have worsen with a general increment of the home rent rates. Local residents are being to the periphery along with the fragmentation of neighborhood patterns and substitution with tourists. Moreover, the gentrification of the quarters is badly affected by more tourism flows. The percentage of touristic apartments offered on AirBnb in some zones is really high: in the historic center there is one touristic home every ten apartments while in the Gòtic quarter the relationship is of one every six apartments (Cocola-Gant, 2016). This means that only AirBnb offers the 16,8% of total apartments in the Gòtic and the 9,6% in Ciutat Vella, while in other quarters the percentage is lower but, anyways, is relevant and growing.

This significant presence of visitors produces unavoidably a forced mobility of residents out of their original quarters. The data emerged by Cocola-Gant research report a worrying situation, specially, in the highly touristic areas: the Ghotic quarter is occupied 50% by the residents and the remaining half by tourists; a percentage which is destined to change in favor of tourists.

Other than the more visible effects mentioned above, the system of touristic accommodation produce **more indirect problems** such as the speculation on housing, overbuilding, the conversion from a local economy useful to resident to another one rotate around the tourist[87], a relevant pressure on transport networks such as underground, train and bus services as well as the road traffic putting an extra pressure on the environment (Interview ABTS). The proliferation of touristic apartments produces and re-produces a context in which a residential life is not possible (Cocola-Gant, 2016) due to the radical transformation of the urban frame.

The movements against AirBnb in Barcelona confirm the existence of a range of negative effects, already argued by Novy and Colomb (2017), on the socio-economic and physical aspects of the society. These are the phenomena in which AirBnb business need to be contextualized. Last but not the least, the main costs of this business are not the ones which are born by AirBnb but ultimately lie with the local community, as already demonstrate by Saman (2015) about the case of Santa Monica.

## Urban social movements against AirBnb: the case of Barcelona

In the last years, the role of the city as performative space of the conflict has gained relevance. At the same

[86] "Assembly of Districts for Sustainable Tourism".

[87] About this: https://assembleabarris.wordpress.com/2017/03/29/desmuntant-airbnb-algunes-dades-a-barcelona/

time urban social movements have become transformative actors of the urban space (Andretta et al., 2015). As widely argued by several scholars, since 90s a new hegemonic model of urban development has been imposed aiming to make cities more attractive to investors and giving a privileged role to private economic actors (Ibid.).

Barcelona has also been experiencing this "urban growth machine" (Logan & Molotch, 1987) with significant consequences in term of privatization, commodification, gentrification and displacement in particular related to the tourism. In the case of Barcelona the tourism has become the key-sector to attract investors and consumers and the whole city has been restructured around the tourism (Colomb & Novy, 2017). In this context, several movements are born that reclaim the right to the city (Harvey, 2008), revealing a conflict between a city for people and a city for profit (Brenner et al., 2012) as already showed in summer of 2014 by the mobilization against mass tourism.

However, the movements started at the time of ending of 2016 and the start of 2017 point out to the accommodation platforms that, in the last years, have played an important role in attracting tourists, reinforcing the already strong process of gentrification.

Gentrification in many cases has been policy-led causing the massive privatization of public housing and the transformation of public space into a place of consumption and tourism (Annunziata, 2014; Sequera & Janoschka 2015). As result of this invasive process, the cities have undergone a destruction of the community values and structure (Boin et al., 2009). This is also true for Barcelona in which the local frame is threatened by mass tourism that with AirBnb and other platforms has incorporated an additional increment.

In context of the the dramatic situation that the catalan city, the urban movements, coherently with the other movements in Southern Europe (Annunziata & Lees, 2016), have framed the gentrification and displacement as collective problems.

The struggle against the speculation system created by AirBnb is part of a wider mobilization to reclaim the right to the city and a sustainable tourism which is possible in a non-capitalistic economy only. Recently 27 collectives and groups of quarters[88], coordinated into ABTS, Assemblea de Barris per un Turisme Sostenible, have started to **elaborate a common discourse and strategy to counter AirBnb business**.

In addition to the more generic aims that the protest campaign has identified, such as the tourism decrease and the increment of other more fair and sustainable sectors, ABTS's members reclaim that AirBnb does not make profit on housing and has questioned the social nature of this digital platforms (Interview ABTS).

Starting with this last argument, the opposition to the hegemonic narrative of AirBnb can play a vital role in the protest (Gerhards & Rucht, 1992). The *frame* (Goffman, 1974) used by the company speaks about sharing adventures and accommodation[89] and saving energy, by giving at the same time a chance for low-income families to survive. AirBnb promotes a sense of community, the idea of the AirBnb citizen as part of this community and supports the concept of home sharing club[90], based on a supposed social function. The actions put in place by movements in Barcelona reveal a completely different identity of AirBnb, in which the social nature is only used to become a more accepted brand.

Even though the movement has been conducting strong protests against touristic accommodation since 15 years, particularly in Ciutat Vella; in the last period the actions are mainly addressed against AirBnb and other digital platforms. In September 2016 members of ABTS and Ciutat Vella No Està En Venda have made a first **action of denounce**: they rented a touristic apartment, illegally published on AirBnb platform,

[88] For a complete list of participant groups into ABTS look at https://assembleabarris.wordpress.com/

[89] About this: https://www.airbnb.it/about/about-us

[90] About this: https://www.airbnbcitizen.com/it/

and linked to other 11 apartments in different quarters of the city with the same property[91]. During the action they called media and the Direcciò del Serveis d'Inspecciò de l'Ajuntament de Barcelona (the inspectors of Municipality), to make a public, administrative and media denounce against the speculative economy put in place by AirBnb. Through this action in fact the actors of the protest have brought to light a system in which big owners and professional administrators make profit on housing, revealing the true face of AirBnb business, accused of trying to achieve a **social washing**[92]. At the same time they have denounced the inefficiency of inspectors of Municipality in part due to the slow bureaucratic procedures and in part linked with the instructions that AirBnb gives to the accommodated personnel regarding potential inspections (Ibid; Interview ABTS). This action, called "#UNFairBnb - Acció pel dret a l'habitatge i contra els pisos turístics i Airbnb" was followed by another one in March 2017, in which activists launched the hashtag #DesmuntantAirBnb with an aim to question the collaborative and social roots of the platform. Also in this case, the actors of protest campaign chose to rent an apartment linked to other 12 through a same administrator, Mark Serra i Pares, to denounce with symbolic case the whole system[93]. In addition to the action of September, with this one the movement have also revealed the AirBnb illegal use of licences HUT – habitatge d'ùs turìstic – belonging to other company and have denounced the role of PPVT (Plataforma Pro Vivenda Turistica) – in which Mark Serra i Pares takes part - a group that is lobbying to liberalise the touristic exploitation of housing since several years. Also one time, the symbolic action have shown that AirBnb is not for low-income people that desire arrive to the end of the month, as the company would present, but rather is for people that have a really good economic situation and that can make other profit through this platform (Interview ABTS). It is in fact necessary to specify that the aim of the protest in context of big speculators and not the small owners which are actually more vulnerable to the sanctions and have already been penalized by the platform. This kind of treatment of small owners ultimately gives more visibility to multi-owners on the website.

In parallel with this activity of denounce, the movement resort to a wide repertoire of actions to sensitize the local community and to create a critical mass. From more performative actions, as the social theater[94], to more formative moments, as the forum on tourism organized during summer 2016[95]. Going afterwards through more conflicted actions such as the big manifestations that in these last years have animated the city[96], where the movement follows the goal to reawaken the consciences of local citizens (Interview ABTS).

On one hand the involvement of community represents a major goal for the protest to be successful; on the other hand the involvement of the local institutions is also essential. As argued by Daniel Pardo of ABTS, the institutions are not the first target of the movement but at the same time they are important interlocutors to propose a legal framework and to reclaim the real application of existing law that could contain AirBnb impacts by imposing a taxation, the registration of the accommodations offered on platform as touristic

[91] About this: https://assembleabarris.wordpress.com/2016/09/20/accio-pel-dret-a-lhabitatge-i-contra-els-pisos-turistics-i-airbnb/

[92] About this: https://assembleabarris.wordpress.com/2016/09/28/inside-airbnb-com-i-per-que-vam-reservar-i-denunciar-un-pis-turistic-illegal/

[93] About this: https://assembleabarris.wordpress.com/2017/03/29/desmuntantairbnb-2a-accio-unfairbnb-pel-dret-a-lhabitatge-contra-airbnb-booking-i-homeaway/

[94] Such as the event in Febrary 2017 on tourism and tourism degrowth https://assembleabarris.wordpress.com/2017/02/28/decreixement-i-turisme-a-can-masdeu/

[95] About the Forum on tousime "1er Fòrum Veinal sobre Turisme: la ciutat és per viure-hi, no per viure'n": https://assembleabarris.wordpress.com/forumveinalturisme/

[96] Is in particular relevant the manifestations of January 2017 "Barcelona No Està en Venda" that have pass by the Rambla, a symbolic place for tourists.

apartments and to put in place an efficient inspection system (Ibid.).

However, we have to remember that the protest against AirBnb is contextualized in a more wide mobilization that has crucial points against the current housing criteria[97]. In parallel with this mobilization there are other campaigns that have rejected the concept of displacing from the quarter of provenience. Is the case of *No Ens Faran Fora* campaign[98] that struggle against the mass displacement of local citizens aimed to create more attractive context for tourists and that in these months have made actions to denounce the tourist industry such as the hotels, housing agencies and shops that make profit on this process. Similar is the case of the campaign against cruisers named *Stop Creuers*[99] finalized to denounce the environmental and social impacts of this kind of industry whose basic aim is, again, to increases the pressure of tourism in Barcelona.

As evident, each one of these campaigns, highly integrated among them, has the common goal to **put in question the supposed natural touristic vocation of Barcelona**. In this sense, the protest against AirBnb embitters a conflict between two visions of city between whom underlies the value of exchange of the city, in this case through tourism, and who defends the value of its use (della Porta, 2008). By questioning the dominant narrative about the benefits of industry of tourism for Barcelona, this movement has put a first fundamental condition to make the change: it has revolutionized the collective imaginary by proposing a different way to live the city, oriented to satisfy local needs rather the demand of consumption of tourists and the interests of speculators.

Last but not least, it is important mentioned the activity of movement's actors aimed to develop a **local-global dialectic**, by crossing other territories that are living the same pressure due to the mass tourism. Indeed, during the Forum on Tourism in June 2016, the members of ABTS have created contacts and showed solidarity with other territorial campaigns of resistance as No Grandi Navi in Venice, and other in Malaga and Tarragona (Interview ABTS). The intent in the future is to involve other cities affected by tourism of mass as Lisbona and, in general, Italian cities, with the aim to build a mediterranean coordination and to contrast in a global way a global problem with common roots (Ibid.).

## The strategy of AirBnb: finance home sharing club as new form of lobby

In November 2015, after the won referendum of San Francisco, AirBnb announces the intention to support the creation of more than 100 Home Sharing Club around the world during 2016. The company has invested $24 billion for this new strategy invented by Peter Knaw.

Despite the lack of studies on this element, this paragraph is aimed at reflecting the meaning of this strategy and the role that home sharing clubs can play in favoring AirBnb business.

In the last years the company has waged local battles with regulators about taxation and housing. Similar situation is being witnessed in the case of Barcelona as it is getting **really difficult for the institutions to supervise AirBnb operation and impose the respect of law**. One of the most significant conflict occurred in San Francisco, the city where AirBnb was born. In November 2015 the citizens of the city were called to vote for a referendum about the so called "Proposition F" that concerns a purpose of law to contrast the negative impacts of AirBnb business through a limitation of days in which host tourists, a request of periodic reports to inform local authority, and to give the choice to residents and non-profit organizations – such as

[97] About this issue, during a public assembly hold the 4 March 2017 in Poble Sec, several actors of the quarter and of the city have approved a manifest for housing right – 5 Punts per l'habitage (5 point for housing). Here the manifest: https://noensfaranfora.com/els-5-punts-sobre-lhabitatge/.

[98] About this campaign: https://noensfaranfora.com/

[99] About the campaign against the cruisers https://assembleabarris.wordpress.com/2017/06/05/torna-la-campanya-alertacreuers-2017/

the tenants unions - to carry out actions against AirBnb[100].

Through this strategy, based on the financing of hosts and guests clubs of hosts and guests, AirBnb had been success in the fight against the threat of greater regulation and more restrictive policies. As reported by the company "many of the the 138,000 hosts and guests in San Francisco took the initiative, organized themselves and led the campaign. The campaign through our community-based volunteers knocked on 285,000 doors, held 105,000 individual conversations with voters, and worked to solicit the endorsement of more than 2000 small family-run businesses."[101]

AirBnb has won the referendum with the 55% of votes but, more importantly, this success has pushed the company to invest in this political strategy to face every attempts to limit its profits. In fact, some days after the referendum, AirBnb has made this strategy public.

On the website the company declared that "what happened in San Francisco is happening over the world" (Ibid.) explicating the aim to create a people-to-people movement that AirBnb named "host movement" (Ibid.).

The **declared objective is struggle against the regulation that wants to limit the business of AirBnb by structuring groups of hosts as instruments of lobbying**. The role thought by the company for these clubs concerns the activities aimed to advocate for a **home-sharing friendly regulation** and to push the AirBnb agenda to the politicians. This global network of hosts has to educate "neighbors and community leaders about the cultural and economic benefits of home sharing"[102].

Currently, the platform has already created **more than 140 Home Sharing Clubs around cities** affected by the presence of AirBnb. This strategy not only represents a kind of informal lobbying able to make the interest for the company, but also is an **attempt to beat social movements on their grounds**. In fact AirBnb makes an explicit reference to the aim to create a grassroots campaign and, through the words of Chris Lehane - head of the company, "to put on the ground, in a global way, a mobilization effort"[103].

If we contextualized this strategy in cities, such as Barcelona, which are experiencing serious problems related to AirBnb and where local citizens are mobilizing against it, the policy of Home Sharing Clubs gains strong relevance. By financing groups of citizens AirBnb has already achieved a significant victory against residents and lawmakers that reclaim a fairer regulation and it is probable that this strategy will prove fundamental in solving other conflicts in favor of the platform.

The genuineness and grassroots nature of this "Host Movement"[104] and the possibility to openly discuss and defend this movement has come up in the form of a strategy. This strategy inaugurated by AirBnb is innovative and should be considered a significant element in redefining the political conflicts that more frequently affect cities in which the company has business.

### *3.4.5 Conclusion*

Since the origin, home sharing was greeted as a more sustainable way to travel and, in short time, the accommodation platforms experienced a rapid growth of users and profit. In particular AirBnb has became

[100] About this: https://www.internazionale.it/notizie/2015/11/03/airbnb-san-francisco-affitti
[101] About this: https://san-francisco.airbnbcitizen.com/organizing-in-100-cities-the-airbnb-host-movement/
[102] About this: https://www.airbnbcitizen.com/clubs/

[103] About this: http://time.com/4416136/airbnb-politics-sharing-economy-regulations-housing/

[104] About this, the declaration of Edward Walker, associate professor and vice chairman of the UCLA Sociology Department, are explicative: http://www.sfgate.com/business/article/Uber-Lyft-Airbnb-harness-users-to-lobby-6005562.php

famous all over the world with income in billions. Even though the win to win rhetoric used by the company and claims to have bases on social values, AirBnb has briefly shown to conduct a business model oriented to accumulate capital rather than sharing. By make profit on housing AirBnb has reinforced problems as gentrification and displacement that already affect more touristic cities such as Barcelona, the object of this study.

Through its activity the company has produced significant changes on the urban frame and incited the protests of local residents that have organized a campaign to contrast AirBnb and in general the idea of a city for tourist. By framing the protest against AirBnb as part of their mobilization to the right to the city, urban movements have been put to question, through a wide repertoire of action, the social nature of the accommodation platform and the touristic vocation of Barcelona.

The aspect of the transformations that can affect the urban context resulting from the competition between platforms as AirBnb and the urban social movements remain to be further investigated. It is to clarify that Barcelona in just an example city of the conflict between AirBnb and residents and similar phenomena are being observed in other cities of the world. It is also important to continue observing the social costs related with AirBnb business and keep a watch on the conflicted contexts in which the company operates. This information gathered from these observations can provide insights about the future of Home Sharing Clubs, considering this research as a first dissertation about the issue.

# Final Remarks and Future Work

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This deliverable provides a first version of commons multidisciplinary balance of the platform collaborative economy.

## Why a multidisciplinary commons balance of the platform collaborative economy?

The commons balance, built upon the review of previous work, aims to contribute to overcoming some limitations in the current frameworks by incorporating a larger multidisciplinary vision of the commons oriented collaborative economy. As we consider, CBPP, platform and open cooperativism, and collaborative economy (Botsman like approach), represent narrow approaches to sustainability.

Digital commons and cooperativism are characterized as a third model, distinct from State and Market, leaving aside the natural environment, and social reproduction system. This might explain the little interconnection with gender, social and feminist perspectives, as well as environmental perspectives to sustainability in these frameworks.

We attempt to integrate the aspects that CBPP and platform cooperativism draws attention to –cooperativism as a means to ensure democratic governance of economic activity, and the conditions of collaborative production that respect basic rights– while keeping in mind the strengths of other theoretical perspectives and processes of socioeconomic transformations in practice. We have also tried to integrate: digital commons –which emphasise the importance of the public and the commons, as well as free infrastructures– the feminist economy, and the circular, environmentally friendly economy. And from there, to develop a multidisciplinary and multi-perspective frame for facilitating the emergence of a new social, feminist, environmental commons collaborative economy.

In sum, these rational drive us to build a commons multidisciplinary balance of the collaborative economy, which does not leave aside technological and knowledge policies, and also considers gender, environmental issues, and other sources of externalization of negative effects, as well as its implications for policy. We have also developed a first operationalization of the balance empirically.

From the analysis of the state of the art of each of the dimensions considered, we conclude that such a multidisciplinary framework is much needed, and could have a significant role in highlighting missing perspectives from current design approaches of policy and technological developments for the collaborative economy.

## What emerges from the multidisciplinary review of the state of the art?

The multidisciplinary perspectives in the current research are actually very few. However, the state of the art in each of the dimensions points to the necessity to consider the other dimensions and the need to develop a multidisciplinary frame. For example, while evaluating the technological and business models one should consider its environmental implications as well.

Even though the collaborative economy was initially greeted from different perspectives as a sustainable alternative to the capitalistic economy, in the last years several scholars have put in question this optimistic interpretation. In parallel with authors that support that collaborative economy is a more sustainable model able to reduce consumption, other scholars argue that it has become a driver of hyperconsumption. However, that analysis has not consider distinction between models at the collaborative economy. While we consider that there are cases based on a commons approach responsible with the externalities they generate, models **environmentally** sustainable and which providing environmental solutions. This seems a relevant question to consider when anticipating that technological developments like Blockchain have a high energy consumption and might be strongly environmentally unsustainable. Perhaps solutions coming from Blockchain-oriented practices potentially applying to energy fields can have room to explore.

In the study of the relationship between collaborative economy and **gender**, there seems to be currently a significantly gap. There are few contributions to the debate and the majority of the articles that discuss the issue do it in a more generic framework linked with overall discrimination in the collaborative economy model. Even if such body of literature is very limited, all the available analysis point towards clear discriminatory factors on gender, but also on race, and class, around the collaborative economy. This applies -particularly the gender one- to all models, also the commons one, and to Blockchain culture. The relevance to incorporate this perspective in the analysis and design of platforms seems clear from current work. Because technological platforms and the agenda of adoption of collaborative economy is not neutral.

The review of the literature around **business models** points to the fact that commons oriented cases have their own particular sustainability constraints, but actually there are several possible business models compatible with the digital collaborative economy. Particularly we highlight that data commons and collaborative economy are economically sustainable, as presented with several families of models which are already taking place. However, there is a lack of evidence about cases crossing the implications of the diverse business models, regarding externalization impacts such as the previously mentioned environmental impact or discriminatory axes.

**Blockchain** might constitute a unique opportunity for the collaborative economy. However, the review of the Barcelona case also points out to the current disconnection between commons collaborative economy and social and solidarity economy,; and the lack of clear governance systems for distributed communities; and the identification of Blockchain as a quick-rising, young, fragmented, vulnerable, and poorly-governed technology (against its promising technological and structural features). The Barcelona case review actually shows that the level of interest around such technology is streamy high and growing exponentially, despite the fact that its level of development is still relatively slow. In conclusion, this points to the need of taking into account policy implications, externality effects, with gender and environmental issues being again critical. In sum, Blockchain might provide solutions for some of the problems present in the rest of dimensions, like new governance and value distribution forms, but at a risk of creating new problems. So the figure of a regulator may be needed in order to reach a consensus for the development of that technology.

Following this line, we conclude that one of the important aspects for the sustainability of the commons collaborative economy is that governments need to activate the necessary mechanisms for decision-making, especially regarding public policies and services that contribute to its development. However, the first wave of analysis on policies for the collaborative economy has adopted a very narrow approach, on the other hand, and on the other one there has been an extensive effort to argue that the collaborative economy corresponds to a massive deregulation operation (under the label of "self-regulation”). Beyond the specific policies that could be adopted, we consider it’s essential to bring attention to policy making processes, and to the public innovation potential around the collaborative economy (instead of the more limited perspective that focuses exclusively on regulation). Also from a legal perspective, our work addresses not only specific regulations, but a key debate on the much deeper impact of how the collaborative economy can really affect society, addressing societal challenges derived from collaborative practices –market regulation, wealth distribution, city governance, among others-. Further work on the D1.8 will allow us to explore more in deep and in detail legal challenges emerging, particularly regarding data.

Actually, the collaborative economy debate has given wings to a major opportunity for a major deregulation of the economy by a neoliberal program. Meanwhile, we consider that the policy innovations emerging from the collaborative economy opportunity for the democratization of policy institutions and the economy, bringing windows of opportunity towards a commons society scenario. But this perspective cannot be developed from a narrow vision of sustainability, economy and policy, but a broader, multidisciplinary perspective which the commons balance tries to contribute to build.

## Possible research lines and exploration of results that the work open up

The presented commons multidisciplinary balance of collaborative economy, and the definition of the commons collaborative economy, constitutes the goal of the deliverable, resulting from the work developed

during the first eight months of the DECODE project. Beyond the deliverable goal, as a research group, we would like to explore in the future this possible lines of work.

## Further operationalization of the commons balance and empirical work

Our multi-disciplinary approach to sustainability is optimal, embracing the complexity of the phenomenon's impact, but challenging at the methodological level. In the current work we provide an operationalization of the balance and building a codebook of specific indicators, and applying it to 10 cases. In this regard, we can conclude that the commons balance we provide is operative. For the future work, we could consider doing a second empirical analysis, on the base of a sample of 100 cases (available at Annex II). That second sample can constitute the base for a following version of the commons balance, which also integrates more cases and provides statistical analysis of the relations between the several dimensions considered with the first version of the balance.

## Applying the commons balance and expanding a characterization of the unicorn extractionist platform economy

The commons balance is intended to be applied to the empirical analysis and characterization of the opposite model of platform economy, that is, extractionist capitalist platforms like Uber and Airbnb. In further work, we could do so and provide an expanded specific characterization of unicorn-like extractionist models of platform economy.

## Further cross-disciplinary analysis

We could also further develop the connections between the different dimensions considered, further elaborating the different analysis presented in contexts of factors related to environment, gender and social base, business models, and legal and policy implications, and also expand technological aspects.

## Deep terminological clarity and consistency

The collaborative economy is an area which is particularly challenging in terms of terminological clarity and consistency. There is actually a battle over the terms and language used, which symbolize the confrontation between cooperative and commons approaches and ideological programs linked to technology and the knowledge society. But terms also differ by geographical distribution, and the same concepts are not equally applied in different countries of Europe. In addition, this is a new and rapidly changing field, with new terms and approaches emerging within few months, and where research work is still limited. All these factors make it difficult to define a terminological frame. We have made a "glossary on commons collaborative economy" (Annex I).

## Complete analysis of the Barcelona case

Barcelona is particularly rich in commons collaborative economy and is an international reference. An exploration of the description and thorough analysis of Barcelona may set an example and may facilitate reflections and inspiration from other cities.

## Document and theorise on the co-creation dimension of the research and research method

The present work has involved co-creation methodologies in several ways. These methodologies were used in the research design, the organizing of a large team behind the work (with a transdisciplinary group of 11 people from diverse backgrounds), in research methods (3 co-creation sessions, developed for the Barcelona cases), and finally in the process of dissemination (with the organizing of a large forum for public policies on co-creation for a "commons collaborative economy"). We consider it an interesting part of the development of an efficient working process.

## Design guidelines for developers

From the work developed, we will provide a resource on design guidelines for technological development of commons based technological platforms and infrastructures.

## Provide policy guidelines

During this first eight months of work, the team organized a major event ¨Procomuns: A Forum of co-creation of public policies for a commons oriented collaborative economy", in Barcelona during 26, 27 and 28 of June 2017. About 400 people and policy representatives participated in this event. In this event, the European Parliament resolution on collaborative economy was firstly presented and discussed outside of the European Parliament by Europarlimentary in-charge of the resolution (Mr. Danti). We also engaged with DG (Connect and Growth), Committee of Regions and Cities, Committee of Social Economical in multiple dimensions. The Generalitat de Catalunya - developed a policy regulation - and Barcelona City Council presented and also discussed its policy approach at the Procomuns forum. The commons balance was also presented and discussed among the participants. This work and particularly the three days of discussion at Procomuns, could be analysed, and synthesized in a set of policy recommendations for supporting the development of a commons oriented collaborative economy by the administration, as framed by the commons balance. The analysis of policy innovation connected to collaborative economy is a very interesting further line of work.

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# About Dimmons and authors

Dimmons is a research group part of the Internet Interdisciplinary Institute (IN3) at the Open University of Catalonia (UOC). The central research line of Dimmons is linked to socio economical innovation, collaborative economy and commons. From this central line, the three main research areas of the group are economical development, public policies and collaborative methodologies. **Dimmons research is based on combining rigor with frontair methodological innovation, action research, methodological pluralism and open knowledge.**

www.dimmons.net

Mayo Fuster Morell has directed the research "**Multidisciplinary commons collaborative economy framework"**. Enric Senabre has coordinated its development, incorporating innovative management through Agile and co-creation methods. The team involved 11 people with a highly diverse disciplinary background.

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# Annex I: A Glossary on Commons Collaborative Economy

This annex provides a glossary of terms related to the commons collaborative economy. They are not organized alphabetically, however, are placed in conceptual order.he terms that will be presented in this chapter are:

- Blockchain
- Bundle of rights
- Collaborative Economy or collaborative platform economy
- Collaborative Economy Platforms
- Commons-Based Peer Production (CBPP)
- Commons Collaborative Economy
- Decentralized Autonomous Organization (DAO)
- Data Commons
- Digital Commons and Digitally Supported Commons
- Initial Coin Offering (ICO)
- Free License
- Open Cooperativism; open cooperative
- Open Data
- Platform cooperativism; platform cooperative
- Smart Contracts
- Start-ups
- Unicorn Model

## Collaborative economy or collaborative platform economy

The collaborative platform economy -also given, among many others, the labels of sharing economy, collaborative consumption (Botsman & Roger, 2010), access based consumption (Bardhi & Eckhardt, 2012), or commons based peer production (Benkler, 2006)– is used as a "floating signifier" for interactions among distributed groups of people supported by digital platforms that enable them to exchange (matching supply and demand), share and collaborate in the consumption and production of activities leveraging capital and goods assets (i.e. money, time, skills and equipment, cars and real estate, among others), and labour (i.e. skills, time, knowledge, interest, among others).

## Commons-based peer production

Benkler created the term **Commons-based peer production** (CBPP) (Benkler, 2002, 2006) to describe forms of production in which, with the aid of the Internet, the creative energy of a large number of people is coordinated into large, meaningful projects without relying on traditional hierarchical organisations or monetary exchanges and rewards. Some authors see CBPP as a precedent to the collaborative economy frame (such as, Fuster Morell, 2016), while others (such as Botsman & Roger, 2010) ignore this previous trajectory.

**Collaborative economy is a digital related term, even if there are "non-digital" forms of economical activity based on collaboration of a community**

Forms of economical activity based on collaboration of a community are necessarily restricted to the digital environment, and happen without the support of a technological platform. However, the term "collaborative

economy" is generally used to refer digitally related cases, and the presence of a digital platform is considered one of its characteristic.

Economical activity based on collaboration of a community, and more concretely, commons is an organizational form that existed before and might exist beyond the digital environment. In other words, collaborative organizational forms is not restricted to the digital environment. They are not restricted to the cases in which the main interaction is taking place around a platform over the Internet or the final resources are hosted on the net. Most of the cases of collaborative economy are related to the digital environment and the expansion of commons collaborative economy (and commons based peer production) during the last decade has resulted in part due to the adoption of ICTs by societies that have facilitated its growth. In this regard, most known examples are those which have departed and mainly operate through a platform over the Internet (such as Wikipedia and FLOSS). However, the collaborative production taking place around a platform over the internet or having its final resources hosted on the net, is only one modality of collaborative production by a community.

At the same time, considering the level of expansion of the digital adoption and how this is affecting society, all the current organizational formats (including commons, but also market or State) are affected by the digital environment to a certain degree. In other word, a ***pure non-digital life might not exist anymore.***

## Collaborative economy platforms: Not a predefined and static set of technologies[105]

One of the characteristic elements of collaborative economy is that the interaction process is supported by a platform, a technological platform. However, the specific technological platform can be very diverse, it is not restricted to very specific sets of technological tools. In concrete, "digital platforms" includes technologies that are not centrally controlled. Furthermore, it might not be a static platform, but the specific platform adopted might be modified. Such as, sometimes free software programs are developed using different tools and changing the tools adopted by the community through time: communities working around free software projects tend to adopt the technologies that better fit their needs according to what is available and to change the technological tools during the development of the project they work on. In other words, if an initiative gets traction, then it continues to grow independently of the set of technological tools adopted to work on it.

## Distinction between digital and digitally supported commons collaborative economy

We can distinguish at least two axes that help us to classify the way in which collaborative economy could be related to the digital environment:

1) Depending on where the main interaction of the process is taking place. This allows us to distinguish between two cases:

1.1) A digital platform is the main space of collaborative interaction, and

1.2) the cases in which the main interaction not taking place in a digital platform.

2) Depending where the resulting resource or goal of the process is hosted, we can distinguish two cases:

2.1) the cases where common resources are hosted (or transmitted) in the digital environment, and

2.2) the cases in which common resources are not hosted in the digital environment (even if the knowledge connected to it is over a platform on the net). See the Table I below for examples of the quadrants resulting from both axes.

[105] Clarification suggested by the reviewers Marco Ciurcina (CNRS)

Table I: Examples of the quadrants resulting from both axes

| | A digital platform, the main space of collaborative interaction | Main interaction not taking place in a digital platform |
|---|---|---|
| Resulting common resources hosted (or transmitted) in the digital environment | Wikipedia, FLOSS | A digitalized product design developed in a makerspace or fablab, Living Labs, hacker/maker spaces and other kinds of "labs". Example: A product designed in a place then marketed and available online; community radios (prepared in a studio but transmitting the radio online) |
| Resulting common resource not hosted in the digital environment (even if the knowledge connected to it is over a platform on the net) | Wikispeed and Open source ecology | Example: Assemblearian movements managing a social center, urban gardens or farming |

## Commons collaborative economy

Comprehensively speaking, commons collaborative economy is a tendency and a modality of collaborative economy characterized by a commons approach regarding the dimensions of governance, economic strategy, technological base, knowledge policies, and social responsibility of the externalizations impacts of the platforms. In this regard, it favors the involvement of the community generating the value in the governance of the platform, and is based on peer to peer relationships in contrast to the traditionally hierarchical command and contractual relationships detached from sociability, and mainly mercantile exchange. The value distribution and profitability is not its driving force, and/or it seeks results in the (generally) open access provision of commons resources and public infrastructures favoring access, reproducibility and derivativeness, and the responsibility with the externalities generated by the process.

The commons constitutes an economic model that generates growth, jobs, revenues on the one hand, and products and services of another, without neglecting the rights, and contributing to a greater technological and economic sovereignty in the country.

The commons model connects with the values of corporate social responsibility in the field of the collaborative economy, and expands the principles of the tradition of social and solidarity economy, as well as of the third sector.

## Start ups and unicorn model

Start ups and unicorn companies follow a corporate-driven model of collaborative economy, as presented in contrast to the commons logic in the previous section. A "unicorn" is a start-up valued over $1B. Thus, only a few commercial peer-to-peer platforms are unicorns. They are also referred as on-demand economy or extractivist model.

The economic model of some of the platforms raises criticism concerning their governance and the way value is generated and appropriated, with the argument being made that, while users bring to the platforms some of the fundamental assets that create value, the profits derived are appropriated by the restricted group of platform owners, thus degrading labour, exacerbating inequality and commodifying daily life

(Schor, 2016). For these reasons, a fraction of media and several digital society intellectuals refer users as the commodity of these platforms models, in more or less informal tone (Fuchs, 2014). Furthermore, there is the risk to expand economical logic to larger ambits in society, inserting commodified exchange into areas that were previously under a social relation logic (Morozov, 2015), so this hegemonization of this economical logic, through institutional normalization (e.g. favorable regulation or deregulation, promotion of these models exclusively) could create near future scenarios where escaping from this could be more complex exponentially.

Some authors claim that the majority of commercial platforms are improperly described as part of the "collaborative economy" (Belk, 2014). Srnicek (2017) in *Platform Capitalism* recent book details the economic trends that accelerated platform growth and highlights how this mode of platforms promote exploitation.

## Plurality of perspectives in the commons collaborative economy: Platform cooperativism and open cooperativism

The term "**platform cooperativism"** was suggested as such and started gaining traction in 2015 after it was popularized by Scholz and Schneider (Scholz, 2016; Scholz & Schneider, 2016). However, due to its novelty it remains still largely unstudied. Platform cooperativism is the most popular term, but not the first one to point to a connection between cooperativism and digital commons. Previous similar research on new forms of cooperativism such as "open cooperativism" (Bauwens & Kostakis, 2014) and also studies of how the digital environment opens up new possibilities for the cooperative tradition (De Peuter & Dyer-Witheford, 2010; Murray, 2010) are of relevance in this relatively new field. Furthermore, Murray (2012) points to the potential of cooperativism and new forms of mutualism for public service reform. There is also a proliferation of relevant books and other contributions from a theoretical framework perspective, but mostly lacking empirical methodology.

According to Scholz, the main characteristics that define a platform cooperative are: collective ownership; decent payment and security of income of its workers; the transparency and portability of the data created; appreciation and recognition of the value generated in the platform activity; collective decision-making; a protective legal framework; transferable protection of workers and the coverage of social benefits; protection against arbitrary conduct in the rating system; the rejection of excessive supervision in the workplace and, finally, the right of the workers to disconnect (Scholz, 2016). In short, according to Scholz, on the one hand, platforms must be shaped around the values of cooperativism, and on the other, digital tools must amplify the scalability and the social and economic impact of cooperative organizations. At the same time, Mayo Fuster (2017) means that the very construction of technology platforms is not a minor issue and that platform co-operatives should adopt open software and licenses. In short, to create a self-managed governance that allows the articulation of a community of development around the digital commons (Fuster, 2015) must approach to an "open cooperativism" (Bauwens, 2014) as an antithesis of unicorn and corporate platforms.

The term **"open cooperative"** is also recent in the literature. It describes organizations that, contrary to what the term might suggest, have not necessarily the legal status of a cooperative but share many characteristics. According to Troncoso & Utratel (2017) the term "open cooperativism" refers to organizations that have the following characteristics:

1. They are statutorily oriented towards the common good. This means that these organizations legally include social rights and environmental protection as part of their mission and not as an externality.
2. They are multi-stakeholder. Open cooperatives enfranchise (either materially mutual or through participation in the governance of the open cooperative) all the actors of the value chain instead of just cooperative members. This includes "affective and reproductive labor, the creation of commons, and other forms of currently 'invisibilized' work" (Troncoso & Utratel, 2017).
3. They co-produce material and immaterial commons.

4. They are organized socially and politically organized globally although they produce locally

This implies mutual coordination of production and other forms of cooperation between open cooperatives that aim at tackling global issues from their territory.

Examples of open cooperatives are Enspiral, Fairmondo, Sensorica, L'Atelier Paysan and AnyShare, the Catalan Integral Cooperative, the Xarxa d'Economia Solidària and the Mutual Aid Network[106].

## Conditions of Digital commons and Data commons: License only or also other aspects?

Marco Ciurcina (NEXA) at chapter 2.5.6 consider at section databases licensed under a free license as "digital commons", while other definitions of digital commons and "data commons" more specifically requires community management and involvement in the governance in order to be consider commons.

However, Ciurcina considers the term "common" applies to FLOSS and the immaterial components of open hardware in that the licenses embed the rule of governance of the shared resource and different communities do manage it by using it, expanding it, remixing it, etc. With this read, there is consistency between these two conceptions regarding the use of the term "common".

## Data Common and "Bundle of Rights"

A data common is a common in which the resource managed as a common is a database. A common exists when the three following conditions are met (Coriat, 2011, 2015):

- A shared resource (in the case of data commons the resource being a database) by a community of commoners
- A structure of rights and obligations (a "bundle of rights") regarding the resource that apply to commoners
- A mode of governance of the resource that aims at enforcing and (re)defining the bundle of rights as well as dealing with the conflicts that might arise

The term **"bundle of rights"** defines the five types of rights that an agent may have over a resource, namely (Schlager & Ostrom, 1992): access, withdrawal, management, exclusion and alienation. While private and exclusive property implies that an agent or group of agents hold(s) all of these rights over a resource, in commons property is not exclusive. This means that the above-mentioned five rights are distributed in non-exclusive combinations among commoners (i.e. not all commoners have the five rights over the resource) in the way decided by them.
In data commons (as in digital commons in general), licenses define the bundle of rights that apply to the shared resource (the database) as well as the rules of its governance. Because data is a digital immaterial resource managed as a common, data commons are by definition a subset of **digital commons**.

When a free license (cf. "Free license" below) applies to a data common, any agent can access, use or share the data, which makes the data common **open data**. However, a data common can have a license that only allows the members of a certain community to access, use or share it. For example, a data

[106] Enspiral https://enspiral.com/, Fairmondo https://www.fairmondo.de/, Sensorica http://www.sensorica.co, L'Atelier Paysan http://www.latelierpaysan.org/, Anyshare https://anyshare.coop/, Catalan Integral Cooperative https://cooperativa.cat/en/, Mutual Aid Network http://www.mutualaidnetwork.org/

common might reserve the right to access certain sensitive data to researchers or doctors. In that sense, although most data commons are also open data, it is not necessarily the case.

Moreover, data commons can be produced in a manner that does not correspond to **commons based peer production (CBPP)** and then turned into a common through licensing. For example, a private company might produce a database and have exclusive rights over it but then decide to make it a common by licensing it with a license that embeds the bundle of rights and mode of governance.

## Free License

Free licenses are defined as those licenses that are non-exclusive and provide users with the four freedoms, or rights: a) to use or perform the work for any purpose, b) to study and adapt it to ones' needs, c) to make copies and share them, and d) to distribute derivative works. The definition of open licenses guarantees these same rights, except allowing the exclusion of commercial use, thereby rendering such licenses non-free. It should be observed however that the licenses considered as "free" and those considered as "open" are for the largest part the same, in particular for free software and open source software licenses.

## Blockchain

Blockchain, known as the technology behind bitcoin that allows the creation of distributed networks of value. The Blockchain is, at the same time, a cryptocurrency, a computing infrastructure, a transaction platform, a decentralised database, a distributed accounting ledger, a development platform, an open source software, a financial services marketplace, a peer-to-peer network, and a trust services layer (Mouyagar, 2016).

Transactions over Blockchain are secure, time-linear, and semi-public. Semi-public means that it can be verified that a transaction has been made, but data inside the transaction remains hidden unless you have the correct private key to unlock them.

Blockchain was described by first time on a paper by Satoshi Nakamoto in October 2008. The paper, called "Bitcoin: A Peer-to-Peer Electronic Cash System", was published on The Cryptography Mailing List, and described a system for the operation of a digital currency called Bitcoin (Nakamoto, 2008). The first version of its implementation, the version 0.1 of the Bitcoin software, created the first block and mined the first 50 Bitcoins on January 3rd, 2009.

Bitcoin solves an old problem in cryptography, the "double-spend" problem, without the need of having a centralized ledger of transactions. When we transfer money printed in paper physically, it is clear that it is not possible spending twice the same unit of money, as the bill or coin physically "travels" from one pocket to another. In the case of digital currencies, previously to Bitcoin, this was solved through clearing all transactions through a central organization. Bitcoin innovates introducing a consensus mechanism, called "proof-of-work" algorithm that allows a decentralized network to decide about the right state of the transactions. The network creates a new block every 10 minutes and includes all the transactions created in the meantime between blocks. Each transaction is validated through a private key - public key system. Newly created blocks are created after solving a cryptographic problem that consumes a lot of computational resources (the "proof-of-work") to be solved. The reference to the previous block is part of the answer to the cryptographic problem, what makes the written data into a block immutable after some blocks are created after it. This is due to the fact that changing a value inside a block means solving the cryptographic problem for this block, all its children, and winning the competition for the current block, all in less than 10 minutes, in order to get that the change is really implemented. After six confirmations (blocks created after the block containing our data), it's considered that there is no computational resources on Earth for doing that (Antonopoulos, 2014).

Bitcoin is the first app created based on a Blockchain network, but the same architecture can be applied for creating other blockchains.

## Ethereum

Ethereum is an open-source platform based on Blockchain that provides the smart contract functionality, what allows to implement online contractual agreements. Ethereum was proposed in late 2013 by Vitalik Buterin, a bitcoin programmer that argued that bitcoin needed a script language in order to code transactions. The first Ethereum block was mined on July 30, 2015[107] (Ethereum, n.d.).

## Smart Contracts

Smart contracts are pieces of code that are sequentially executed depending on some triggers (satisfied conditions) coming from the physical world. What makes smart contracts interesting into the Blockchain environment is that they are able to emulate contractual clauses. In 1994, computer scientist Nick Szabo described what he called a "smart contract" as "a computerized transaction protocol that executes the terms of a contract" (Szabo, 1994). Smart contracts are then a series of if-then conditions that are solved with help of external observed data.

## Decentralized Autonomous Organizations (DAO's)

As its name suggests, it is an organization without a central source of power, and strictly speaking, able to run without any human governance. In order to get this autonomous behavior, It involves that some rules must be previously encoded as smart contracts. Not having human governance doesn't mean not needing human interaction, as organizations are finally composed by people.

## Initial Coin Offering (ICO)

An Initial Coin Offering (ICO) is a crowdfunding method that involves the exchange of a newly generated token by a cryptocurrency, at an exchange rate previously defined. ICOs have become during 2017 the main funding system for Blockchain projects. Funding records have been successfully broken during 2017. The current one belongs to Tezos, a Blockchain project that raised $232 million on July, 2017. This easily method for raising money has attracted some scams. On July 25, 2017, The U.S. Securities and Exchange Commission (SEC) announced that some ICOS must be treated as securities, what involves that they have to be subject to the federal securities laws. This decision from a regulator may help to filter and legitimate valuable projects in order to develop the Blockchain ecosystem.

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[107] https://etherscan.io/block/0

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# Annex II. Barcelona Case: Sample of Cases of Commons Collaborative Economy

1. **Favoralia:** gift-economy platform http://www.favoralia.com/
2. **Som Mobilitat**: mobility platform cooperative http://www.sommobilitat.coop/
3. **The Good Data**: data broker platform cooperative https://thegooddata.org/
4. **FreeSound**: p2p sharing sounds platform http://www.freesound.org
5. **Megafone**: Artist's Antoni Abad platform where he and some collaborative teams research around good social impact made by IT, based action-research projects http://megafone.net/
6. **Musicalliure.cat:** p2p music in catalan language platform http://www.musicalliure.cat
7. **Myplay:** a platform where emergent music talents, private house hosts and small audiences can meet https://www.myplayz.com/
8. **Ropateca:** sharing platform of haute-couture clothing http://ropatecaonline.com/
9. **Tuuulibreria:** non-lucrative association for promoting literature and new writers http://www.tuuulibreria.org/
10. **Grrr.tools:** collaborative platform for the reuse of materials, for designers, architects and artists https://grrr.tools
11. **Lektu.com:** book selling platform with anti-DRM philosophy, opened to big and small indie publishers, also for self-published authors, with Creative Commons and free culture perspective https://lektu.com/
12. **Goteo:** crowdfunding platform for open and free/libre projects of all kind (hardware, design, arts…) https://barcelona.goteo.org/
13. **Roba amiga:** second hand clothing social reuse and thrift shops cooperative http://www.robaamiga.cat/
14. **Nolotiro.org:** p2p exchange platform for not-used goods https://nolotiro.org/
15. **Teaming:** crowdfunding platform social-oriented http://www.teaming.net
16. **Totsuma.cat**: crowdfunding platform focused on catalan culture and pro-independence projects http://www.totsuma.cat/
17. **Amical Viquimedia:** non-lucrative association from Wikimedia international network http://www.viquimedia.cat
18. **Fundació Guifi.net:** foundation which promotes the use of free telecomunications, being their infrastructures (optical fiber) treated as a common good for all the community http://fundacio.guifi.net
19. **Open Street Map:** online collaborative maps open-sourced, with a community settled at Catalunya http://wiki.openstreetmap.org/wiki/Ca:Catalunya

20. **Decidim:** participatory platform for public and political distributed decisions, which works currently for Barcelona City Council https://www.decidim.barcelona/
21. **Sentilo:** open platform for the management of the (open) data generated by the sensors and infrastructures of Smart Cities http://sentilo.io
22. **Linkat:** promotion and training Generalitat de Catalunya's program for the educative sector, based on Linux http://linkat.xtec.cat
23. **Smart IB:** work and entrepreneurs of the cultural sector cooperative, in a digital transformation process http://www.smart-ib.org/
24. **Som Energia:** energy platform cooperative http://somenergia.coop/
25. **eReuse:** technologic services organization for the promotion of reuse and recycling of electronic materials, as long as the need of the tracking of the materials http://ereuse.org
26. **Generatech:** organization for the promotion of women and genders diversity at audiovisual technoculture http://generatech.org
27. **Olokuti:** a shop and space for promoting sustainable consumption http://www.olokuti.com
28. **Taxi Sostenible:** a platform for those who want to share cabs between Barcelona city and the airport http://www.taxisostenible.com/
29. **Aixada:** collaborative consumption cooperative http://aixada.org/
30. **Banc del temps online:** online platform for gift and time exchange economy http://www.bdtonline.org/
31. **BeWelcome**: p2p platform for organizing and sharing homes http://www.bewelcome.org/
32. **Fesedit:** a p2p non-lucrative platform for organizing travels and sharing cars http://www.fesedit.cat/
33. **Eticom**: telecommunications consumption and non-lucrative cooperative https://eticom.coop
34. **Intercanvis.net:** exchange of goods networks platform http://intercanvis.net
35. **Pont Solidari Banc de Recursos:** non-used material and furniture redistribution GNO for social entities http://pontsolidari.org/
36. **Xarxa Oberta de Beacons de Barcelona (XOBB):** open beacons network of Barcelona http://www.xobb.cat/xobb/#/
37. **FemProcomuns:** platform cooperative for the promotion of commons-based economy http://www.femunacooperativaprocomuns.net/
38. **La Teixidora**: entity oriented to documenting events and opening it for everyone http://teixidora.net/
39. **Sharing Academy**: collaborative platform which builds relations between particular teachers and students who need academic assistance http://sharingacademy.com/
40. **Taller de Infografía Popular:** non-lucrative collective orientated to creative didactics and visual literacy around infographics and graphic http://fforfact.tumblr.com/
41. **Socialcar:** car sharing platform with a two-sided market model http://socialcar.com
42. **Barcelona Photobloggers**: photography amateurs blogging network https://barcelonaphotobloggers.org/

43. **CCCB:** Center of Contemporary Culture of Barcelona, oriented to open culture www.cccb.org
44. **Col·lectiu Punt 6:** architecture, urbanism and participation collective which aims a life without any kind of discrimination http://Punt6.org
45. **Coperfield:** business consultancy firm which holds an incubator for social innovation/entrepreneurship projects http://www.coperfield.org
46. **Dipòsit de la Recerca de Catalunya**: Catalan Research Office with a link on open research http://www.recercat.cat/
47. **Mapa literari català:** a literary dissemination platform http://mapaliterari.cat/ca/
48. **X.Net:** activist group specialized on different digital contemporary issues, including free culture and copyright issues http://whois--x.net/
49. **Restaurant Leka**: a restaurant where the furniture, the work clothing and the recipes are based on open-design and are available on their web http://www.restauranteleka.com
50. **Medio Design:** consultancy and design firm related to the new production and digital fabrication models http://www.mediodesign.com/
51. **Ableton Live Barcelona:** online informal community of Ableton creative software tools https://www.facebook.com/AbletonLiveUsersBarcelona/
52. **ARSGames:** non-lucrative association for the videogames cultural research open dissemination and promotion
53. **Docúpate:** experts and teachers panel who assists and teaches about documentary production http://www.docupate.org/es/14-2-convocatoria.html
54. **Filmin**: on-demand tv platform of independent cinema https://www.filmin.es/
55. **Gràcia Territori Sonor:** non-lucrative association, based on Gràcia district, which aim is promoting experimental music http://www.gracia-territori.com/
56. **HAMACA**: videoart and electronic arts distribution organization with a horizontal network form http://www.hamacaonline.net/informacion.php
57. **Latele.cat:** open, free and distributed communication media channel http://latele.cat/
58. **Tea-tron:** network and platform for the dissemination, debate and promotion around theatre and performing arts in Catalunya http://www.tea-tron.com/teatron/Portada.do
59. **Colectivo Enmedio**: creative activism network creatiu http://www.enmedio.info/
60. **Compacto:** audiovisual production cooperative http://compacto.coop/
61. **Institute for Advanced Automatisms (IFAPA)**: artistic-action based research collective which aim is to stop the effects of quantification and datification of capitalist societies http://www.ifapa.me/
62. **Taller d'Història de Gràcia**: non-lucrative association with a History workshop format which promotes the research and rescue of the collective memory of Gràcia district http://www.tallerhistoriadegracia.cat/
63. **La Caníbal:** cooperative bookstore which promotes non-fiction and critic, feminist literature, including through cultural actions, events and presentations http://www.lacanibal.net/

64. **Creativechain:** Blockchain and coin platform for the creative sectors http://creativechain.org/proyecto/
65. **Chefly**: two-sided market and sharing platform for those who wants to eat homemade food, and those who loves to cook at home https://chefly.co/
66. **ECrowd!:** crowdlending platform for environmental-friendly projects https://www.ecrowdinvest.com/ca/
67. **Piggybee:** p2p platform for people who travel and people who want to send packets to other countries https://www.piggybee.com/es/
68. **Bitnation:** Blockchain platform for distributed governance https://bitnation.co/
69. **Backfeed:** Blockchain platform for decentralized organizations http://backfeed.cc/
70. **Arboribus:** online B2B (with a P2P orientation) lending platform https://www.arboribus.com/
71. **Community Exchange System**: SaaS management tools for social coins https://www.community-exchange.org/home/
72. **Coop57:** financial services cooperative http://www.coop57.coop
73. **Fiare Banca Ética:** ethical bank http://www.fiarebancaetica.coop
74. **Zank:** personal P2P lending platform https://www.zank.com.es/
75. **Verse:** app for managing micropayments between friends and P2P https://verse.me/es/
76. **Iniciativa Barcelona Open Data**: an hybrid between GNO and consultancy private firm for the promotion of Open Data use between civilians as in companies http://iniciativabarcelonaopendata.cat/
77. **Dotopen:** creative consultancy firm which organizes hackathons (as Smart City Hack contest) for developing social apps and platforms http://appcircus.com/
78. **Espai Contrabandos:** a space for the visibilization of independent publishing related to non-fiction and critical thinking literature, by a collaboration with an association and Pol·len publishers cooperative https://www.espaicontrabandos.com/
79. **Fablab Barcelona** http://www.fablabbcn.org/
80. **HOLON**: Open Design and Service Design firm http://www.holon.cat
81. **Makerconvent:** a makerspace at the Civic Center Convent de Sant Agustí http://conventagusti.com/maker
82. **MOB Barcelona:** creative coworking spaces; each space has a specialization. At the same time, they work as an Open Innovation Platform http://www.mob-barcelona.com/
83. Ouishare España: ecosystem and network of collaborative economies entrepreneurs, promoters and researchers http://ouishare.net/en/community/37
84. **Atta33 Makerspace+TMDC:** two interdependent makerspaces, with different focus united under the same physical space https://atta33.com/
85. **Can Batlló** https://www.canbatllo.org/
86. **International Creative Commons Cinema Festival of Barcelona:** http://www.bccn.cc/

87. **Ciutat Invisible**: self-managed cooperative oriented towards the creation and dissemination of critical contents which burst political and social transformation processes https://www.laciutatinvisible.coop/
88. **La Deriva:** a disciplinary and postdigital self-managed space for creators and creatives http://laderiva.net/
89. **La Escocesa:** cultural space for arts http://laescocesa.org**La Fundición:** cultural work cooperative http://lafundicio.net/que-es-como-funciona/
90. **Lab Libertario:** non-physical space and collective which aim is the dissemination of new learning ways for new tools of creation and open tech http://libertar.io/lab/
91. **Librería Gigamesh:** fantasy genre bookstore where they promote and freely shares a space for small and independent publishers, writers and local table game developers http://www.gigamesh.com/
92. **Makeatuvida**: non-lucrative association which researches and promotes a collaborative, open, maker philosophy. Some of their projects are El Recetario http://www.makeatuvida.net/
93. **Transfolab:** makerspace oriented towards the reuse and recycling of materials, as long as the promotion of a circular economy culture http://www.transfolabbcn.com/
94. **The Social coin:** social coin platform plataforma de moneda social https://thesocialcoin.com/
95. **Communia**: social economy cooperative for technologic sovereignty http://www.communia.org/
96. **Jamgo**: tech and IT development cooperative http://jamgo.es
97. **Pangea**: independent non-lucrative organization wich promotes the strategic use of open IT and networks http://pangea.org
98. **Open Wireless:** a wi-fi sharing network https://openwireless.org/
99. **Bonobo Community**: work cooperative for IT professionals http://www.bcommunity.es/
100. **Delibera:** platform tools for deliberating processes http://www.delibera.info
101. **Swarm City:** Blockchain technology of commerce decentralization https://swarm.city/
102. **CatLabs**: Generalitat de Catalunya program, inspired on Living Labs, oriented to create a social digital innovation spaces network based on Catalunya http://catalunya2020.gencat.cat/ca/instruments/catlabs/
103. **Open Green Map:** open mapping project for spaces, people and projects related to environmental sustainability development http://www.opengreenmap.org/greenmap/barcelona-green-map
104. **Dones en Xarxa:** plataforma no lucrativa per a fomentar xarxes i promoció de les dones professionals i emprenedores (abans vinculades al sector TIC) http://donesenxarxa.cat/?lang=ca
105. **LabCoop**: non-lucrative cooperative for incubating social and cultural entrepreneurial projects http://labcoop.coop/
106. **Calidoscoop:** a cooperative for the social and solidary economy http://www.calidoscoop.coop/