platform labour in urban spaces

D1.2

Report on the different business typologies of digital platforms in the sharing economy

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1. WORK PERFORMED

This report is focused on the economical dimension of the work package 1 of Platform Labour in Urban Spaces (PLUS) project, titled "Conceptualizing platforms: legislative, economical and historical dimension". More specifically, this document is going to investigate and articulate the different types of business models related to the platforms in terms of legal structures, ownership, governance, data and technological policies, growth model, and social and economic impact.

The main goal of the research is to analyse the different types of digital platforms and their business models around the four areas established in the PLUS project. From this, a set of recommendations regarding the economic dimension is provided, to apply in the future development of the project.

To study this, an empirical analysis of 60 platforms has been performed in the four labour PLUS areas: Networked hospitality business, Taxi services, Urban food delivery and On-demand home services and care.

The conclusions show that different business models in the Platform Economy (PE) coexist. Moreover, from the more extractivist models to the more cooperative ones, the governance of the platform plays a major role in their characterisation. The analysis also shows that as the nature of the PE business models respond to a constantly changing environment, so too does the different labour models of platforms. It then becomes interesting to analyse what implications this has on the juridical recognition and working conditions of platform workers. At the same time, the results of this investigation highlight the interconnection among governance, economic model and data and technological policies. In this regard, alternative platforms based on digital commons and cooperativistic values are the most democratic.

This report is divided into ten parts. After the executive summary, the second chapter of this report undertakes in the identification of the different classifications around the digital platforms typologies and their business models. The third chapter focuses on a brief state of the art of the four labour PLUS areas from two perspectives: socioeconomic and technological impact. Afterwards, the theoretical review of the analytical digital platforms framework is presented. In the fifth chapter, the methodology and the sample are presented while the following chapters provide the analysis of results and report conclusions. Finally, some recommendations are reported before the references used and the annexes.

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2. CONTEXT AND OBJECTIVES

The purpose of this section is to briefly describe the different types of digital platforms, their characteristics and business models. Figure 1 summarises the different types of digital platforms taking into account governance, economical sustainability, power distribution (in terms of data and technology ownership), social responsibility, and the impact caused by their activity.

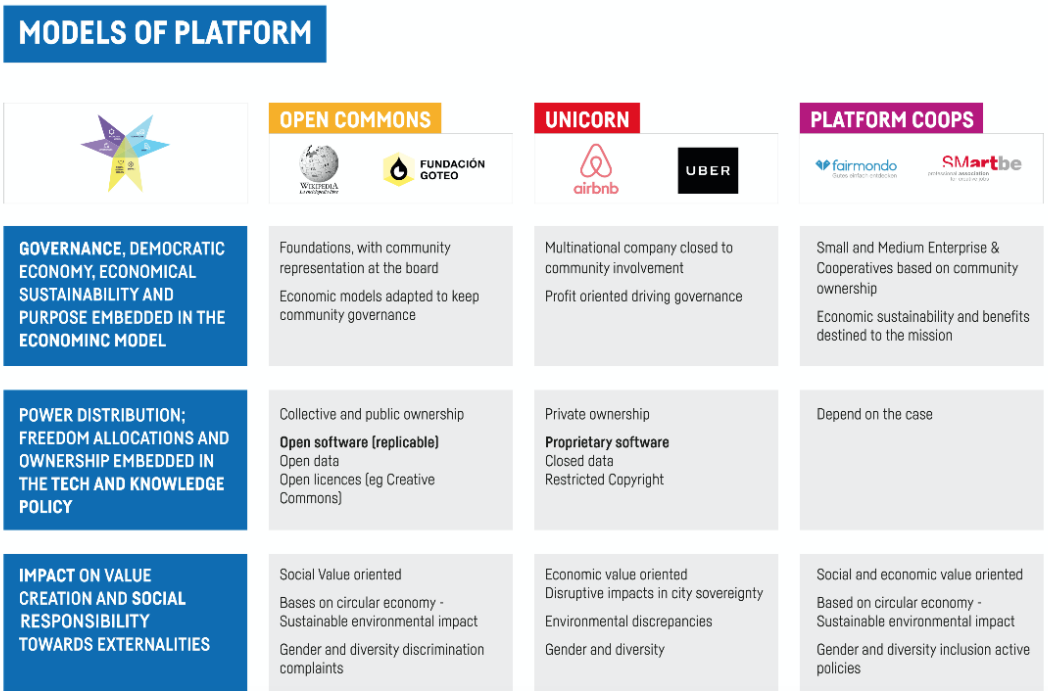

Figure 1. Models of platforms. Author: Fuster Morell (2017).

2.1 Open Commons

Benkler, partly relying on the work relating to the traditional commons developed by 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, or CBPP (Benkler, 2002, 2006). This concept is used 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 meaningful projects without relying on traditional hierarchical organisations or monetary exchanges and rewards (Benkler, 2006). 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 logic of market and state, with characteristics such as: openness to participation (Fuster Morell, 2010), strong equality in the distribution of the contributions among the whole community (Ortega, 2011), decentralisation (Crowston & Howison, 2006;

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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 et al, 2016).

Open commons platforms are generally promoted by foundations, in which its community is involved in the governance of the project. The platform takes advantage of Free Libre Open Source Software (FLOSS) and contributes new developments, opening data and knowledge through the use of open licenses. Such platforms are associated with circular economy, sustainable environmental impact, and social value-orientation.

2.2 Unicorns

Unicorns refer to a platform startup promoted by technology companies with high market capitalisation. Aileen Lee wrote a post in TechCrunch about companies born after 2003, referring to those which had been valued, at some stage in their life-cycles up to 1 billion dollars of market capitalisation, as 'unicorns'. According to Simon (2016:3) *"unicorns match unsatisfied demand with supply, through the production which can be scaled up of very affordable, innovative services and products"*.

PLUS concentrates its interest on some of these disruptive platforms. In particular, in the framework 'lean platform's (Srnicek, 2016) four platforms have been chosen: Airbnb, Uber, Deliveroo and Helpling. All are largely based on the use of widely used digital devices, are adopted to get primary or supplementary incomes, and are deeply affected by some negative effects of industry 4.0 innovations.

Unicorns are profit oriented multinational companies, which closed their governance to those outside the ownership of the platform. Generally, they are developed with proprietary software and data is not available outside the organisation. In addition, unicorns are economic value oriented, generating disruptive impacts in the sovereignty of cities, and with environmental, inclusion and gender discrepancies.

2.3 Platform cooperatives

Studies of social economy and cooperatives point to the growing diffusion, economic sustainability, significant resilience and better working conditions of the cooperative models when compared with 'traditional' businesses (Roelants et al. 2012, Birchall & Ketilson, 2009), according to econometric evidence on the comparative behaviour of worker cooperatives and capitalist firms (Burdin & Dean, 2009).

Cooperatives also tend to generate more stable employment (Delbono & Reggiani, 2013). This suggests that platform cooperatives could be a model for expansion in the sharing-oriented platform economy, particularly through labour platforms, which may create

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more positive impacts relating to social sustainability and equality, especially in cities with high unemployment.

The term platform cooperativism was popularised by Scholz and Schneider (Scholz, 2016, Scholz & Schneider, 2016). 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 organisations. However, due to its novelty, it remains still largely unstudied. At the same time (Fuster Morell, 2017), stated that the very construction of technological platforms is not a minor issue and those platform cooperatives should adopt open software and licenses. In short, to create self-managed governance that allows the articulation of a development community around the digital commons (Fuster Morell, 2010), it must approach open cooperativism (Bauwens, 2014) as the antithesis of the unicorn and corporate platforms.

Platform cooperatives are generally small/medium enterprises or cooperatives owned by their members. Economic benefit is central to their mission. Platform cooperatives may or may not be close to the digital commons (open data and open technology). Finally, platform cooperatives are social and economic oriented, seeking to generate a positive environmental impact and proactive regarding gender and inclusion policies.

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3. RESEARCH BACKGROUND

This section provides brief background research about the main issues relating to the working conditions of digital platform workers. There is also a focus on the four labour PLUS areas: Networked hospitality business, Taxi services, Urban food delivery and On-demand home services and care. The background research is focused on the main issues of each area and touches upon the characteristics of the different types of digital platforms presented in the previous section.

Regarding the income generated by a digital platform, In Europe there are two levels of countries: high levels of digital income in Central and Eastern Europe (Czech Republic, Slovenia and Estonia) and Southern Europe (Italy and Spain), and low-income in Northern and Western Europe (France, Germany, Sweden, the Netherlands and the United Kingdom) (Huws et al, 2019). The report (Ibid.) points out some other relevant conclusions for this research: 1) platform workers mainly seek additional forms of income by accepting any type of work, 2) even though food-delivery (Foodora, Deliveroo, Glovo) and transport (Uber) receive greater attention through public debate and academic discussion, domestic services appear to be more widespread than them, 3) male platform workers are dominant, even in domestic work (which includes jobs such as carpenter or plumber) in those countries studied, with the exception of Italy, where women are dominant in transport and delivery activities (6.3% compared to 5.4% men) and domestic work (9.8% compared to 8% male).

In spite of digital platforms having some common impacts in their different sectors of work, each area has had its own specific disruptions. In order to look deeper, the following sections focus on the four labour PLUS areas from two perspectives: socioeconomic and technological impact.

Regarding networked hospitality, the focus is on the huge socioeconomic impact caused by some overcrowded city zones and rental price increases, and the disruptive innovation for traditional lodging from a technological point of view. From the socioeconomic perspective of taxi and car-sharing services, the growth of unicorns and the power of the data collected from its users are taken into account. Urban food delivery socioeconomic analysis focuses on the reliance on self-employment, while the technological approach seeks to study its algorithmic management and gamification techniques. Finally, how on-demand home services and care, suffers gender and racial exclusion, being a new technological form of matching workers to the private sphere are analysed.

3.1 Networked hospitality business

The expansion of Short-Term Rentals (STRs) platforms, among other things, has caused anti-tourism marches in some European cities, the first of which took place in Venice and Barcelona (Coldwell, 2017), but has since expanded to other popular tourism spots, like Majorca, gaining huge media attention (Huete & Mantecón, 2018). Overcrowded city centres

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and rising rents are the two main issues that explain these mobilisations (Gravari-Barbas, M., & Guinand, 2017).

3.1.1 Socioeconomic impact and cities regulation

Despite the expansion of STRs having some benefits for urban spaces, promoting tourism-related jobs and the revitalisation of neighbourhoods (Fang, Ye & Law, 2016; Holm, 2016), it has also lead to increasing rents, provoking neighbourhood changes and anti-social behaviour (Espinosa, 2016; Oskam & Boswijk, 2016). In some cities, like Barcelona (Gant, 2016) or Berlin (Füller & Michel, 2014), the liveability and housing availability are in danger. Regardless, it is important to note that neighbourhood changes are often intertwined with already existing problems related to tourism and gentrification (Stors & Kagemeier, 2017).

Cities around the world are regulating the impact of STRs, primarily in response to the phenomenon that is Airbnb (Guttentag, 2015). Globally, cities have promoted three regulatory approaches: 1) prohibition, 2) laissez-faire, and 3) allowing it with certain restrictions (Jefferson-Jones, 2015; Miller, 2014). According to Nieuwland & van Melik (2018:23), the majority of city governments are *"focusing on two negative externalities in particular: the shortage of affordable housing and neighbourhood changes, both representing the residents' interests"*, while the impact on traditional lodging is less considered. In any case, in cities where tourism is still growing, Airbnb seems to be seen as complementary to hotel rooms, whereas in cities with a more saturated tourism industry, STRs might be considered as direct competition. In addition, Airbnb itself also lists hotel rooms and B&Bs as possible options, allowing commercial operators to constantly monitor the availability of rooms in their hotel structure (Dazzi, 2019:39).

Despite the majority of cities limiting city-center tourism licenses, because of their varying nature there is not a 'one size fits all' approach to regulating the impact of Airbnb (Gurran & Phibbs, 2017, Lines, 2015, Nieuwland & van Melik, 2018). As mentioned, cities like Barcelona, flooded by tourists, are promoting public policies to regulate aspects such as overcrowding and housing availability. The different public policies mainly include the introduction of limits on the number of overnight stays (Amsterdam), the inclusion of hosts in special registers (Barcelona), limits on the conversion of accommodation from long-term to short-term rentals (Berlin), limits on the use of Airbnb in certain central areas of the city (Paris), subdivision of the urban area into areas with differentiated use of tourist licences (Barcelona), direct acquisition of buildings for rent regulation (Barcelona and Berlin), specific forms of taxation on rents (Italy), or by extending or raising the tourist tax (Barcelona).

Faced with different requests, whilst their have been tensions and sometimes even bitter negotiations, the Airbnb platform has often proved collaborative in the efforts. For example, in Barcelona offering local administrations their own databases to promote the programmability of services and the control of tourist flows, collecting tourist tax in several

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Italian cities including Bologna and automating the limits of rents per host in accordance with local regulations (London).

The attention to the requests of local administrations shown by the platform is a symptom of a policy that is attentive to reputation and also due to its forthcoming listing on the stock exchange. In 2018, some of the main European cities have joined forces to request the European Union go beyond the pressure already exerted by the European Commission on Airbnb for greater consumer protection (price transparency and elimination of unfair terms), and encourage the American multinational to share its data in order to facilitate the planning of cities. Along with pressure from cities, several digital initiatives to make the platform and its data on temporary rentals more accessible are flourishing on the net, among which Inside Airbnb stands out (http://insideairbnb.com/). The site was created in 2014 by Australian photojournalist Murray Cox to map, monitor and critically review Airbnb ads (Dazzi, 2019:41).

Currently, Dimmons-UOC in collaboration with Murray Cox, is developing a study on Data Strategies for Cities to facilitate Negotiation with Platforms[1]. The goal of the study is the systematisation of knowledge about negotiating with platforms, in order to inform possible actions and strategies that cities may develop from each responsible department. Preliminary results were presented in the Sharing Cities Encounter 2019 and the Smart City Expo World Congress in Barcelona on 20th November and the report is expected to be released in January. The participant cities were: Amsterdam, Athens, Barcelona, Berlin, Bologna, Bordeaux, Grenoble, Krakow, Montreal, Munich, Napoli, Paris, Porto, Rotterdam, San Francisco, Tallinn, Thessaloniki, Umea, Valencia and Vienna.

Other initiatives currently being developed by various cities are: the City of Vienna's own-initiative opinion on the sharing economy for the Commission on Economic Policy (ECON) of the European Committee of the Regions, "*A European framework for regulatory responses to the collaborative economy*". This was debated and unanimously adopted on the 22nd of October 2019 at the 25th ECON Commission Meeting will be presented for adoption at the Plenary Session on 4th-5th December 2019; the European Cities Network on Short Term Holiday Rental, formed by 19 European cities and regions that are working together on the challenges of short-term Rental Platforms to tackle common problems regarding their socio-economic impact, and coordinating actions among the members. A recent example being its recent joint press release "Cities alarmed about the European protection of holiday rental" following the recent Opinion of the Advocate-General (AG) of the EU Court of Justice concerning Airbnb, in consideration of the benefits of its freedom to provide services, laid down by the E-commerce Directive of the European Union. The key insights of both initiatives were presented at the Sharing Cities Encounter 2019 on 19th-20th November by Klemens Himpele, Head of the Department for Economic Affairs, Labour and Statistics,

[1] This study and collaboration is promoted by the Sharing Cities Action, a joint action between Dimmons-UOC and Barcelona City Council to foster collaboration among cities that supports the Declaration of Sharing Cities. The study is framed within the goal of promoting common actions between cities to defend their sovereignty in response to large platforms.

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Vienna City Administration, and Albert Eefting, Senior Policy Advisor on Housing Affairs of the City of Amsterdam & coordinator of the European cities network on short term holiday rentals.

The Corporate European Observatory, a research and campaign group working to expose and challenge the perceived access and influence enjoyed by corporations and their lobby groups in EU policy making, is also keeping track of the lobby activities in Brussels from large platforms like Airbnb and Uber: "UnFairbnb. How online rental platforms use the EU to defeat cities' affordable housing measures" (Corporate Europe Observatory, 2018) and "Über-influential? How the Gig Economy's lobbyists undermine Social and Workers Rights (Tansey & Haar, 2019)".

3.1.2 Technological disruptive innovation for traditional lodging

Airbnb and other similar platforms trend towards disruptive innovation (Bower & Christensen, 1995). This means that a disruptive product or service transforms a market to the point of upending its dominant actors, offering an extra set of benefits (cheaper, simpler, community oriented, etc), with the goal of generating a new market. Indeed, price is not surprisingly one of the main factors when choosing hotel accommodation (Chu & Choi, 2000; Dolnicar & Otter, 2003; Lockyer, 2005a, 2005b) and usually the extra benefits offered by a disruptive innovation limits the capacity for innovation by the traditional actor (Bower & Christensen, 1995). In the case of hotels or other similar models of accommodation, the structural costs of their business do not allow them to match those services offered by companies such as Airbnb.

The initial approach of Airbnb is to be a digital marketplace for peer-to-peer accommodation. Such accommodation goes back centuries (through B&B), but Airbnb introduces the possibilities of Internet tools (Guttentag, 2015), using mechanisms of trust that allow hosts and guests to post public reviews about one another and is essential for confidence between both parties in a digital environment (Lauterbach et al., 2009). This element is not exclusive of course to platforms like CouchSurfing or Airbnb and online consumers' perceptions provided on platforms like Tripadvisor are a key point in traditional forms of accommodation services to choose one option or another (Noone & McGuire, 2013) and to improve the quality of the service (Cunningham et al. 2010).

Beyond price though, Airbnb provides other types of benefits for the user - the feeling of being like at home, the experience of living as a local interacting with the host or neighbours, or the possibility to stay and visit non-touristy areas. These are the main elements that Airbnb or CouchSurfing offer. At the same time, Airbnb has introduced innovations such as identity verification mechanisms and a 24-hour telephone concierge service that allows user to feel like a traditional lodging costumer (Guttentag, 2015).

Airbnb, founded in 2008, has experienced a huge growth after underwhelming initial popularity. This links perfectly with disruptive innovation theory that suggests a

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disruptive product enjoys limited initial success, but then grows in size as it increasingly enters the mainstream market. Figure 2 shows the growth of Airbnb from 21,000 guests arrivals in 2008 to 80,000,000 in 2015. Currently, more than 500 million travellers use the platform.

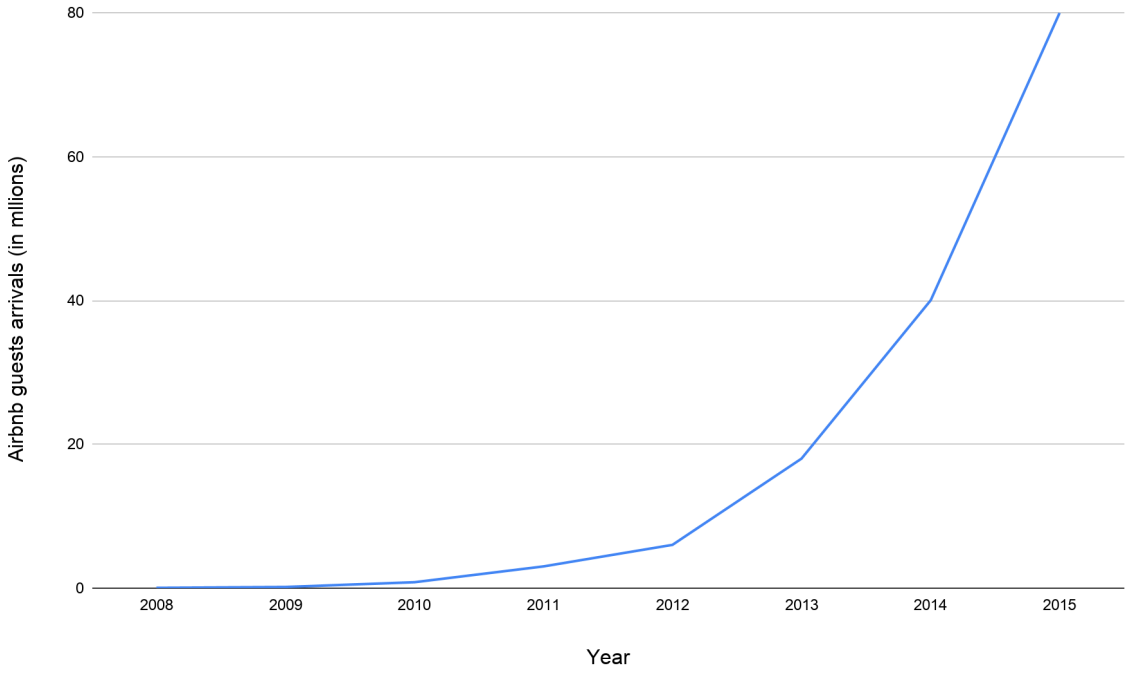

Figure 2. Airbnb guests arrivals per year. Source: Airbnb (Recode, 2017)[2]

Despite the growth of Airbnb slowing, approximately 49% of users confirmed it had replaced a traditional hotel visit with an Airbnb stay in 2016. In 2015, 41% had done so. The prediction was that this number would remain steady throughout 2017 and Airbnb's cannibalisation of the hotel market would hover at approximately 50% for both business and leisure travel (Morgan Stanley, 2017). The same report estimated overall lodging occupancy in the U.S. and Europe would fall to 66.8% from 67.6% in 2016. Due to the hotel industry seeing its second lowest level of nightly rate growth in 2016 in 20 years (excluding the recession), the report's authors also believe Airbnb is going to be a drag on hotels' revenues in the years to follow as they lower nightly rates to boost occupancy. The report predicted that in 2016, Airbnb was going to decrease U.S. and European hotels' revenue per available room (RevPAR) by nearly 1%, and by 2.6% in 2018.

According to Guttentag & Smith (2017), approximately two-thirds of Airbnb users had used the service as a hotel substitute. When considering traditional hotel attributes

[2] Airbnb is on track to record more than 100 million stays this year — and that's only the beginning of its threat to the hotel industry
https://www.vox.com/2017/7/19/15949782/airbnb-100-million-stays-2017-threat-business-hotel-industry

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(cleanliness or comfort, for example), "Airbnb was generally expected to outperform budget hotels/motels, underperform upscale hotels, and have mixed outcomes versus mid-range hotels, signalling some (but not complete) consistency with the concept of disruptive innovation" (Ibid.).

Some studies have focused on the causal impact of Airbnb on reduced hotel revenue. According to Zervas et al. (2017) in Texas it is in the 8-10% range, while Dogru et al. (2019), assessing the impact in different U.S. cities, estimate 2%. In any case, the impact is non-uniform, "*with lower-priced hotels and those hotels not catering to business travellers being the most affected. The impact manifests itself primarily through less aggressive hotel room pricing, an impact that benefits all consumers, not just participants in the sharing economy*" (Zervas et al. 2017:1). In spite of this, beyond the negative impact on lower-end hotels, Dogru et al. (2019:1) found that the figures "*provide evidence of Airbnb's growing impact on the mainstream market across hotel class segments, signalling a high level of consistency with the tenets of the theory of disruptive innovation. The magnitude of these effects is not only statistically but also economically significant*". Thus, it seems that Airbnb is disrupting innovation across all forms of traditional hotel lodging.

3.2 Taxi & car-sharing services

3.2.1 Socioeconomic: from the disruption of taxi services to the most of urban commodities

The definition of transportation network companies (TNCs) was provided by the California Public Utilities Commission (CPUC) in 2013 referring to *"an organisation whether a corporation, partnership, sole proprietor, or other form…that provides prearranged transportation services for compensation using an online-enabled application (app) or platform to connect passengers with drivers using their personal vehicles."* In 2015 the European Parliament highlighted that TNCs were developing their activity through *"loopholes in regulatory requirements and lower standards of consumer safety/privacy"*. In the same report, it is mentioned that TNCs could aspire to become monopolies (Azevedo & Maciejewski, 2015). Other studies indicate that Uber is provoking negative effects on public transportation in some cities (Graehler et al., 2019; Schaller, 2018; Badger, 2017) and increased traffic congestion (Fitzgerald Rodriguez, 2016, Fitzsimmons, 2017). Currently, Uber is, by and large, the most popular and widespread rideshare service. Focusing on labour, according to Berger et al. (2018), the arrival of Uber in a city increases the number of self-employed taxi drivers by 50%, while the hourly earnings in the same sector declined by up to 10%.

The socioeconomic impact of Uber is the highest amongst the unicorn platforms. From the conceptualisation of the term "unicorn" (Lee, 2013) to describe any privately-held startup worth $1 billion or more, the landscape of these types of companies has shifted dramatically.

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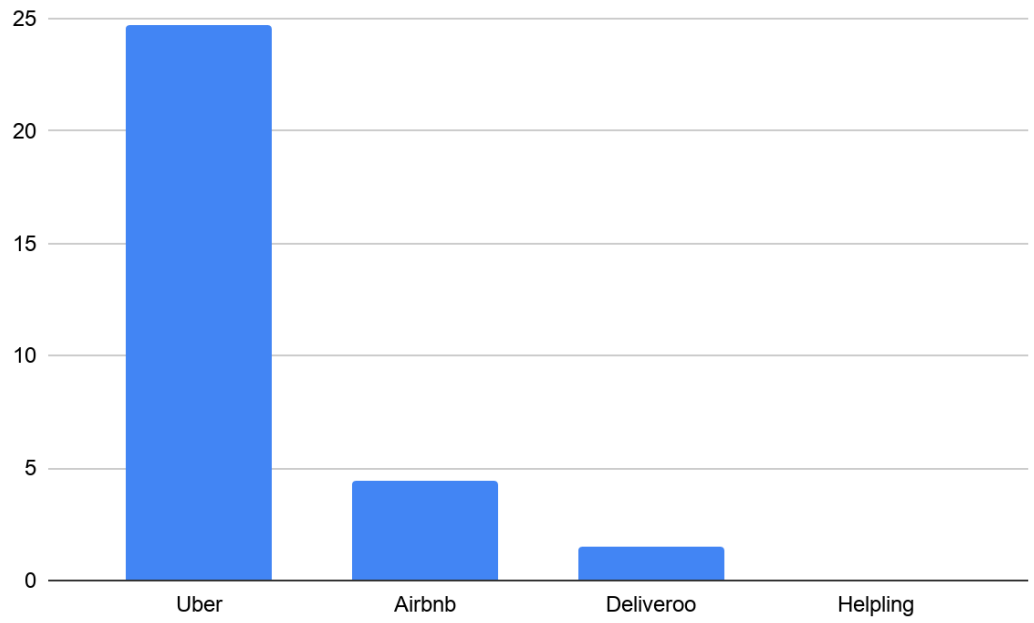

Figure 3. Comparatives analyses of the four PLUS platforms. Source: authors

The World Economic Forum (Desjardins, 2019), estimated the combined value of the world's 326 unicorns at $1.1 trillion. Considering the four disruptive lean platforms of this project and the total funding amount raised by each one (Figure 3), it is easy to show the relevance of Uber. In addition, Uber is not simply an alternative to the taxi driver sector, its tentacles spread far further: Uber Eats in the sector of food delivery; Uber Movement providing a data metric for evaluating traffic safety to urban planners; Uber Fleet to manage its own network of drivers; Uber Rideshare service to provide insurance for Uber drivers and passengers; Uber Freight matching (via an app) carriers with shippers and Uber for Business to assist an organisation with services for team transportation, commute programmes or meal ordering. In conclusion, Uber is colonising different sectors and creating a user dependence on its services.

3.2.1 Technological: managing the power of data

As outlined, Uber is generating a huge socioeconomic disruption beyond taxi services. Indeed, the platform dominates multiple sectors of economy and work. At the same time, the company is generating negative effects on public transportation and increased traffic congestion. In spite of this, the platform is making huge efforts to added public reliance to its app. Reading between the lines of comments made by Andrew Salzberg, Uber's head of transportation policy and research, it is clear the type of domination that the company is trying to achieve through the data that it generates: *"We should prepare transit for the future, and make it the most competitive way to get around, because that's what we*

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want to see," [...] "We're so confident that transit is in fact the best way to get around in many cities that we want to put it in our app as a rider proposition" (Hawkins, 2019).

Data is also being obtained by tracking user activity on third-party websites and applications. Uber harnesses this data to engage in first-degree price discrimination, charging each consumer a different price for the same good or service (Khan, 2018). The data tracked by the platform is also used to provide information to urban planners of various cities. *"According to the rideshare company, this data could help communities compare travel conditions and how big events or road closures affect travel times. The data was initially released to planners, city officials and research organisations, through Uber's website movement, with plans to also become available to the general public"* (Bajpai, 2019).

3.3 Urban food delivery

Glovo, to date, has received $346.1 million via a number funding rounds (O'Hear, 2019). Deliveroo has received a total of $1.5 billion, their last round being a sum of $575M led by Amazon (Deliveroo, 2019). Uber, the company that owns Uber Eats, has received a total of $20 billion in funding (Clark, 2019). There is no doubt that these companies attract a vast number of investors who expect returns from their investments in the future. However, this is not the only reason why these companies have attracted public attention. In major cities across the world, there are many people delivering products - continuously coming and going in their cars, bicycles and other means of transport, striving to earn a living despite the fact that delivery jobs are usually low-paid, unstable, and in Europe's case, the workers being left out of traditional social protection schemes. These delivery workers fall under a broader set of concepts that includes terms like the 'on-demand economy' and the 'gig economy'.

The gig-economy is a concept which refers to poorly paid and low skilled jobs, which are mostly governed by non-standard contractual forms. This means that rather than being a culture of more flexible and dynamic work, it appears to be the 'last resort' for the supply of work in the face of both employment-related and economic difficulty (Flanagan, 2019; Friedman, 2014; Sargeant, M. (2017). The Gig Economy and the Future of Work. E-Journal of International and Comparative Labour Studies, 6(2), pp. 1-12., 2017). Therefore, it is the development of new forms of labour organisation based on the business model of digital platforms (Flanagan, 2019), combined with the erosion of the employment relationship of the standard kind (Stanford, 2017), that have contributed to the emergence of gig-economy jobs at a global level (Crouch, 2019; McKinsey, 2016). This study is based on the argument that technological innovation has not operated independently, rather it is intertwined with other elements, for example, the transformations of the labour market and law:

"*A better understanding of the complete range of forces driving changes in work organisation, and a rejection of the assumption that they are technologically determined and hence inevitable, can inform regulatory and political responses to the rise of platform work*" (Stanford, 2017: 382).

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Previous research investigating the impact of the gig-economy on labour has focused on both technological and socioeconomic factors. From the technological side, the analysis of labour practices has been based mainly on the study of "algorithmic management" approaching how it should be defined (Bucher, 2018; Lee et al., 2015; O'Neil, 2016), what it is and how it functions (Lee et al. 2015; Rosenblat & Stark, 2016; Van Doorn, 2017). Some authors argue that algorithms are not just shaped by rational procedure but also institutions (Beer, 2017; Hoffmann, 2019; Seaver, 2017), and their impacts (Eubanks, 2018; Mager, 2012; Rieder, 2017). In this sense, an important strand of the discussion has focused on the disruptive role that some companies such as Uber and Deliveroo have played in the development of the gig economy (Fleming, 2017).

From the socioeconomic perspective, literature concentrates on the impact that the gig economy has had on labour and social protections and proposes policies for the regulation of the sector (McKinsey, 2016). The majority of previous research regarding app-based platform work has focused on both the characteristics of the working conditions and how they should be regulated. More recently, research has concentrated on the role of union practices and collective bargaining in changing legislation (Johnston & Land-Kazlauskas, 2018), especially in light of increasing individualisation of working relationships and the difficulty of increasing labour activism within such working contexts.

Since the tackling of challenges provoked by the emergence of the platform economy involves many policy departments and competencies, it is said to be forcing current governmental departmentalisation to become more transversal (Ganapati & Reddick, 2018). In this sense, policy-centric debates largely focus on how policies must avoid stifling potentially beneficial innovation, while also ensuring competition and consumer protection, the preservation of labour rights and the avoidance of erosion of the tax base (Sunil & Noah, 2015). More nuanced and less radical approaches call for innovative and smarter forms of regulation (Miller, 2016; Ranchordas, 2015; Rauch & Schleicher, 2015). Possible sources of innovation considered include the use of data-based regulation, whereby companies will adopt an open data framework with regulation co-created by sharing economy organisations and governments to provide public services. However, little research has been conducted in the area of public policy innovation in labour contexts.

The innovative character of this type of economy, connected to the practices of co-creation and digital tools (Humphreys & Grayson, 2008), makes it a particularly suitable area for the deployment of new approaches in policy-making, and especially for opening up new streams of effective policy innovation (Davidson & Infranca, 2016). However, there is a lack of knowledge regarding how different stakeholders perceive policy innovation and which concrete policies they are interested in. Moreover, current literature on platform couriers' working conditions is mostly based on single case studies rather than thorough investigations of a significant sample. Previous research also does not include participants from different countries to explore the similarities (or otherwise), of working as a courier for different platforms in various parts of the world.

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Platforms such as Uber Eats, Deliveroo and Glovo have devised innovative ways to organise their labour forces. In analysing the labour process of these platforms, it is essential to interrogate both the technologies and structural features that permit it. Such management techniques have been made possible by these new developments and broader economic and social changes.

3.3.1 Socioeconomic: The Crucial Role of Self-employment on Urban Food Delivery Models

A central concern raised by the emergence of platform work is the fact that many businesses such as Deliveroo, Uber Eats, and Glovo, classify their workers as self-employed contractors rather than employees, in order to reduce labour costs and keep associated risks low for the company, known as misclassification strategy (Forde et al. 2017). However, this places the workers outside the scope of key social protections that come with standard employment and allows platform providers to fire workers easily (Poon, 2019; Schmidt, 2017).

When talking about workplace flexibility, it should be considered that different conceptualisations of flexibility exist and workers and organisational goals differ (Hill et al. 2008). In this regard, it is usually assumed that workplace flexibility inherently benefits both parties, however, this is not always the case (Gouliquer, 2000). Although gig economy platforms provide temporal flexibility to workers, giving them control over how they spend their day, this attraction also means that platforms have little obligation to their self-employed workers, can pay them less, and have the authority to fire them on the spot without justification (Lehdonvirta, 2018).

Digital technology is an important aspect of platform labour as it is a method of organising and disciplining labour in the absence of managerial oversight (Altenried, 2017). Many authors go further and express that it is this very combination that makes platform labour possible and efficient (Altenried, 2017). For example, Uber and Deliveroo workers are normally paid by singular ‘drops’ or ‘rides’, meaning that although they can earn as much or as little as they like by competing for shifts that will generate them income, they are more likely to work unsociable hours, and cover the costs of work equipment themselves. In addition, platforms often accept more workers than necessary, further contributing to intense competition for shifts and serving as another tool to discipline labour and make it more efficient (Altenried, 2019; Ivanova et al. 2018). Thus, these methods of organisation further benefit the platforms, while also creating poorer working conditions for their respective workers.

In this regard, while the platform economy and hence platform labour is a relatively new phenomenon, several authors claim that the legal framework between a direct employee and a self-employed worker has always been challenged (Zwick, 2018) and that the access to employment protection for “atypical” workers is a longstanding problem that has generated considerable debate (Forde et al., 2017). In this sense, misclassification is seen

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as a strategy used by companies due to the high economic incentives which surpass any legal risks (Harvard Law Review, 1997).

Several authors reflect on the period between 1945 and 1973 that was marked as a 'normative model' of labour in which most occupations were defined as full-time, permanent and backed by access to social security systems. While this model was only a reality for a certain segment of the working class (stratified by vectors such as gender and race), it served as a "powerful aspiration" for workers (Huws, 2016). The rise of platform labour is located in the demise of this normative model through the multiple crises shaking the global economy since the 1970s and up to the economic and financial crisis that became visible in 2007. These crises and the consequent reconfiguration of labour relations are the contexts in which both an increase in multiple forms of contingent work and the use of new technologies in order to intensify the labour process are observed.

3.3.1 Technological: algorithmic management and gamification techniques

The use of digital technology to organise the labour process and control workers is a crucial feature of practically all platform companies. Digital technology allows for the systematic registration, ordering, and aggregation of large quantities of data and the almost automatic incentivising and directing of workers via the apps they use to connect to the platforms (Schreyer & Schrape 2018). It also streamlines the transaction process between users of the platforms and workers. The software architectures employed by the platforms allow for the organisation of the labour process increasingly without the direct oversight of human managers, a form of automated management often referred to as "algorithmic management" (Lee et al., 2015). This term strives to describe algorithms that take on 'managerial functions'. In the case of food delivery, (Ivanova et al. 2018) referred to "application-based management", in order to underline the importance of the applications that platform companies provide their workers, who need access to them on their personal smartphones.

While human management is still important in many cases and the extent and precision to which the singular working steps are organised by digital technology vary greatly across different platforms, it has to be underlined that the role of software architectures in organising, managing and controlling labour is absolutely crucial to most digital platforms (Ivanova et al., 2018, Rosenblat, 2018, Schreyer & Schraper 2018). The software allows for a range of functions, from (automated) shift planning and communications to the tracking, tracing and rating of workers. These possibilities enable new forms of surveillance of workers across the urban space (De Stefano, 2019).

As the software organising the labour process is controlled by the platforms, both workers and customers can more often than not only partially understand its workings, as it remains "blackboxed" (Rossiter, 2016). Moreover, platforms can change algorithms as much as they want without informing workers, allowing for the swift and unexpected

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implementation of the platform providers' wishes, without worker consent or input (Degner & Kocher, 2018).

These new methods of organising, monitoring, and measuring labour allow for tight control of platform workers, even if their workplace is out of the direct sight of management. For instance, Deliveroo employs tactics in the management of its workers that lie within the Deliveroo app itself. The managerial options and software used varies according to country and time, as Deliveroo is experimenting with different forms of payment, incentives and control. In some places, Deliveroo couriers have received personalised monthly assessments on their average 'time to accept orders', 'travel time to the restaurant', 'travel time to customer', 'time at customer', 'late orders' and 'unassigned orders'. Deliveroo workers thus receive regular, algorithmically generated encouragement to improve their performance via the app. Deliveroo also responds to unsatisfactory performance, which, because it is algorithmically determined, is often inaccessible to the workers themselves (Gandini, 2018).

Another method used by platforms has been deemed "gamification" (Woodcock & Johnson, 2018). In the context of digital platforms, gamification operates through algorithmic collection and synthesis of the data of workers (Schmidt, 2017; Sun, 2019). The purpose of gamification in work lies in the attribution of game-like qualities to work tasks, and is thought to increase productivity by introducing a fun element to work (Koivisto & Hamari, 2014). By transforming platform labour into a 'game', platform providers are adding an intrinsic motivational component (Sun, 2019). Moreover, it makes workers more competitive amongst themselves by increasing awareness of their peers' performances (Schreyer & Schraper, 2018).

3.4 On-demand home services and care

The home-based service work on the platform economy is a commodification of domestic labour, which has traditionally been gendered and racialised. Both paid and unpaid domestic and home-based services are part of what Feminist Economics has defined as the 'Care Economy', embed as 'social reproduction' work. To date, home-based services, have had a marginal presence in analyses of the gig economy, in contrast with the other digital crowdworking areas like taxi & car-sharing services or urban food delivery (Flanagan, 2019). Amongst other things to explain this, Flanagan believes *"the interpersonal nature of home-based service work highlights limitations in the applicability of gig platforms premised on high levels of worker fungibility that are not aroused by ride-sharing or digital crowdwork"*. In the context of domestic workers but also applicable to other labour platform fields, Van Doorn, 2017: 909), ethnography of workers' participation may be a way not only to expose but also to learn, contribute and engage in planning action. The little research conducted in this sector can be attributed to the 'invisible' nature of domestic and care work making academic scrutiny and research problematic.

This section is focused on the main issues of on-demand home services and care. From a socioeconomic point of view, platform workers suffer from traditional gender and

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racial exclusion. Regarding its technological approach, the platform reinforces an established and less than ideal consumer/worker relationship.

3.4.1 Socioeconomic: reinforcing gender and racial exclusion

Domestic workers, as with other platform workers, do not receive minimum pay for their work, no annual or sick leave, no pension, are required to provide their own working tools, make their own tax and business arrangements, and are subject to on-call scheduling without remuneration for the 'time out of life' which that implies (McCann & Murray, 2010: 29–30). These conditions do not differ from those who have domestic workers hired away from the digital platforms. In fact, domestic work has always been characterised by its precariousness. Employers of this sector of the on-demand gig economy typically provide less-skilled and lower-remunerated jobs, with a high impact upon women, who face disadvantages related to poverty and inequality (Hunt & Samman, 2019).

Home-based service work within this economy seems to be a new form of global care chains. This concept (Hochschild, 2000) has been largely studied via feminist economics and emphasises the exchange generated by transnational networks of households and families, between which there are deep inequalities in the processes and policies of globalisation and capitalist dynamics (Pérez-Orozco & López-Gil 2016). Considering the demographic challenges, primarily revolving around aging population within Western countries, it is interesting to study the societal impact of these new 'digital global care chains'.

In addition, platform home work service suffers from an extra invisibility because of a second grade intermediary (Atanasoski & Vora, 2015: 23, Van Doorn, 2017:905). The intimate nature of domestic work, which takes place inside houses, does not receive the same attention of other platform labour fields. In contrast, domestic work reaches its highest levels in two of the PLUS' countries, Spain (9.2%) and Italy (6.9%) (Huws et al. 2019).

The Hello Alfred[3] platform, for example, facilitates personal help and hospitality services available to its clients. The platform provides a meta-service to take care of the subscribers' requests, but the services are performed in the background. Thus, Hello Alfred deals directly with home workers, eradicating direct interaction between its clients and the providers of services (Atanasoski & Vora, 2015). To complete the picture, these types of platforms perpetuate traditional stereotypes and exclusions:

"The service platform thus both inherits the prior forms of racialised and feminised intimate labours, supporting the nuclear, heteronormative, and white family form and addresses such intimate service obligations (and possible annoyances) from the modern home in a mode consistent with notions of racial and sexual progress" (Atanasoski & Vora, 2015:23).

[3] https://www.helloalfred.com/

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At the same time, there are some domestic workers' organisations, networks and alliances to promote corporate self-regulation in an effort to achieve social justice in the workplace. The International Domestic Workers Federation (IDWF)[4] at a global level, the Migrant Forum[5] in Asia, the National Domestic Workers Alliance (NDWA)[6] in the Americas, and the Rights Equality Solidarity Power European Co-operation Today (R.E.S.P.EC.T)[7] in Europe, all of which have the common goal of protecting and advancing domestic workers' rights everywhere. Specifically, R.E.S.P.E.C.T is focused on seven main goals: 1) The recognition of domestic work, 2) Comprehensive legal protections, 3) Effective mechanisms of enforcement of labour legislation, 4) Effective protection for migrant domestic workers, 5) Effective protection for domestic workers in the employment of the diplomatic corps, 6) Effective protection for 'au pairs' and 7) Provisions to protect domestic workers against physical, sexual and psychological violence. According to Van Doorn (2017: 980) just 12 startup companies in the US have publicly committed themselves to the code provided by NDWA adding that, "*while there are certainly good reasons to question the extent to which corporate self-regulation will bring about the desired change, what I find incredibly important about this initiative is the fact that it actually involves domestic workers in the act of drawing up alternative 'future of work' scenarios*".

Some authors argue that the platform economy model reproduces gender, race and class hierarchies and biases (Edelman et al., 2017; Schor, 2017). One of the main elements which makes the platform economy susceptible to gender discrimination is transactions taking place in contexts without structural features (such as laws or social norms) that otherwise constrain such discrimination, and gender identity having more relevance to both buyers and sellers due to the increased intimacy of such transactions. Their very nature between buyer and seller in a more personal space, makes these financial exchanges intimate, giving access to private information that is not typically shared with others.

By assuming that market transactions present more risks and considering that in the platform economy many of these occur through a digital platform (Schoenbaum, 2016), the issue of trust becomes central in explaining how gender discrimination occurs in such business models. One of the more usual tools to mitigate risk, is to make the transaction more personalised and many companies (such as Helpling, Cuideo, etc.) require descriptions of users and providers, such as photos, names, or skills. Results show that both males and females prefer a female service provider when the nature of the exchange is more intimate (Ibid.).

Thus, platform economy firms reinforce gender stereotypes, such as the image of women as more reliable, caring and reassuring, by using gender identity as a risk-reducing mechanism which confers trust and orients preferences (Imperatore & Fuster Morell, 2018).

[4] https://idwfed.org/en
[5] http://mfasia.org/
[6] https://www.domesticworkers.org/
[7] http://www.respectnetworkeu.org

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3.4.2 Technological: new ways of matching workers to the private sphere

Scholars have pointed out the connection between private home services provided by platform workers and immigration in different world areas such as Australia (Flanagan 2019:61) and the US (Van Doorn, 2017:906), but it can be considered an almost global trend. Indeed, traditionally in the private sector, two types of organisations acted as connectors between workers with employers. On the one hand, newspapers and on the other, servant labour registries run by private for-profit businesses (O'Donnell & Mitchell, 2001: 7). While newspapers did not play an *"active role in screening candidates or shaping the terms of the engagement, [...] labour registries, which not only amassed data on potential employers and employees, but offered to screen and recommend workers on the basis of 'good character' and, in the later 20th century, perform criminal and reference checks"* (Flanagan 2019:61). Thus labour registries did not simply match the parties together, they also played a role in creating the conditions of engagement in the private sector. According to Flanagan (2019), digital platforms, as a new type of 'matchmaker', have inherited traditional stereotypes and stigmas. This, ironically, is a result of the digital platforms imposing higher pre-screening standards on care services (Doty, 2019:119).

Platforms play a role in the vigilance of workers' conscientiousness when responding to requests in a timely manner: *"Indeed, digital intermediaries provide the potential for far stricter monitoring and recording of response times than the masters of old, including punishments to workers with 'slow' response times through lowered ratings or financial sanctions"* (Flanagan 2019:71).

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4. FRAMEWORK OF THE ANALYSIS

The potential to contribute to a sustainable development of society through the platform economy (PE) has been pointed out since its initial characterisation (Botsman & Rogers, 2010; Cohen & Kietzmann, 2014; Heinrichs, 2013). Nonetheless, the empirical evidence of its expected socio-economic and environmental effects are still limited, fragmented and inconclusive - only 9% of PE academic literature has focused on the potential benefits, costs and welfare impact (Codagnone et al., 2016).

The framework of sustainability qualities within the sector has combined social, economic and environmental dimensions (Botsman and Rogers, 2010). So far, 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 and Guedes, 2011). Ex-post empirical research remains limited.

From a social dimension (Richardson, 2015) points to PE sustainability as a source of change and reduction in social inequalities (Dillahunt & Malone, 2015; Fraiberger and 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, and that collaborative businesses can be used as a means to redistribute income. Schor's empirical work has documented how the market orientation and organisation of these 'sharing' 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 that (based on extensive surveys and interviews in the PE sector), although platforms and their users may be moved by sustainable development, various rebound effects such as compulsive acquisition behaviour around capital assets also take place, something corroborated by other empirical analysis (Parguel et al., 2016). However, sharing-oriented mobility could contribute to reconciling environmental and social demands within a positive narrative through the reclaiming of urban space and by deploying innovative solutions (Brimont et al., 2016).

The multi-disciplinary approach to sustainability is optimal, embracing the complexity of the phenomenon's impact, but challenging methodologically (Heinrichs, 2013). An initial research strategy for approaching sustainability in PE was based on the use of secondary data and sustainability indicators adopted from corporations' sustainability literature (Delai and Takahashi, 2011). However, this strategy has several limitations: there is no consensus about what sustainability indicators to use (Delai and Takahashi, 2011) and frequently indicators are not adapted to such PE 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 this area is that it

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has focused only on the impact of the unicorn models of multinationals. This has been in car sharing (Fraiberger and Sundararajan, 2015; Firnkorn, 2012; Hall and Krueger, 2015), rental industries and tourism accommodation (Fang et al., 2016; Neeser, 2015) and on online labour (Agrawal et al. 2013; Horton and Golden, 2015), as well as on the contrasting impact of the unicorn model and the current incumbents (Zervas et al., 2017). 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 used are not transparently illustrated and data is not made available to researchers (De Groen & Maselli, 2016; Kässi & Lehdonvirta, 2016).

In contrast, we will connect with the study of sustainability in commons-oriented modalities (Ostrom, 2008).

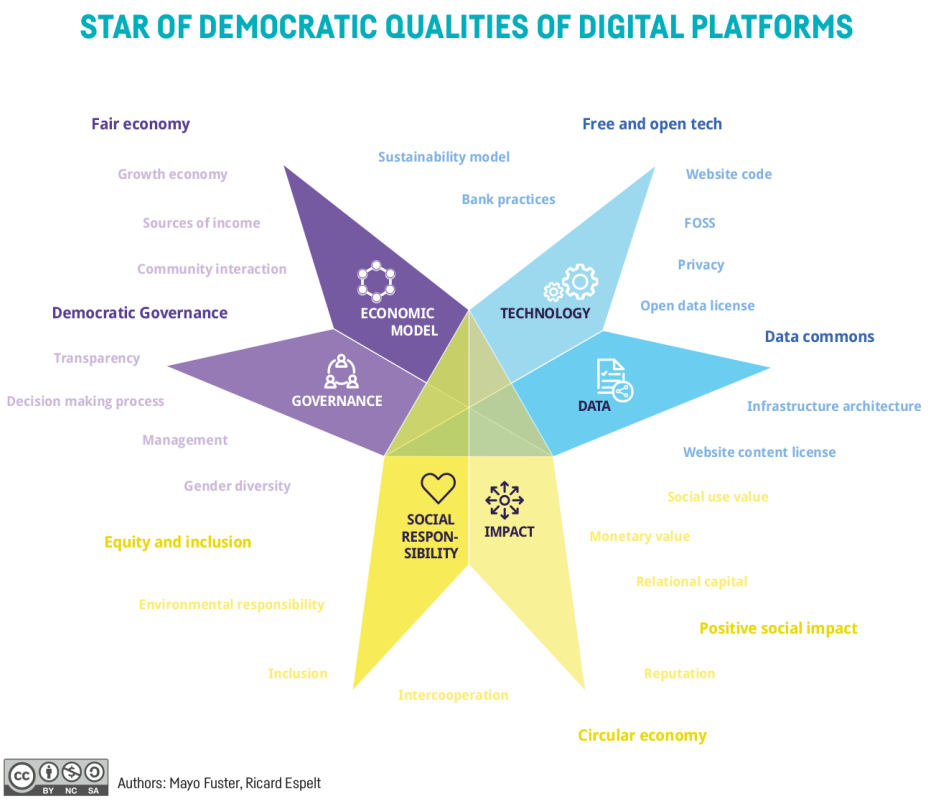

Figure 4. Star of democratic qualities of digital platforms.

We developed a framework of PE sustainability (Figure 4) that aims to integrate environmental, socioeconomic and gender equality, political, and Internet related dimensions. Unlike previous work in this area, we consider three critical dimensions to democratic and sustainability qualities: gender as a source of inequality, digital sustainability of the Internet as a commons, and political sustainability. While related literature considers the Internet as a given immutable resource, the net environmental approach points to the

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Internet as a living process and ecosystem (Holman & McGregor, 2005) of common resources that needs to be preserved in terms of its fundamental principles of net neutrality, decentralisation and openness (Boyle, 1997). How far the models studied contribute to the regulatory requirements and policy quality has been also considered as part of the sustainability frame.

The democratic qualities of the sharing-oriented platform economy are articulated around 5 dimensions.

4.1 Governance

Regarding platform governance, we have considered several dimensions and the extent to which they adopted a democratic modality. They are 1) the governance among value creators at the platform interaction level (matching platform functionalities with the extent to which users can participate) and 2) the governance regarding platform provision (considering legal constitution, policies of participation and transparency) is evaluated:

1) The democracy among the value of creators considers: 1.1) the possibility of user interaction: if users can communicate among themselves or create groups; 1.2) the spaces for workers'/producers' organisation; 1.3) the adoption of any formal or informal decision-making system/tool; 1.4) the participation in the definition of formal rules and policies; and 1.5) the decision about the distribution of the platform's income.

2) The governance regarding platform ownership organisation: 2.1) the type of legal entity and the options for community members to engage with each type, considering: public administration, university, foundation, association, cooperative, company, or without legal format; 2.2) the status of users (ie users only or also owners) regarding the platform's legal entity; 2.3) the accessibility of profit and loss account to all the members of the legal entity; and 2.4) the publication of the financial statements to both members and non-members of the platform.

4.2 Economic model

At the time of studying the different PE models, we consider 1) the link between the orientation of the economic benefits and the social impact of the activity, 2) the economic sustainability of the project, and 3) the financing models are evaluated:

1) Economic orientation takes into account: 1.1) the type of legal entity and the potential economic return that is established with the community in relation to its financing model. In order of more to less community focused these are: public administration, university, foundation, association, cooperative, commercial company or without legal format; 1.2) the distribution of the economic benefits: reinvested in the project, divided between the proprietors, or other options; 1.3) the growth model: organic, that is to say, escalating economically without impacting on the governance model; reproductive,

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replicating the model or speculative with the intention to achieve maximum growth and then sell the project; 1.4) the commercial character of the platform, considering whether monetary exchanges between users are: never, almost never, sometimes, often or almost always; and 1.5) the use or not of banking services ethics.

2) Regarding sustainability we evaluated: 2.1) whether the economic balance of the initiative is positive or not; and 2.2) the participation in stock exchange.

3) Regarding the platform's financing model, the type of resources considered are: 3.1) equity or debt investment, 3.2) credit bank, 3.3) public financing or grants, 3.4) research programs (i.e., H2020); 3.5) direct micro participation (crowdfunding, crowdlending, match funding etc); 3.6) non-monetary donations (inside or outside) of the community, 3.7) family savings, 3.8) trademark commercialization, 3.9) selling merchandising, 3.10) premium services, 3.11) advertising, 3.12) quotas, 3.13) alternative currencies, 3.14) free resources, 3.15) organisation of events, 3.16) entrepreneurship training programmes, and 3.17) income from subproducts or derived goods/services.

4) From the type of commercial labour platform utilised, it is assed: 4.1) how the platform workers are providing the services (web-based or location-based), 4.2) who is going to take care of the tasks (given to selected individuals or the crowd); 4.3) the type of workers/producers which are going to perform the tasks (high or medium or low skilled); 4.4) the type of tasks to be performed by the workers/producers (creative, repetitive or manual); 4.5) how the tasks are paid (for each delivery or each hour or timely delivery), 4.6) the juridical recognition of workers (paid-employed or self-employed); 4.7) the platform labour rights inherent to their juridical status; 4.8) workers/producers profile according to sociodemographic variables (gender, race, country of birth, age, educational background etc.), 4.9) the working conditions of platform workers regarding safe physical environment, the reception of educational material to perform tasks, the possibility to develop or learn new skills, the dependence on tight deadlines and, the performance of repetitive tasks; 4.10) the schedule flexibility taking into account who chooses the amount of working hours and the possibility to work at home; 4.11) earnings maximisation and income security; 4.12) the possibility to reach the minimum salary; 4.13) salary equity among all platform workers; 4.14) how the platform obtains ‘traction’; 4.15) in case of using algorithms, the variables taken into consideration in their creation; 4.16) the use of geolocation techniques; 4.17) the right to log off; 4.18) the possibility to avoid work during peak hours without being penalised; 4.19) the existence of welfare, health and educational policies; 4.20) the right of collective bargaining and, 4.13) in the case of wishing to change employment, the possibility of finding a similar job.

4.3 Technological policies

Technological practices and policy openness refers to the adoption of software and technological architecture that favour freedom and openness.

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It has been adopted as an indicator the type of license the software code of the platform uses. We have categorised the licenses depending on their degree of favorability to openness, or 'freedom'. In this case we have prioritised the robust licenses (copyleft), such as GPL and LGPL. These allow freedom to be maintained throughout the entire chain of users, from its author to the end user and make use of copyleft, forcing derivative work to be maintained with the same copyright regime as the original. Below these, in terms of openness, we place the permissive software licenses, such as MIT and BSD, that make the distribution of the work more flexible, either as free or private. Finally, below these we place all rights reserved or contents without a license.

Regarding technological architecture, two indicators have been adopted. Firstly the type of technological infrastructure on the platform which we categorised from more open to less. At the same time, we considered its reproducibility (the availability of source code as FOSS) and distribution (which would range from p2p to federated to centralised) as follows: 1) Peer-to-peer (e.g., BitTorrent), 2) Centralised reproducible FLOSS, but not federated (e.g. Media wiki), 3) Federated (e.g., Kune), 4) Centralised in one entrance point (e.g. Wikia); and 5) Centralised but not reproducible because one node is exclusively provided by the platform owner and proprietary (e.g., Facebook). The other indicator considered is the use of blockchain (Yes/No) with the objective to decentralise the platform's technological architecture and open up community participation.

4.4 Data policies

In the case of data platform policies, the report considers three elements: content, data and governance. The content element refers to the type of user-generated content license. The licenses used and their categorisation from more open/free to less were: 1) Public Domain; 2) CC0, 3a) CC BY , 3b) CC BY-SA, 4a) CC BY-NC 4b) CC BY-ND, 5) CC BY-NC-SA, 6) CC BY-NC-ND, 7) All rights reserved or No license. In this case, we have balanced the possibility to share only by author recognition (CC BY) and the possibility to keep the same license attributions (CC BY-SA). In the same way, we have balanced the possibility to create author recognition non-commercial derivatives contents (CC BY-SA) with author recognition with no derivatives (CC BY-ND) but potential commerciable contents.

Regarding data policies, the indicator adopted is the ability to access data generated by users, taking into consideration their agreement. The options considered were (in order of more open to less): 1) API without restrictions, 2) Full data export (data dump), 3) Freely downloadable as a whole, 4) API with some restrictions, 5) Freely downloadable in part, and 6) Not possible to export, copy, or access any API.

Finally, data governance refers to the possibility that platform members participate in this and, if it is considered, how it can be achieved by them.

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4.5 Social responsibility and impact

These dimensions consider the social responsibility of the platform and its impact.

1) Our assessment has taken into account: 1.1) gender equity relating to users, workers, owners and the creation of explicit gender policies; 1.2) if the platform is adapted or available to people with functional diversity; 1.3) social inclusion in terms of involving those on a low income and/or those with only a basic education; 1.4) the control of fake accounts; 1.5) environmental responsibility (circular economy, sustainable energy, energy efficiency; 1.6) economic responsibility, considering the type of providers and the promotion of responsible consumption; and 1.7) the contribution to city sovereignty.

2) From the perspective of impact we have considered: 2.1) the level of project mission accomplishment; 2.2) the utility online value of the platform (social use value and reputation building); 2.3) its economic impact in terms of job creation; 2.4) the capacity of community building and relational capital; and 2.5) cooperation with other actors (with the perspective of quadruple helix engagement: civil society, public administration, research and business).

In conclusion, on the basis of the democratic qualities of PE, sharing-oriented PE can be defined as a set of qualities, and a modality of sharing economy (regarding both the design and the performance of the process), characterised by a commons approach to the dimensions of governance, economic strategy, technological base, knowledge policies, and social responsibility of the externalizations impacts of the platforms. In this regard, sharing-oriented platform economy is characterised by (1) favouring P2P relations—in contrast to the traditionally hierarchical command and contractual relationships detached from sociability, and merely mercantile exchange—and the involvement of the community of peers involved in the governance of the platform; (2) it is based on value distribution and governance among the community of peers, and profitability is not its main driving force; (3) it's developed over a privacy-aware public infrastructure, and results in the (generally) open access provision of commons resources that favour access, reproducibility and derivativeness; and finally, (4) a responsibility to the externalities generated by the process.

4.6 The Star of Democratic Qualities of Digital Platforms vs. Sharing Cities Action Declaration and Sustainable Development Goals

During the Sharing Cities Summit 2018, forty two large scale cities started a collaboration to deal with the threats and opportunities of the PE. This collaboration led to the Common Declaration of Sharing Principles[8] and Commitments, which integrates their different viewpoints on the PE and updates and expands upon a set of 7 principles, established during its New York meeting in 2017.

[8] Sharing Cities Declaration (Barcelona, 2018) http://www.sharingcitiesaction.net/declaration/

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For this research, the Sharing Principles have been linked to the Star of Democratic Qualities of Digital Platforms, along with the 17 Sustainable Development Goals (SDG) promoted by the United Nations (Figure 5).

Our analysis of the results will look in depth at the apparent connections that have been established.

Figure 5. The Star of Democratic Qualities of Digital Platforms with the principles of Sharing Cities Action and the Sustainable Development Goals incorporated.

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5. METHODOLOGY

The methodology is based on the statistical analysis of a sample of sixty cases present in the seven cities of PLUS project: Barcelona, Berlin, Bologna, Lisbon, London Paris and Tallinn. In contrast to previous work, this research is focused on the four PLUS main areas and has an international scope. This section provides a first section with sample selection criteria. etc.

5.1 SAMPLE

5.1.1 PLUS' platforms sample selection criteria

PLUS project is based on the elaboration of a grid of investigation that forms the basis of our research. This grid has been created by crossing the platform economy with an urban dimension. The selection of cities has been based on the Globalization and World Cities (GaWC) Research Network[9]. The choice is motivated by the trans-urban approach of the project which considers cities as a variegated network within the global economy and its ongoing transformations.

The index measures the level of city integration into the global economy. A good level of integration is assumed as necessary for a transnational comparison. The selection guarantees the commitment with different levels of cities connectivity. Moreover, it differentiates between those cities with a population greater or less than 1,000,000 because, without clear and trustworthy official data on the number of PE workers, we have assumed city population as an indicator of platforms possibility for development. Departing from the "World According to GaWC 2016" classification, four alpha-cities (London, Paris, Barcelona, Lisbon), two beta-cities (Berlin and Tallinn), and one gamma city (Bologna), have been selected. Regarding platforms, the selection of unicorn platforms was guided by three main criteria:

1) Firstly, the selected platforms are among the most significant amongst those considered to be 'unicorn platforms in Europe. Operating as "aggregators" of supply and demand, Airbnb, Uber, Helpling and Deliveroo represent a high volume of users of online services - in areas witnessing continued growth. Airbnb is designing the future of the networked hospitality business (Oskam and Boswijk, 2016; Zervas, Proserpio and Byer, 2017). Uber is a leading global player in taxi services (Cramer and Krueger, 2016) and 'uberization' has become a synonym of platform economy (Nerinckx, 2016). According to a Capital Economics survey in 2017, Deliveroo, which started its activity in the UK and is currently available in 13 countries, had a revenue of 327.8M€. Helpling is the leading online platform for on-demand home services outside of the U.S.

[9] Globalization and World Cities Research Network https://www.lboro.ac.uk/gawc/

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2) Secondly, such platforms have been chosen because the users who offer their services should be the owner of the instruments used to carry out their respective work. The Car (Uber), House (Airbnb), Bicycle or scooter (Deliveroo) or CUnicorning Instruments (Helpling) are the assets or tools required to be the suppliers of these services. Operating as 'aggregators', online platforms are simply the third part of a business process, allowing supply and demand to meet each other, but require workers to transform consumption goods into assets.

3) Finally, the third criteria is strictly interwoven with the selection of cities for the project. Such platforms have all been the subject of interest or disputes by local stakeholders: Paris, London and Bologna are cities where riders of Deliveroo are developing a collective bargaining; London and Berlin have locally legislated for regulating Uber services, Barcelona is imposing a taxation to Airbnb and is seeking to manage the boom through municipals acts, Tallinn has a parallel service on people transportation which is competing with Uber, Lisbon has established a parallel service for rental hosting to compete with Airbnb, etc, while Helpling has been largely supported as a tool against illegal labour in home services.

The results of this selection process (Table 1), is an innovative grid for PLUS analysis of the platform economy in urban spaces. The grid can be read along both axes. The vertical axis shows how many platforms each selected city hosts; the horizontal one shows in which cities each selected platform is active. Combining these gives us 21 cases- study that we aim to compare and intertwine to produce a 'European field of action'.

	AirBnb	Uber	Deliveroo	Helpling	Total
Paris	Yes	Yes	Yes	Yes	4
London	Yes	Yes	Yes	Yes	4
Berlin	Yes	Yes	Not	Yes	3
Bologna	Yes	Not	Yes	Yes	3
Barcelona	Yes	Not	Yes	Not	2
Lisbon	Yes	Yes	Not	Not	2
Tallinn	Yes	Yes	Not	Not	2
Total	7	5	4	4	

Table 1. PLUS' sample grid.

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5.1.2 Sample Composition

Departing from the general PLUS platform selection criteria, Dimmons IN3 (UOC) has adapted the PLUS approach to define a specific criterion for the sample. The sample is formed by a total of 60 cases, that can be considered as 'lean platforms'. The selection of the sample has been guided by four main criteria:

1) Firstly, we have selected platforms with a type of activity in one or more PLUS cities.

2) Secondly, the selected platforms are related to PLUS working areas: networked hospitality business, taxi services, urban food delivery, and on-demand home services. In order to develop cluster analysis among cases of the same area, we have selected 15 cases per area.

3) Thirdly, in order to be able of gathering up, the different models that coexist in the Platform Economy ecosystem, the sample includes platform alternatives to the Unicorn platforms. Indeed, 30% of the global sample was formed by models that aim to become an alternative to for-profit platforms. These allows us to compare both between different models in terms of economic goals and differentiating among the 4th sectors of study of the PLUS project.

4) Finally, although for the global sample (studied through digital ethnography), we account for a proportionally higher amount of for-profit business models, it is the reverse in the 20 cases studied in depth, where more than 50% of the cases (11 out of 20) were non-profit business models. This implies that this study offers a deeper knowledge about non-profit business initiatives in the 4 sectors studied than of for-profit business models.

Following this criteria and taking into account PLUS working areas the sample is:

Category	Number of platforms	Unicorn	Alternatives
Networked hospitality business	15	9	6
Taxi & car-sharing services	15	12	3
Urban food delivery	15	7	8
On-demand home services and care	15	11	4
Total	60	40	20

Table 2. PLUS' sample grid for categories considering unicorns vs alternatives.

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City	Number of platforms	Unicorn	Alternatives
Barcelona	32	22	10
Berlin	19	15	4
Bologna	28	24	4
Lisbon	17	16	1
London	22	17	5
Paris	27	17	10
Tallinn	13	11	2
Total	158	122	36

Table 3. PLUS' sample grid for cities considering unicorns vs alternatives.

5.2.1 Networked hospitality business

	Type	BCN	BER	BLQ	LIS	LON	PAR	TLL
AirBnb	Unicorn	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Couchsurfing	Unicorn	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Booking	Unicorn	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hostelworld	Unicorn	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fairbnb	Alter	Yes	Yes	Yes	Not	Yes	Yes	Not
BeWelcome	Alter	Not	Not	Yes	Not	Not	Not	Not
Les Oiseaux de Passage	Alter	Not	Not	Not	Not	Not	Yes	Not
Fairbooking	Alter	Yes	Yes	Yes	Yes	Yes	Yes	Not
Trustroots	Alter	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Rentalia	Unicorn	Yes	Not	Yes	Yes	Not	Yes	Not
Holiday Lettings	Unicorn	Yes	Yes	Yes	Yes	Yes	Yes	Yes

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Escapada Rural	Unicorn	Yes	Not	Not	Yes	Not	Not	Not
Homestay	Unicorn	Yes	Yes	Yes	Yes	Yes	Yes	Not
HomeAway	Unicorn	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Holidays Exchange Coop	Alter	Yes	Not	Not	Not	Not	Not	Not

Table 4. Networked hospitality business grid sample.

5.2.2 Taxi services

	Type	BCN	BER	BLQ	LIS	LON	PAR	TLL
Uber	Unicorn	Not	Yes	Not	Yes	Yes	Yes	Yes
Freenow	Unicorn	Yes	Yes	Yes	Yes	Yes	Not	Not
Bolt	Unicorn	Not	Not	Not	Yes	Yes	Yes	Yes
Cabify	Unicorn	Yes	Not	Not	Yes	Not	Not	Not
Cotabo	Alter	Not	Not	Yes	Not	Not	Not	Not
Heetch	Unicorn	Not	Not	Not	Not	Not	Yes	Not
TaxiApp UK	Alter	Not	Not	Not	Not	Yes	Not	Not
Alphataxis	Alter	Not	Not	Not	Not	Not	Yes	Not
Gett	Unicorn	Not	Not	Not	Not	Yes	Not	Not
Taxi Berlin	Unicorn	Not	Yes	Not	Not	Not	Not	Not
TaxiEcològic	Unicorn	Yes	Not	Not	Not	Not	Not	Not
Ittaxi	Unicorn	Not	Not	Yes	Not	Not	Not	Not
TaxiGo	Unicorn	Not	Not	Not	Not	Not	Not	Yes
CityTrips	Unicorn	Yes	Not	Not	Not	Not	Not	Not
Taxi.eu	Unicorn	Not	Not	Not	Not	Not	Yes	Not

Table 5. Taxi services grid sample.

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5.2.3 Urban food delivery

	Type	BCN	BER	BLQ	LIS	LON	PAR	TLL
Deliveroo	Unicorn	Yes	Yes	Yes	Not	Yes	Yes	Not
UberEats	Unicorn	Yes	Not	Yes	Yes	Yes	Yes	Not
Just-Eat	Unicorn	Yes	Not	Yes	Yes	Yes	Yes	Not
Glovo	Unicorn	Yes	Not	Yes	Yes	Not	Yes	Not
Foodora	Unicorn	Not	Yes	Yes	Not	Not	Yes	Not
Open Food Network	Alter	Yes	Not	Not	Not	Yes	Yes	Not
La Colmena que Dice Sí (LCQDS)	Alter	Yes	Yes	Not	Not	Not	Yes	Not
Coopcycle	Alter	Yes	Yes	Not	Not	Not	Yes	Not
My Menu	Unicorn	Not	Not	Yes	Not	Not	Not	Not
Wolt	Unicorn	Not	Not	Not	Not	Not	Not	Not
Mensakas	Alter	Yes	Not	Not	Not	Not	Not	Not
La Courcyclette (The Cilfé project)	Alter	Not	Not	Not	Not	Not	Yes	Not
Crow Cycle Courier Collective (CCCC)	Alter	Not	Yes	Not	Not	Not	Not	Not
Olvo	Alter	Not	Not	Not	Not	Not	Yes	Not
Régie de Quartier de Stains	Alter	Not	Not	Not	Not	Not	Yes	Not

Table 6. Urban food delivery grid sample.

5.2.4 On-demand home services and caring

	Type	BCN	BER	BLQ	LIS	LON	PAR	TLL
Helpling	Unicorn	Not	Yes	Yes	Not	Yes	Yes	Not
Easyfeel	Unicorn	Not	Not	Yes	Not	Not	Not	Not

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Joyners	Unicorn	Yes	Not	Not	Not	Not	Yes	Not
Helpific	Alter	Not	Not	Not	Not	Not	Not	Yes
Qida	Alter	Yes	Not	Not	Not	Not	Not	Not
Cuideo	Unicorn	Yes	Not	Not	Not	Not	Not	Not
Cuidum	Unicorn	Yes	Not	Not	Not	Not	Not	Not
Parentalis	Alter	Yes	Not	Not	Not	Not	Not	Not
Equal Care Co-op	Alter	Not	Not	Not	Not	Yes	Not	Not
Breezie	Unicorn	Not	Not	Not	Yes	Not	Not	Not
Badando	Unicorn	Not	Not	Yes	Not	Not	Not	Not
Sitly	Unicorn	Not	Not	Yes	Not	Not	Not	Not
Toptata	Unicorn	Not	Not	Yes	Not	Not	Not	Not
Naniffy	Unicorn	Yes	Not	Not	Not	Not	Not	Not
Cronoshare	Unicorn	Yes	Not	Not	Not	Not	Not	Not

Table 7. On-demand home services and caring grid sample.

5.2 Data collection

A 'codebook' (see Annex 10.2) for data collection — a set of indicators related to the analysis variables— was employed. The codebook departs from the *"Star of Democratic Qualities of the Platform Economy"*. The design from the outset is based on multidisciplinary analysis of state of the art of the PE, from economical, technological, environmental, gender and inclusion and legal and policy perspectives. The *"Star of Democratic Qualities of the Platform Economy"* considers the dimensions of governance design, economical strategy, technological base, knowledge policies, and social responsibility regarding the external impact of the platforms.

Data collection was based on two methods: web collection and a structured interview. Web collection was based on digital ethnography of the web platforms. It was applied to all sixty cases. In addition, we performed a structured interview with twenty of these sixty cases. Finally, during data collection, 'field notes' of general impressions were kept in a field book in order to have detailed qualitative data about study cases. As it is suggested in the PLUS research global plan and other deliverables such as D. 2.3 Grid of

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investigation, a snowball sample strategy (see Annex 10.1) has been deployed to reach potential interviewees.

A single researcher collected the data. To guarantee the reliability of the sample, two other researchers tested the indicators of the codebook with a set of cases, and verified the information collected for a number of cases by the main data collector. In this way, we controlled the quality of our data.

5.3 Data analysis

Firstly, the same researcher that collected the data reviewed all of it in order to detect any possible mistakes during its collection. Later, some of the indicators that had been used were adapted to include answer options that had not been previously considered. For example, regarding the labour model of the platforms two options had been previously used, *"self-employed workforce"* or *"paid-employment workforce"*. After this revision and thanks to the notes collected during the interviews, a new option *"mixed model"* was included. This final data base was used to develop descriptive statistics (percentages and proportion of cases) of the several variables gathered during both web and phone data collection.

To develop the analysis further, we also developed a correlation analysis. However, we are aware that the sample is relatively small (n=60) and that for most of the indicators we have an even smaller number (n=20). For this reason, completely aware of the limitations of this study, we calculated these correlations just to sketch possible hypothesis that should be tested with a much larger sample of cases. We performed two different types of correlation analysis.

On the one hand, the relation between the different dimensions of the study: Governance, Economic Model, Technological Policies, Data Policies, and Social Responsibility and Impact were studied. In order to do so, we transformed the different categorical variables that compose each dimension into binomial variables - "0" was used for less pro-democratic answers and "1" for more pro-democratic answers. For instance, "0" was used to categorise commercial companies and "1" was used to categorise non-profit organisations. Later, in order to be able to perform the analysis per dimensions, we considered each dimension as an ordinal variable that was composed by all the variables used. A greater presence of pro-democratic values, means that in more variables of the dimension, "1" should be the answer for the case. Then, if a greater presence (meaning more than "1") in the governance dimension is accompanied by a greater presence in the economic model, we can hypothesise that these both dimensions are positively correlated.

In order to do so, we applied different non-parametric tests. We are aware that non-parametric methods are not as powerful as parametric ones. However, because non-parametric methods make fewer assumptions, they are more flexible, robust, and applicable to non-quantitative (categorical/nominal) variable, fittin better into our study. In this regard, to develop the correlations between each dimension Spearman's correlation was

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used. The same process was done to compute the correlations between between the Sharing Cities Principles and the Sustainable Development Goals.

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6. FINAL RESULTS AND IMPACT

In this section, the analysis of the cases through the "Star of Democratic Qualities of the Platform Economy" is presented. The starting point is the recognition of PE as a diverse and dynamic field. In light of this, the aim of this report is more related to mapping a plural 'galaxy' than drafting a clear line of delimitation as to what each model of the PE is, and what it is not. Each of the cases studied results from varied combinations of elements rather than a few established boundaries or formulas.

6.1. PLUS' Cities Platform Economy Ecosystem

The analysis points to a diverse ecosystem in terms geographical expansion of the cases studied in depth. In this regard, 6 of the 20 cases studied are operating outside of Europe, and 4 are operating in several European Countries. Thus, 10 of the cases studied are operating internationally, of which 5 are alternative platforms to unicorn ones. Of these 5 platforms, 4 are non-for profit business and just one project is a social business (framed under a commercial legal entity). Regarding the platforms that are operating in just one country or on a local level, 10 platforms have been studied of which 7 are non-for profit business models. This implies that out of the 9 for-profit business models studied, just 3 are operating at a country or local level, whereas out of the 11 non-for profit business models the number of businesses operating at a country or local level totals 7.

The analysis points out that the PE, with a special attention on lean platforms, does not rely completely on the platforms in order to function properly (Figure 6). On the one hand, there are some organisations that are using the platform as a support for their daily activity (31.7%), but if the platform did not exist would still be able to continue functioning. On the other hand, other organisations rely completely on the digital platform (68.3%). In these cases, if the platform did not exist, the organisation would be unable to continue operating. In other words, their business model relies completely on the existence of the platform.

Of the 41 platforms that are what we called 'Digital Based', just 6 of are non-for profit business models with no social oriented business. This means that from a total of 18 alternative models, for just 33% the platform is a key component upon which their business model depends. This is not the same for for-profit business models; out of the 42 cases studied, 85% depend on the platform to be able to function properly as a business.

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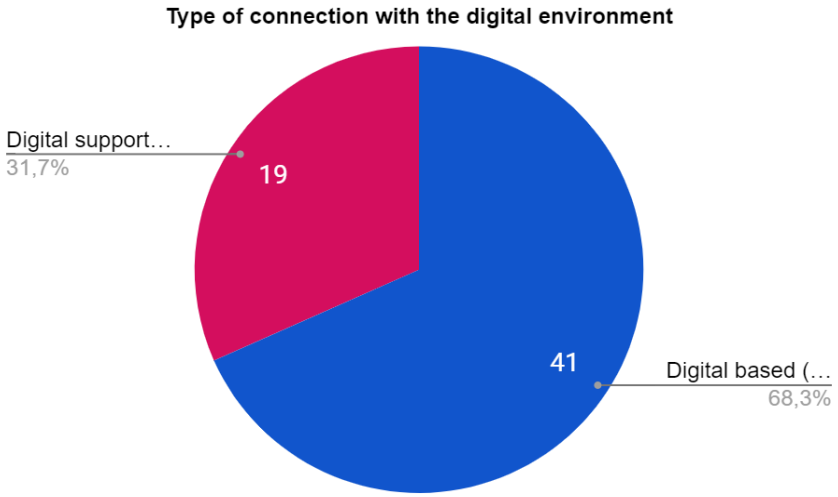

Figure 6. Type of connection with the digital environment (n=60).

Finally, regarding the type of interaction between the users, most of the 60 organisations studied (85%) are Business to Consumer (B2C). Three platforms are Business to Business (B2B) and six Peer to Peer (P2P).

6. 2 Governance

Regarding platform governance, it has been evaluated both the informal and formal mechanisms that shape platforms' governance dimension. Firstly, the informal mechanisms are measured by evaluating: 1) The relationships with platform users (this means consumers, producers, workers, collaborators among other types of users); 2) the existence of workers' or producers' spaces for self-organisation; and 3) decision-making processes (from the most democratic to the least). It is then given consideration to the formal mechanisms that give shape to the platform governance and included as main dimensions: 1) the platform's legal constitution and 2) policies for participation and economic transparency.

6.2.1. Informal mechanisms

Analysis regarding informal mechanisms shows that 14 out of the 20 of the platforms studied consider that they are enabling workers spaces for organisation. In this case, 13 of them are alternative business models (beyond platform cooperatives, for-profit social business are included). It is important to note that one for-profit platform (Case 19), considers that the company is providing spaces to workers organisation since they are able to meet in the streets during working-hours, but explained that this is something that the company does not want to foster. During the interview, its representative also mentioned the fact that the company provides a physical support centre for workers' inquiries as a place that encourages workers organisation. Although, the functioning of the centre is perceived to

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be for individual concerns not collective ones: *"It works as a fish shop, you go there and the workers must take a ticket to be seen"* (Case 19).

Similarly, in one of the for-profit business cases studied (Case 29) when a manager of the platform was asked about the provision of spaces for workers' organisation, they argued that workers (the participant referred to them as 'collaborators'), have a specific space to provide comments about each of the services performed, and that the platform does not see their comments. The participant later explained that although they would like to have a closer contact with collaborators to improve the service, they did not do so, because they wished to make clear the non dependent working relationship between the parties, where legal requirements specific to a paid employee do not apply.

Another indicator included in the informal mechanisms analysis, aims to measure the existence of a decision-making democratic process. In order to do so, the participants are asked if the platform is using any type of technological enabled tool for decision-making, if it relies on traditional mechanisms such as a postal vote, or lastly, if it is not using any type of mechanism. Consequently, it is differentiated between the cases that have established a democratic decision-making system (formalised to include both traditional and technology enabled tools) and informal accounting for those cases in which there is no type of protocol established. In this regard, 11 of the 20 platforms studied have established a democratic decision making system, all of which are considered as alternative models to unicorn platforms. Of those which have not (9 cases), two are considered as alternative business models. It is important to note that one of these cases is a non-for profit model (Case 50) that has only recently been created, and the other is a for-profit social business (Case 31). This implies that all the for-profit business models studied in depth and considered as unicorns (or potential unicorns), have not established any type of system for democratic decision-making.

6.2.1. Formal mechanisms

Concerning formal mechanisms, one of the key indicators is the legal format of the platforms studied. The analysis shows that the PE has a varied makeup that goes beyond for-profit models, as shown in Figure 7. 71.7% of the platforms studied are commercial companies, while 28.3% are based on non-for profit legal formats.

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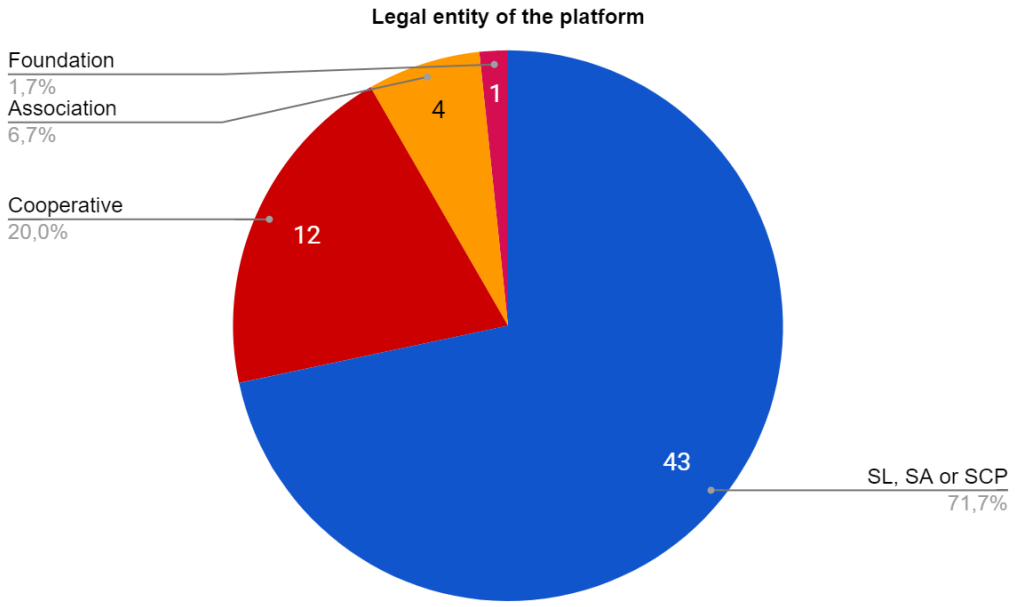

Figure 7. Legal entity of the platform

Regarding the user's involvement in formal rules and policies that govern the platform from a community interaction perspective, 14 out of 20 cases consider that users can participate in the definition of formal rules and policies of the platform, while 6 consider that they cannot. Secondly, in almost half of the sample (9 out of 20), those making decisions regarding the use and distribution of platform benefits are its owners, while in the other half are all the members (9 out of 20) (Figure 8).

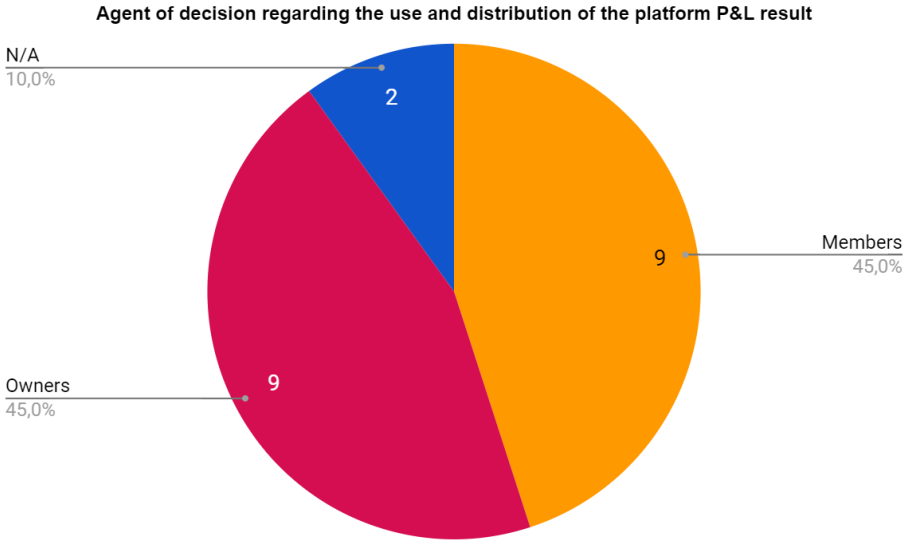

Figure 8. Workers as agents of decision making regarding the use and distribution of the platform's profit and loss results (n=20).

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Of the 14 cases that consider users can participate in the definition of formal rules and policies, we find 4 in which owners are the agents of decision regarding the use and distribution of the profit & loss result. This implies that although these platforms include users in the definition of formal rules and policies, they are less democratic than the other 10 cases, since not all of the members have the right to vote formally guaranteed (Figure 8).

In respect of platforms' external economic transparency, the vast majority of projects (17 out of 20) do not publish their financial statements openly on their websites, while the rest do it. However, the level of internal economic transparency it is also quite opaque, 13 out of 20 of the projects do not allow all of the legal entity members to have access to the profit and loss account.

6.2 Economic Model

In order to be able to differentiate among different economic models in the PE, included are indicators from different aspects of platforms' economic models: the economic orientation, economic sustainability and financing models.

6.2.1 Economic orientation

Regarding the projects; economic orientation, we have taken into account: the type of legal entity, the type of distribution of the economic benefits, the growth model, the commercial character of the platform, and the use (or not) of banking services ethics.

First, regarding the distribution of the economic benefits, it has been considered whether they are either reinvested in the project, divided between the owners, or other options. In this case, 100% of the projects state that they are currently reinvesting all their benefits (if existing) in the project. Secondly, in regard to the growth model, it has been differentiated between models that aim to: (1) escalate without changing their governance model and without the idea of selling the platform in the future, (2) those that have in mind the idea of selling the platform in the future when there is a highly-profitable purchase offer, and (3) those projects that want to grow progressively, decentralising the platform's governance. 9 out of the 20 projects studied in depth have in mind to grow progressively decentralising governance, 7 out of the 20 projects studied aim at escalating without changing their governance model and without the idea of selling the platform in the future, and finally, 3 projects out of the 20 have in mind selling the platform in the future. Thirdly, it has also been considered whether monetary exchanges between users are: never (4 out of 20); almost never (0 out of 20); sometimes (2 out of 20); often (4 out of 20) or almost always produced (10 out of 20).

6.2.1 Economic sustainability

Regarding economic sustainability, it has been evaluated whether the economic balance of the initiative is positive or not. The analysis shows that the vast majority of the

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projects studied 75% have still to reach the break-even point, or in other words, they are not currently economically sustainable. Moreover, as detailed in Table 8, there does not seem to be a clear relation between its legal entity and economic sustainability.

Legal Entity Type	Break-even point reached	Proportion
Cooperative	1	1 out of 8
Association	2	2 out of 3
Commercial Company	2	2 out of 9
Total	5	5 out of 20

Table 8. Project economically sustainable. Break-even point reached (n=20).

6.2.1. Platforms' financing sources

In this section, the results of the study on the resources used by platforms as funding are shown. The most commonly used forms of funding by the overall sample of projects are "family savings" and "public funds". Although proportionally a higher number of the cooperative projects studied have received public funds (5 out of 8), a significant proportional amount of commercial cases have also received funding from public institutions (5 out of 9). Moreover, the proportion of non-profit projects (the sum of the number of cooperatives and associations) is equal to the proportion of commercial companies that have received public funds.

Regarding investment from family savings, proportionally, cooperatives had a lower incidence (3 out of 8) than commercial companies (6 out of 9). It is also asked if the project relies on any type of equity investment. With this indicator, it is analysed if the project has pursued any rounds of financing i.e. if private investments in equity from external stakeholders such as business angels have taken place. In order to simplify the analysis it is included both preferred stock (no right to vote) and common stock (right to vote). The commercial companies studied rely more (5 out of 9) on this type of funding, whereas just 1 cooperative has used equity investment as a financing resource. It is also seen very similar results for the "debt investment" case, in which 5 out of 9 of the commercial companies are using debt as an investment source while just 2 out of 8 cases of cooperative platforms are relying on this type of funding.

Apart from the main sources of funding mentioned above, 9 out of 20 of the cases studied rely on compulsory member fees and 6 out of 20 use non-monetary donations. It is also observed that 5 out of 20 offer premium products and services through their platform, 4 out of 20 have launched campaigns of direct micro-participation, and 4 out of 20 have sold merchandising. Other sources of funding such as research grants (3 out of 20) or using the platform as a means for advertising companies (2 out of 20) are relatively unused. This is the same for alternative sources of funding related to donations. If the whole sample is

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considered: 6 out of 20 had non-monetary donations from the community, 3 cases non-monetary donations from the external actors and 4 out of 20 cases monetary donations.

Nevertheless, apart from the sources of funding used by the sample as a whole, it also becomes interesting to differentiate among the various sources of funding depending on legal entity type (Figure 9).

Regarding cooperatives, the most used sources of funding are public funds and non-monetary donations from the community, in 5 out of 8 cases. Other important sources for the cooperatives studied are compulsory member's fees (4 out of 8 cases), followed by family savings, non-monetary donations from external actors, monetary donations and direct micro-participation, all of which are used by 3 cases. Sources of funding less used by the cooperatives studied were debt investment and research grants (2 cases out of 8), followed by equity investment and the sale of merchandising used by 1 case. Finally, neither advertising or premium services and/or products are a source of funding for the eight cooperatives studied.

This is quite similar for the three associations studied which mainly rely on family savings and compulsory member fees (2 out of 3 cases). Again, public funds, monetary donations and non-monetary donations from the community (1 out of 3) are at least mentioned. Moreover, as in the case of cooperatives studied, a source of funding not mentioned is advertising.

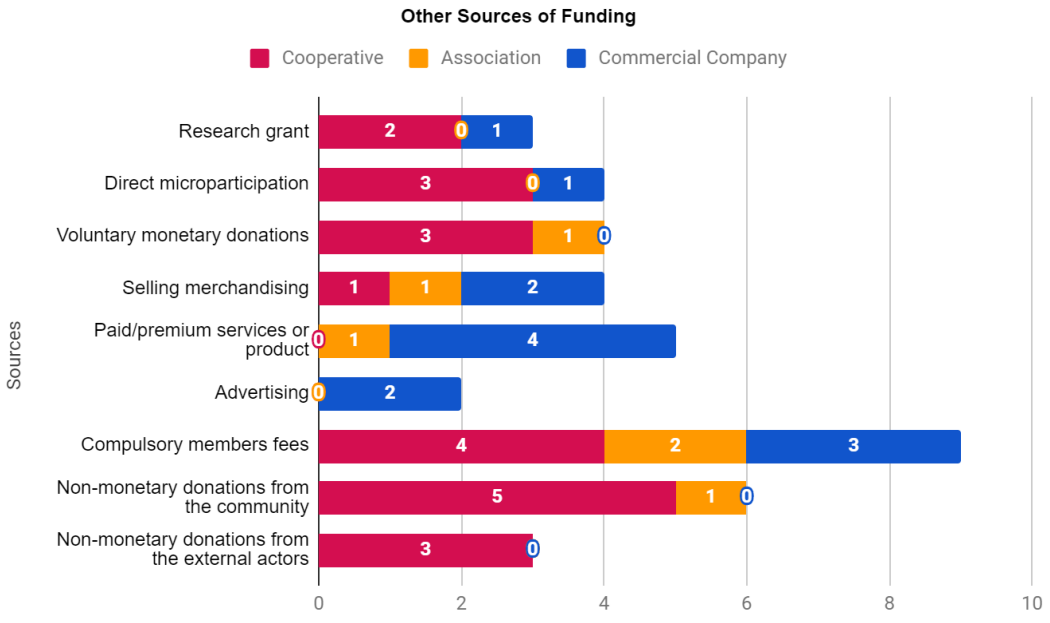

Figure 9. Platforms' other sources of funding (n=20).

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Perhaps not surprisingly, the picture looks quite different for the commercial companies studied. In this case, the most commonly used source of funding by the projects interviewed are family savings 6 out of 9. Other important sources of funding are equity investment, debt investment, and public funds. All four sources of funding are used by 5 out of 9 cases. These main sources are followed by the offering of premium services and/or products through the platform (4 out of 9), compulsory fees (3 out of 9), the sale of merchandising and advertising (2 out of 9) and research grants (1 out of 9). Finally, sources of funding that are important for non-for profit models remain either insignificant or almost insignificant for for-profit models. Regarding non-monetary donations from the community, non-monetary donations from the external actors, monetary donations and direct micro-participation, only the latter is mentioned, but just by 1 project out of 9.

6.2.2 Platforms' labour models and working conditions

6.2.2.1. Juridical status differentiating per business model

From the 20 cases studied, in a total of 5 cases platform workers are considered under paid-employment contractual figures, 4 on self-employed figures, 10 have a mixture model, and in 1 they are not considered workers since it relies on 100% voluntary work.

In this regard, it is found that among unicorn or extractivist business models the most used model is the mixture one (4 out of 7), followed by a complete reliance on self-employed workers (2 out of 7) and paid-employment (1 out of 7). On the contrary, despite that alternative business models studied also rely mainly on mixture models (6 out of 13 cases), an important number of cases considers workers in paid-employment recognitions (4 out of 13).

The most popular type of model among the sample of cases is a mixture model, applying to 10 out of the 20 cases studied in depth. This means that in the Platform Economy we find not just binary models, relying relying solely on either paid employees or on a self-employed workforce, but a combination of these two juridical recognitions. In addition, this mixture model also gathers up those cases where platform workers (those who perform commercial activities through the platform) are not considered as workers of the platforms legal entities. This is the scenario for almost all of the cases included in the Networked Hospitality Business, a sector in which all the platforms that involve a commercial activity(ies) but where there is no monetary exchange between hosts and guests, refer to them as "users".

However, it is important to state that in the sample studied just 1 unicorn platform considers workers in a paid-employment framework, whereas a greater number of alternative platforms consider platform workers in paid-employment juridical recognitions.

Regarding if workers are paid an amount of fixed income per hour or if it is dependent on the number of tasks, and/or deliveries completed. The results vary a lot

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depending on the type of laboural recognition of platform workers. First, among those recognised as self-employed workforce it is found two different models. A first model in which workers are paid per hour or units of time (3 out of 4), and a second model in which they are paid per the amount of deliveries or tasks completed (1 case out of 4). Second, among those business models in which workers are considered paid-employees (5 out of 20) all of them paid their workers per hour or equivalent units of time. Lastly, among those business models in which self-employed workforce and paid-employment workforce coexist with non-consideration of for example hosts as workforce, it is found again different models.

First, according to the results, a combination between self-employed workforce and paid-employment workforce is made as an adaptation to local laws and agreements. This means that in one territory platform workers are considered self-employees, while in another territory people -that are doing exactly the same tasks- are considered under paid-employment figures. In concrete, Case 19 and Case 27 both for-profit platforms on the on-demand home services and on the urban food delivery sector follow clearly this model.

However, other platforms depend on a combination between a self-employed and paid-employment workforce as an adaptation to local laws — platform workers having different recognitions depending on the territory. Otherwise, each platform worker is treated as an independent case (i.e. Case 43).

In other cases studied, platforms decide to rely on Business to Business (B2B) relations to manage the platform's workforce. For example, case number 11 in Spain, depends on a directly self-employed workforce of 3%, and the remainder subcontracted to other businesses - the participant suggested the figure of 400 business in Spain alone. This strategy can be seen as an answer to current public debates around the juridical recognition of platform workers. In this case, by subcontracting the workforce to other companies the platform passes the risk of following a misrecognition strategy to these companies reducing the possibility of any legal consequences. The platform does not know how these workers are recognised, and more importantly, it is not required by law to know it.

Lastly, there are cases in which platform workers (hosts, couriers, car drivers, cleaners, etc.) are not considered as ‘workforce’ by the platform, but instead are seen as “providers” or “producers”, with the platform simply acting as an intermediary in which the different users can interact within each other. Several alternative models that are formed by different local instances comment that in each local instance or each node, members decide the type of juridical recognition that they want to give to its workers, and do not consider those that are under the daily development and maintaining of the platform (usually members of the cooperative) as a ‘workforce’.

6.2.2.3 Working conditions and future options

Platform managers for each case were asked their subjective valuation of platform workers working conditions (hosts, platform couriers, car drivers, etc.). Of the 20 platforms

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studied, 15 managers believed that platform workers are working in a safe physical environment, while just 4 managers stated that conditions were unsafe. In addition, it was also found that most of the platforms studied (13 out of 20) consider that platform workers are developing high skills or learning new abilities while completing tasks, while 7 out of 20 failed to give a positive answer. Thirdly, in 13 out of 20 platforms studied, platform managers felt that platform workers are not dependent on tight deadlines, while 5 believed that their platform workers are dependent on them. Finally, half of the sample studied (10 out of 20 cases) agreed that platform workers are performing short-repetitive tasks, with 8 out of 20 platforms stating that they were not.

In half of the cases studied (10 out of 20), platform workers are unable to work from home, while in 7 cases they are. In Figure 10, it is observed that in 14 out of 20 cases studied, platform managers state that platform workers are earning a salary per hour over the minimum wage, but in the 6 other cases they were not. Regarding wage equality, quite a polarized ecosystem can be seen. In almost half of the cases studied (9 out of 20) any legal member is earning twice or more than other members, and for almost the same number of platforms (8 out of 20) there is at least one legal member that is earning twice or more than other members.

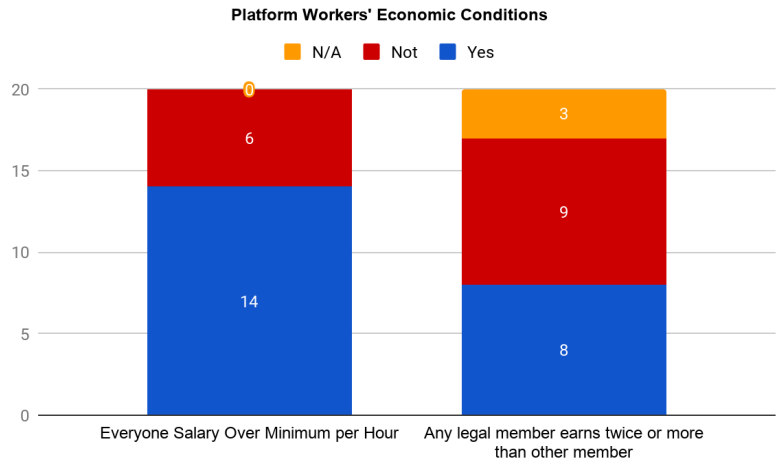

Figure 10. Platform workers' economic conditions (n=20)

Regarding platform workers uncertainty and alternative job options, we asked managers whether they considered that "platform workers may lose current sources of income precedent from the platform activity in the next six months" and if they considered that "platform workers could easily find another job with a similar salary". In the first case, 13 out of 20 cases consider that platform workers should not be afraid of losing the platform as a source of income in a half year view, while just 2 platforms out of 20 consider that they should be afraid. In the second case, 9 platforms out of 20 considered that platform workers would easily find a job with a similar salary. However, it should be noted that almost half of

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the sample failed to give an answer to this question, while 2 cases stated that it would not be easy for them to find alternative options.

In most of the platforms studied (15 out of 20), consumer demand has peak hours or suffers from huge variations depending on the day of the week. However, in just 1 platform the participant stated that in case of not working during these hours the platform workers are penalised, while in most of the cases (14 out of 20), platform managers stated that workers were not.

Related to demand peak hours is the fact of modifying prices according to demand changes - also called 'surge pricing' - which, in turn, can have an impact on platform workers income and its volatility. In this regard, 7 out of 20 platforms, stated that they change prices according to demand changes. However, in most of the cases studied (10 out of 20), platforms do not use this pricing technique.

6.2.2.4. Geolocation, algorithmic management and gamification techniques

Regarding the use of geolocation techniques, it is found that most of the platforms (11 out of 20) are not using them, and between those that do, 7 out of 20 stated that they are only using them during platform workers' working hours. None stated that they are constantly monitoring platform workers i.e. even when they are not working, while 2 platforms did not give an answer to this question.

Between those 11 platforms that are not using geolocation techniques, we find 7 alternative platforms in the Networked Hospitality Business (3 out of 3 alternative platforms studied in this sector), Urban Food Delivery (3 out of 6 alternative platforms studied on this sector), and the On-demand home services and care (1 out of the 2 alternative platforms studied in this sector). It is also observed that 4 out of 5 lean platforms studied in the on-demand home services sector are also not using such geolocation techniques.

For algorithmic management techniques, a total of 9 cases out of 20 are using them. However, here we find a clear difference between alternative business models and unicorn platforms. While just 3 out of 13 alternative platforms use algorithmic management, 6 out of 7 unicorn platforms are, Figure 11.

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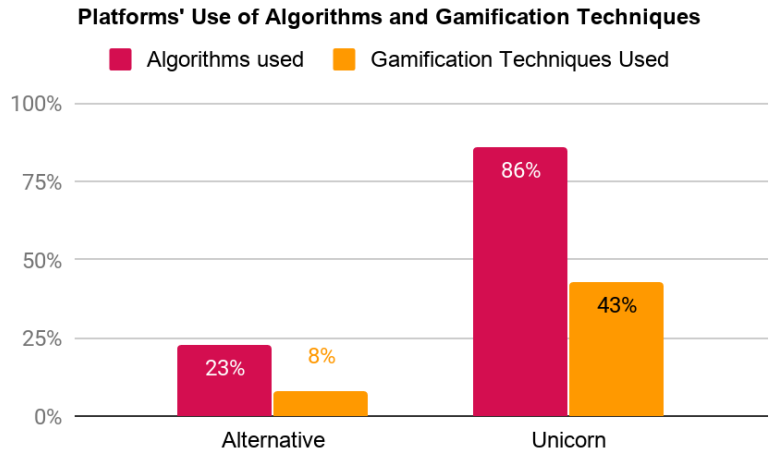

Figure 11. Platforms' use of algorithms and gamification techniques per platform type (n=20).

In this regard, platforms were also asked what kind of variables they are introducing in algorithms and what weight each of them carries. Case 19, an Urban Food Delivery Unicorn platform, mentioned that among the variables that they are taking into account are: the amount of time that the platform courier has used the platform, the number of deliveries done, if working in peak hours, and the consumers score given to the platform courier service. Regarding the last variable, the participant commented that this score only affects couriers when it is their responsibility. For instance, if arriving late due to traffic the platform courier is not penalised, but are when providing a bad service such as yelling at a customer. Lastly, regarding peak hours, the participant advised that they are not penalised for not working them, as it has no impact upon their score. However, this specific case *is* considered as penalisation. Firstly, because it has a direct impact on the amount of hours worked/number of deliveries done by an individual and secondly, because it is not the fact that the courier's score is unaffected - platform couriers have to be in a good position in the ranking made by an algorithm to be assigned a major number of deliveries and hours - if they decide not to work during peak hours, they go down the ranking, which will have a monetary penalty.

Moreover, it is also important to mention that while some platforms talk about "the algorithm" as if it was responsible for the whole management process, others do not. For instance, the participant from Case 32, an on-demand care services platform, explained some of the different variables that are taken into account. The participant commented that they are using more than 20 variables, but that they do not accept criteria related to race or nationality. Between all these criteria, territorial proximity with the customer and previous experience with the pathology are found. From this information, the company derives a ranking of people and then the company's human resources team decides who is allocated an initial interview with the customer. Ultimately, the customer will decide whose services to use (or not use) from those selected.

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Another interesting example is an alternative taxi services platform, Case 12, in which they are using algorithms which try to give an equal distribution of the amount of work available to each driver. In addition, since most of the drivers are members of the legal entity, they have a right to vote on the whole algorithmic management system, including the variables that are taken into account. Moreover, the drivers in this case are not dependent on the platform, since they have the option to work without using its operation system.

On the other hand, regarding the use of gamification techniques (the use of game elements to incentivise platform workers towards certain behaviours), just 4 out of 20 platforms state that they are using them. More importantly, from these 4 platforms three are unicorn platforms, while just 1 is an alternative model. This implies that out of the total amount of unicorn platforms studied, 3 out of 7 are using gamification techniques compared to just 1 of the 13 alternative platforms studied.

Finally, just 2 of the 20 platforms state that platform workers are able to reject both algorithmic management and gamification techniques (where used) if they want to. More importantly, these two are both alternative platforms. This means that no unicorn platform has stated that platform workers are able to reject both algorithmic management and gamification techniques.

6.3 Technological policies

Technological practices and policies openness, refers to the adoption of software and technological architecture that favour freedom and openness.

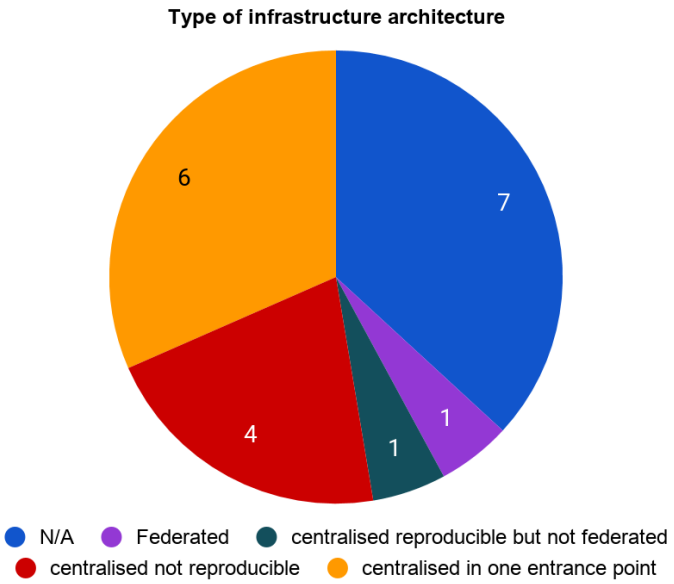

Figure 12. Platform's infrastructure architecture (n=60).

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The results focusing on software openness show that 66.7% of the platforms use copyrighted software and 33.3% adopted open source.

6.4 Data policies

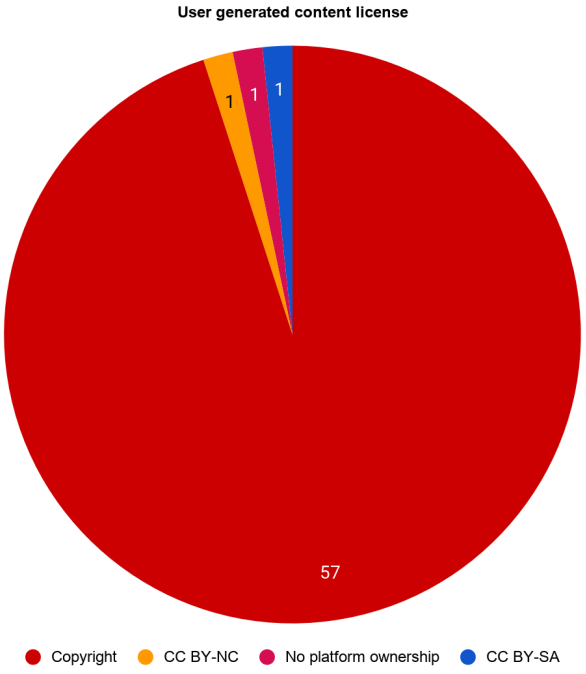

Figure 13. User generated content license (n=60).

Regarding knowledge platform policies, we have analysed two elements: content and data. The content element refers to the type of user-generated content license and its categorisation from more open/free, to less. Figure 13 shows that 95% of the platforms studied considered user generated content under copyright license whereas just 2 cases licensed it under open source. Moreover, 1 project stated on their website that user created content is considered owned by the user when they have chosen to post it on the platform, specifying that users can control how the content they generate is shared through their visibility settings and preferences (Case 6).

Regarding data policies, the indicator adopted is the ability to access data generated by users, taking into consideration their agreement. Just one (1.7%) project out of 60 made it possible to obtain access to their data through a data commons license "CC BY-NC-ND" (Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International), the remainder (98.3%) did not specify a license on their website.

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6.5 Social responsibility and impact

6.5.1. Level of maturity

With respect to a platform's level of maturity, the results show that just 2 out of the 20 projects studied are functioning on a stable mode, are fully operational and are the reference or main player in their domain (mature phase). 6 of the platforms studied are in a phase of growth, so functioning on a stable mode, but still in an expansive phase. 3 of the platforms are in a medium phase, which means that they are in a validation stage and functioning on a stable mode. Most of the projects studied (8 out of 20), are in an early stage. This means that they have only recently been created and are in the initial stages of implementation of an idea or business model. Finally, just 1 project is no longer working (Dead phase).

6.5.2. Social use value and reputation building

This section shows the results regarding analysis of the platforms' popularity in the digital space.

	Alexa Traffic Global Rank	Google search results	Google Backlinks	Twitter followers	Facebook followers	Instagram followers
Networked hospitality business	1.446.291	64,553.161	172,442	27,050	2,401,691	495,343
Taxi services	2.557.799	73,085.121	60,978	97,612	2,100,764	117,437
Urban food delivery	1.259.868	3,845,264	27,940	20,189	309,127	32,164
On-demand home services and caring	3.253.885	696,821	2,952	984	28,652	1,893

Table 9. Social use value and reputation building by sector (n=60).

Information has been collected using several indicators of a platform's popularity from which has been calculated the average per sector of study. In short, we gathered

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information for Alexa's Global Rank[10], Google search results for all time, Google Backlinks[11], and the number of followers in the main social networks: Twitter, Facebook and Instagram.

As shown in Table 9, regarding social use value of the platforms by sector, it can be seen that those with the highest values are the networked hospitality business sector (Alexa average global ranking value of 1.446.291 and Google search results average value of 64,553,161) and the taxi services sector (Alexa's average global ranking value of 2.557.799 and Google search results average value of 73,085,121). This is followed by the urban food delivery sector, with an Alexa average global ranking value of 1.259.868 and total Google search results average value of 3,845,264, and finally, by the on-demand home services and caring sector - Alexa Global Rank average value of 3.253.885 and total Google search results of 696,821.

The sector with the highest average of Twitter followers is taxi services, followed by networked hospitality, then on-demand home services and caring and finally urban food. In the case of Facebook and Instagram, we found that the most popular sector is networked hospitality business, followed by "taxi services", "urban food delivery" and lastly, on-demand home services and caring.

	Alexa Traffic Global Rank	Google search results	Google Backlinks	Twitter followers	Facebook followers	Instagram followers
SL, SA or SCP	1.606.473	49,567.953	85,001	45,998	1,733,223	254,851
Cooperative	4.438.583	93,059	1,414	861	2,150	758
Association	4.635.311	37,033	26,099	1,562	4,740	265
Foundation	598.438	18,700	13,405	600	5,768	236
Average alternative models	3.224.111	49,597	13,639	1,008	4,220	420

Table 10. Social use value and reputation building by legal entity type (n=60).

When analysing the same indicators of social value and reputation building by type of legal entity (Table 10), it is found that the most searched for cases are Commercial

[10] "Alexa rank is a measure of website popularity. It ranks millions of websites in order of popularity, with an Alexa Rank of 1 being the most popular. Alexa Rank reveals how a website is doing relative to all other sites" on https://bit.ly/2YHAL9O.

[11] "In search engine optimization (SEO) terminology a backlink is a hyperlink that links from a Web page, back to your own Web page or website. Also called an Inbound Link (IBL) these links are important in determining the popularity (or importance) of your Web site. Some search engines, including Google will consider Web sites with more backlinks more relevant in search results pages. May also be written as two separate words, back link" extracted from https://www.webopedia.com/TERM/B/backlink.html

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Companies, which are also those with the highest number of followers on the main social networks. The difference compared to the average for alternative models in each of the indicators is substantial. However, within alternative models there are also differences; Cooperatives are the most popular models within non-for-profit legal entities, followed by associations and foundations.

6.6. Community building and relational capital

In this section, the different results obtained from indicators to measure economic impact in terms of community building and relational capital of platforms are shown.

The two types of stakeholders with which a greater number of platforms studied (12 out of 20) had engaged with were civil society and economic, followed by public administration (8 out of 20), and research actors (5 out of 20).

The majority of platforms have more women than men as users, but the numerical difference in this type of profile is such that it can only be considered as insignificant. However, things start to change when the proportion of men and women among platform workers is evaluated.

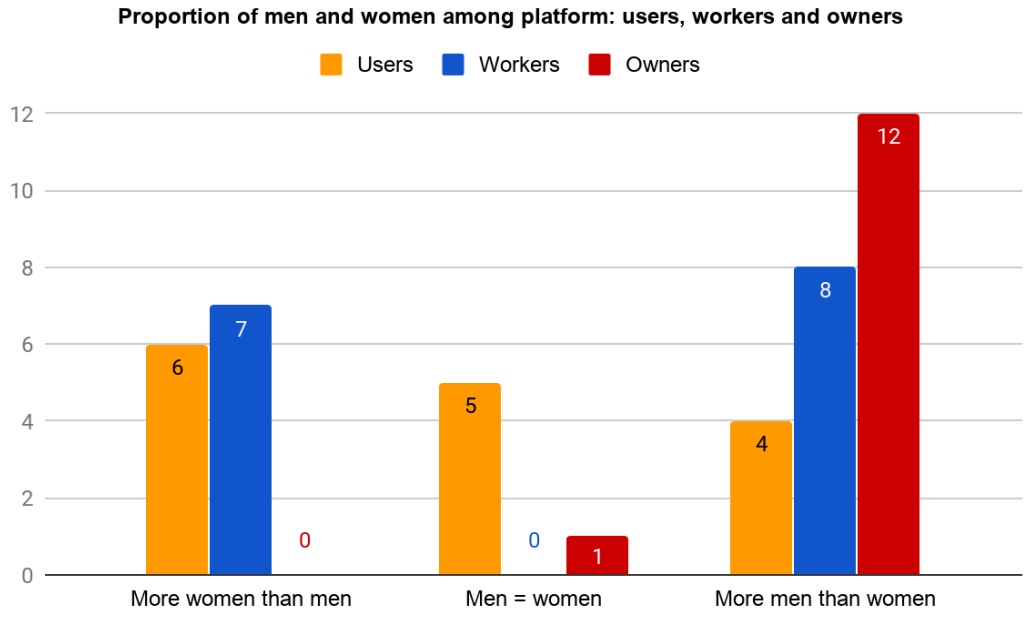

Figure 14. Proportion of men and women among platform users (n=15), workers (n=15) and owners (n=13).

This can be explained by the fact that most of the cases studied are part of the urban food delivery sector (largely male represented), or the care and cleaning sector (largely female represented). But, importantly, there is a striking discrepancy when looking at gender representation of the owners of those platforms. Of those that agreed to answer this

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question (n=13), only one had an equal representation in terms of gender, while the remainder had more men than women as platform owners (Figure 14). Moreover, the majority of platforms are not taking concrete measures to change this situation. Just 6 of the 20 platforms mentioned having explicit policies to promote gender equality and inside this group, platforms of all the legal types are found. In this regard, most of the policies established by platforms are focused on increasing women's participation in tech sectors.

However, other innovative practices can be found, such as the approach expressed by Case 7, a networked hospitality cooperative, which can be highlighted as 'best practice'. The participant explained that they operate under the principle that everyone has to be able to participate in the meetings and in the community, but that when they hold meetings and assemblies, normally it is women who have more issues to consider which make attendance problematic. So, for example, if a woman advises the community that she can not be present because she has to take care of children, they invite her to come with them. Then, the community through a common budget, pays someone to take care of the children. Another example that the participant explained (though it had only occurred on one occasion), related to a member that told them that she would have to use holiday days in order to attend, and the community paid her by way of compensation.

Depending on the legal type of the platform, they differ in the social responsibility measures that have been taken. Firstly, while 3 out of the 9 of the commercial platforms are adapted or available to people with functional diversity, 6 out of the 11 non-profit platforms (Cooperatives and Associations) are adapted. Secondly, 8 out of the 11 of non-profit platforms are promoting involvement of people on low incomes, while just 3 out of the 9 for-profit platforms are doing so. Thirdly, 5 out of the 9 of the commercial companies studied consider that they promote the involvement of people with just a basic education, while 7 out of 11 for the non-profit models do.

Regarding environmental responsibility, 6 of the non-profit platforms are promoting the recycling and circularity of materials, compared to just 2 of commercial platforms. Moreover, approximately the same proportion of platforms (2 of commercial companies studied and 2 of alternative platforms), stated that their platforms are hosted on green energy servers. However, 4 of the non-profit platforms studied are offering a type of service or product improving energy efficiency, and 4 of the commercial platforms studied are doing so. Finally, regarding the provision of educational materials in order to raise awareness about sustainable consumption, 6 of the non-profit platforms are active in this area, compared to just 2 of commercial companies. In terms of concern to economic responsibility, clear differences are observed. For example, regarding prioritising social responsibility when choosing service providers, it is found that 9 of the non-profit platforms studied are doing so, as opposed to only 2 of the commercial platforms. As perhaps expected, 8 out of 9 commercial companies have designed or are using a system in order to control fake accounts, while just 3 out of 11 non-profit companies are taking similar measures. Finally, 4

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commercial companies stated that they have asked permission to operate at city level, compared to only 1 of non-profit platforms.

6.7 Analysis of the correspondence between the star of Democratic Qualities of Digital Platforms and Sharing Cities Declaration and Sustainable Development Goals

As mentioned in the framework of the analysis, one of the goals of this research is to assess the correspondence between the indicators used for its analysis and the principles developed in the Sharing Cities Declaration (SCD), (Barcelona, 2018), and the Sustainable Development Goals (SDG). This approach has given some relevant insights:

- SDG's are embedded mainly within impact and responsibility dimensions, and then economic sustainability (67,6%). Thus, governance and data policies are not considered as SDG and technology policies have a very small presence (1.9%) (Figure 15).

- Overall there is a is a good connection between the dimensions applied to Sharing Cities Declaration and those used by this research in the framework of the Star of Democratic Qualities of Digital Platforms: Governance (10%), Economic sustainability (59%), Data policies (8%), Technology policies (3%) and Social responsibility and Impact (20%) (Figure 16).

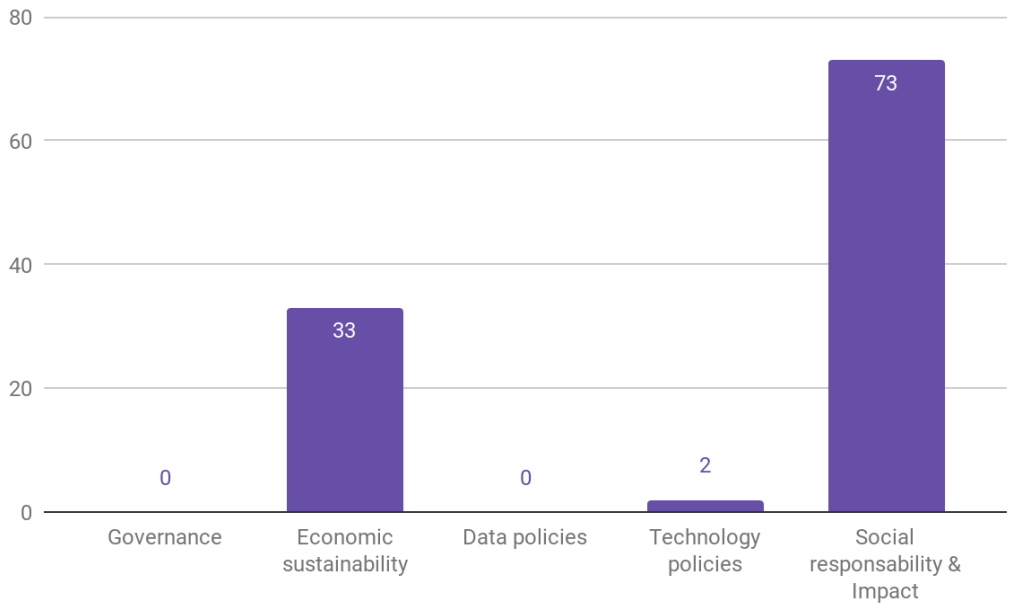

Figure 15. Correspondence between Star of Democratic Qualities of Digital Platforms and Sustainable Development Goals.

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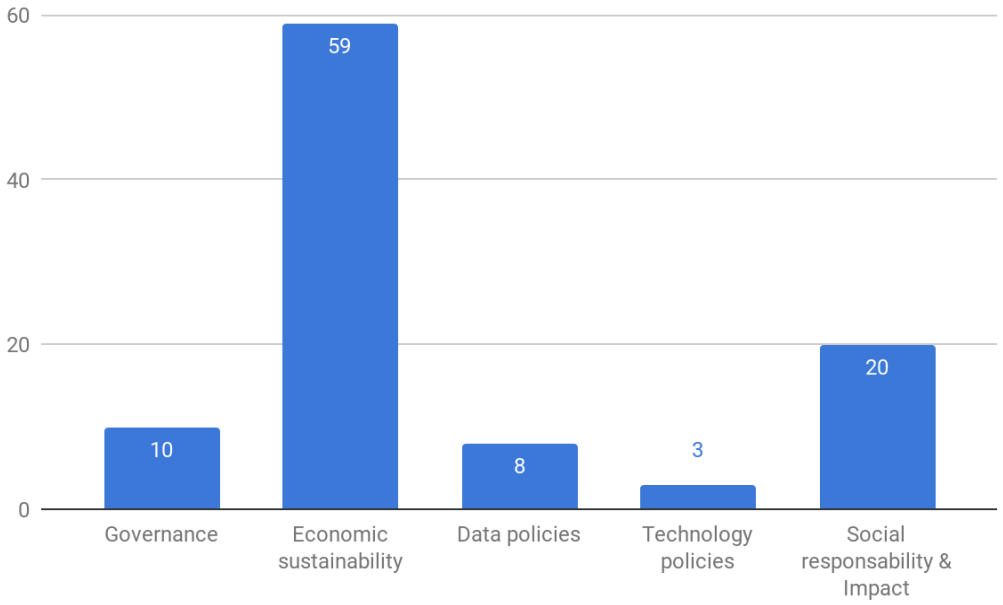

Figure 16. Correspondence between Star of Democratic Qualities of Digital Platforms and Sharing Cities Declaration.

6.8 Correlations among dimensions

The correlation among dimensions (Annex 10.4.1) reinforce the central role of the governance of the platform (Figure 17).

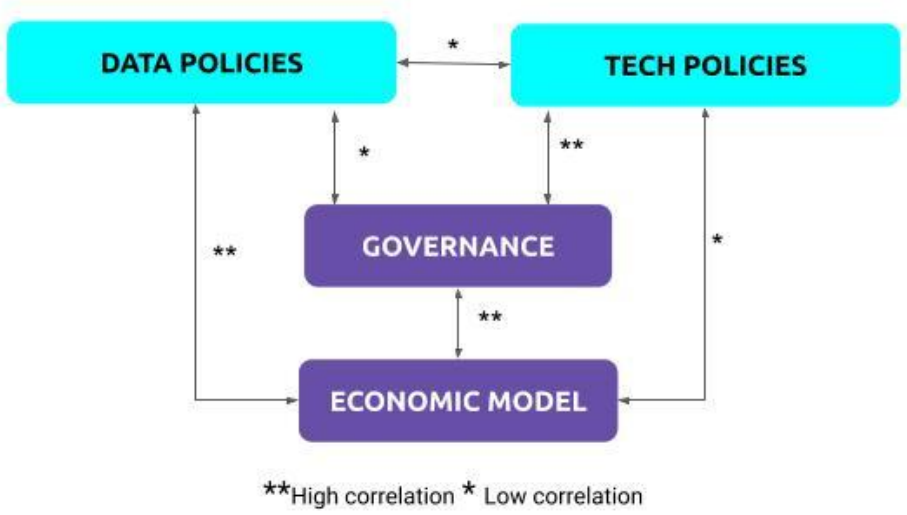

Figure 17. The main correlations among platform economy democratic dimensions.

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The governance of a platform is highly correlated with its economic model (0.566**). At the same time, governance is also correlated with its technology policies (0,687**) and data policies (0,545*). Technological policies and data policies themselves also have a strong link (0,505*). Finally, there are correlations between the economic model and technological (0,553*) and data policies (0,666**).

6.9 Correlations between Sharing Cities Declaration Principles and Sustainable Development Goals

In this section we have presented the connections between the principles of the Sharing Cities Declaration (SDC) and the Sustainable Development Goals (SDG).

SDG3 "Good Health and Well-being" - SDC7 Principle #7. (0,470*) To protect citizens' digital rights through the implementation of Technological Sovereignty policies and ethical digital standards (including the rights of privacy, security, information self-determination, neutrality, and giving citizens a choice about what happens to their digital identity, who uses their data online, and for which purposes). To promote policies in order that personal data is controlled by citizens themselves, and are protected from being misused, collected or shared without explicit consent. To guarantee that digital platforms enable algorithmic accountability and the portability of users' data, digital identity and reputation. To ensure that cities are able to access in a privacy-preserving manner relevant data from firms operating in their territories (such as information about transportation, safety, labour, and all potential public interest information). To favor that city data should be managed as a common good to solve urban challenges.

SDG5 "Gender Equality" - SCD2 Principle #2. (0,561*) Empower people to have opportunities to earn or increase their income through new work agreements and adapted fiscality without contributing to social precariousness or constituting an administrative burden.

SDG12 "Responsible Consumption and Production"- SCD1 Principle #1. (0,454*) To distinguish between the different models of digital platforms regarding their functioning and impacts, in order to design public policies according to these differentiations.

SDG12 "Responsible Consumption and Production"- SCD7 Principle #7. (0,586**) To protect citizens' digital rights through the implementation of Technological Sovereignty policies and ethical digital standards (including the rights of privacy, security, information self-determination and neutrality, giving citizens a choice about what happens to their digital identity, who uses their data online, and for which purposes). To promote policies in order that the personal data is controlled by citizens themselves, and are protected from being misused, collected or shared without explicit consent. To guarantee that digital platforms enable algorithmic accountability and the portability of users' data, digital identity and reputation. To ensure that cities are able to access a privacy-preserving manner relevant data

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from firms operating in their territories (such as information about transportation, safety, labour, and all potential public interest information). To favour that city data should be managed as a common good to solve urban challenges.

SDG9 "Industry, Innovation and Infrastructure" - SCD9 Principle #9. (0,834**) To promote the development of local collaborative economic ecosystems and particularly small and medium enterprises (SME), based on positive impact in cities —as described in the first principle— through entrepreneurship support programs, participative tools, funding or other promotion tools.

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7. CONCLUSION & DISCUSSION

The definition of the framework of analysis and its application to the four PLUS working areas have provided a useful tool for the characterisation of the different types of digital platforms and the sophistication of the existing platforms in each PLUS city. The analysis points to a diverse ecosystem of Platform Economy business models in four areas: networked hospitality business, taxi services, urban food delivery and on-demand home services in each of the seven cities involved in PLUS (Barcelona, Berlin, Bologna, Lisbon, London, Paris and Tallinn). It is important to note that due to the limited number of cases (a total of 60 cases studied through web collection and 20 of them in depth through phone interviews), it is not possible to extract strong conclusions from this research. However, the analysis performed contributes to the description of the different business models, as well as to the recognition of the Platform Economy as a diverse and dynamic field.

Firstly, in terms of geographical expansion, of the 20 cases studied in depth, half are operating internationally and the other half in just one country or on a local level. In this regard, there seems to be a differentiation in terms of geographical expansion between non-profit business models and for-profit business models. While most non-profit platforms operate on a local level (7 out of 11), most of for-profit business models operate internationally (6 out of 9).

Secondly, the research performed also showed that not all the platforms analysed have a complete dependency on the platform (meaning that they would have to stop its activities if the platform failed) and for 19 out of 60 cases the platform is a tool for their daily functioning from which their business model does not entirely depend. In addition, the non-dependent platform group is mainly composed by alternative models. Whilst for just 33% (6 cases) of alternative business models the platform is a key and indispensable component of their business model, for 85% (35 cases) of for-profit entities the platform is indispensable to be able to function properly as a business. These findings are consistent with previous research on for-profit platforms, such as Deliveroo and Uber, in which digital technology is found as a labour management enabler without which platform labour would not be possible neither efficient (Altenried, 2017; Rosenblat, 2018; Schreyer & Schraper 2018).

In relation to platforms' governance models, several insights have been commented on during the report. First, it is found that the alternative platforms usually enable users' and/or workers' participation in the definition of formal rules and policies, as well as acting as spaces for workers' collective organisation. Conversely, most lean business models do not consider that this something they are participating in. Secondly, regarding participation processes it is found that all the for-profit business models studied in depth have not established any type of system for democratic decision-making, while 11 out of 13 alternative business models have done. Although even for non-profit organisations, improving economic transparency (especially for external actors), is a key element to improve, this report agrees with previous studies on social economy and cooperatives that

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point to better working conditions of the cooperative models when compared with 'traditional' businesses (Roelants et al. 2012; Birchall & Ketilson, 2009; Burdin & Dean, 2009),

In addition, the analysis regarding the interconnection between governance, sustainability, and data and technological policies dimensions reinforce the findings previously shown by Fuster & Espelt (2019). Using the same framework, the authors showed the key position of the platform governance. Platform governance is related to both the economic and sustainability dimensions, as well as with data and technological policies. Thus, a democratic governance favours a sustainable economic approach.

The analysis also shows that regarding legal entity there is also a diverse ecosystem. Although, the vast majority of cases studied have a commercial type of business entity, there are also a great number of platforms under non-profit legal forms. The analysis shows that the vast majority of the projects studied (75%) are still not economically sustainable. In this sense, there does not seem to be a clear relation between its legal entity and economic sustainability and all the platforms analysed plan to reinvest their benefits into the project rather than dividing it amongst its owners. Nevertheless, even though a limited number of cases have been analysed, three recognised that the goal of the project is to grow as much as is possible in order to sell as a form of exit whereby the platform is sometimes seen as a way to speculate.

Despite that there are some forms of funding shared by all of the platforms and the most commonly used forms by the overall sample of projects are "family savings" and "public funds". The proportion of non-profit projects (the sum of the number of cooperatives and associations) is equal to the proportion of commercial companies that have received public funds. Although, this research does not show the economic amount that each of the projects has received thanks to public funding, it suggests that for-profit platforms, although usually causing some negative impacts on cities, are receiving public funds that enable their growth. Apart from the main sources of funding mentioned above, 9 out of 20 of the cases studied rely on compulsory member fees, and 6 out of 20 use non-monetary donations. It has also been seen that 5 out of 20 offer premium products and services through their platform, 4 out of 20 have launched campaigns of direct micro-participation, and just 4 out of 20 have sold merchandising. Other sources of funding such as research grants (3 out of 20) or using the platform as a means for advertising companies (2 out of 20) are relatively unused. This is the same for alternative sources of funding related to donations; considering the whole sample, 6 out of 20 had non-monetary donations from the community, 3 cases non-monetary donations from the external actors and 4 out of 20 cases had monetary donations.

When analysing the various sources of funding used depending on the legal entity type several differences are found. On the one hand, concerning non-profit business the most used sources of funding are public and non-monetary donations from the community. On the other hand, for the commercial companies studied, the most commonly used sources of funding are family savings, equity investment, debt investment, and public funds.

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Regarding non-monetary donations from the community, non-monetary donations from external actors, monetary donations and direct micro-participation, only the latter is mentioned, but by only one project out of nine.

Also related to the platform's economic model is their laboural model. In this regard, it is found that the most followed type among both for-profit business and non-for profit organisations is a mixed model with a combination of self-employed workforce and paid-employees (10 out of 20). We therefore have to consider that for 'mixed models', those who perform commercial activities through the platform are not considered as workers of the platforms legal entities.

According to the results, a combination between self-employed workforce and paid-employment workforce is sometimes made as an adaptation strategy to local laws and agreements. This means that in one territory platform workers are considered self-employees, while in another territory the workforce — which is doing exactly the same tasks — is considered under paid-employment figures. This agrees with a central concern widely commented on in literature about platform labour, that many businesses classify their workers as self-employed contractors rather than employees, in order to reduce labour costs and keep associated risks low for the company, known as misclassification strategy (Forde et al. 2017). However, other platforms depend on a combination between self-employed workforce and paid-employment workforce not as an adaptation to local laws (platform workers having different recognitions depending on the territory), but where each platform worker is treated as an independent case.

In other cases studied, platforms decide to rely on Business to Business (B2B) relations to manage the platform's workforce. This strategy can be seen as an answer to current public debates around the juridical recognition of platform workers. By subcontracting the workforce to other companies the platform passes the risk of following a misrecognition strategy, reducing the possibility of any legal consequences. The platform does not know how these workers are recognised, and more importantly, it is not required by law to know it.

Lastly, as stated above, there are cases in which platform workers (hosts, platform couriers, car drivers, platform cleaners, etc.) are not considered as workforce by the platform and instead are considered as "providers" or "producers" with the platform considering itself as an intermediary in which the different users can interact with each other. For instance, some alternative models formed by different local instances explained that in each local instance or each node, members independently decide the type of juridical recognition that they want to give to its workers, understanding that workers are the ones under the daily development and maintaining of the platform. Usually they are members of the cooperative, which does not consider platform workers as workforce.

Regarding the use of new technologies such as geolocation, algorithmic management and gamification techniques, several findings can be stated. First, between

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those 11 platforms that are not using geolocation techniques, we find 7 alternative platforms in the networked hospitality business (3 out of 3 alternative platforms studied in this sector), urban food delivery (3 out of 6 alternative platforms studied on this sector), and in the on-demand home services and care (1 out of the 2 alternative platforms studied in this sector). We also found that 4 out of 5 lean platforms studied in the on-demand home services sector are not using them. In this regard, most platforms, including non-profit ones, with variations depending on the sector, find geolocation techniques decisive for the platform's functioning.

Secondly, regarding the use of algorithmic management, a total of 9 cases out of 20 are using them. However, here there is a clear difference between alternative business models and unicorn platforms. While just 3 out of 13 alternative platforms use algorithmic management, 86% of the unicorn platforms (6 out of 7) do. We highlight here Case 19, which mentioned that among the variables that they are taking into account are: the amount of time that the platform courier has used the platform, the number of deliveries done, if working in peak hours, and the consumers score given to the platform courier service. This agrees with previous research on the Deliveroo app on the different variables that are taken into account to assess platform couriers' through which its workers receive regular, algorithmically generated encouragement to improve their performance via the app (Gandini, 2018).

Thirdly, in regard to the use of gamification techniques, 3 out of 7 unicorn platforms are using them, compared to just 1 out of 13 of the alternative platforms studied. This relates with previous research about the purpose of gamification in work which lies in the attribution of game-like qualities to work tasks, and is thought to increase productivity by introducing an emotional element to it (Koivisto & Hamari, 2014; Sun, 2019). In this regard, Case 19 comments upon the fact of introducing gamification techniques as something that is freely followed by platform couriers just taking into account individual behaviours and impacts, although previous research has stated its impact on incentivising competition amongst peers (Schreyer & Schraper, 2018).

Finally, just 2 of the 20 platforms state that platform workers are able to reject both algorithmic management and gamification techniques. More importantly, these two platforms are alternative platforms. No unicorn platform has stated that platform workers are able to reject both algorithmic management and gamification techniques.

In relation to data policies, two results demonstrate the lack of attention to the subject. Firstly, the huge level of copyright or non licensing regarding website content and secondly, only 1 out of the 60 platforms allows its content to be downloaded. This research signals this fact to be a big challenge for the platform economy, including non-for profit

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models, in the frame of the expansion of the value of data commons[12], in which alternative business models could find themselves comfortable.

Regarding participation in terms of gender, it has been stated that as users, on average, platforms are more or less equal. However, no project that considered itself as having an equal representation in the workforce gender' terms has been found. Previous research performed by Huws et al. (2019) finds that male platform workers are dominant, even in domestic work (which includes jobs such as carpenter or plumber) in those countries studied, with the exception of Italy, where women are dominant in transport and delivery activities (6.3% compared to 5.4% men) and domestic work (9.8% compared to 8% male). This difference can be explained by the fact that most of the cases studied are part of the urban food delivery sector (largely male represented), or the care and cleaning sector (largely female represented). In this regard, most of the platforms studied in the care and cleaning sector do not include tasks related to jobs such as carpenter or plumber. Another important finding of this research, relates to gender representation of the owners of the platforms. Only one platform had an equal representation in terms of gender, while the remainder had more men than women as owners. Moreover, the majority of platforms are not taking concrete measures to change this situation. Just 6 of the 20 platforms mentioned having explicit policies to promote gender equality. Inside this group, platforms of all the legal types are found. In this regard, most of the policies established by platforms are focused on increasing women's participation in tech sectors.

Approaching the end of the report it is found that depending on the platforms legal type, cases differ in the social responsibility measures that have been taken. Firstly, while 3 of the 9 commercial platforms are adapted or available to people with functional diversity, 6 out of the 11 non-profit platforms (cooperatives and associations) are adapted. Secondly, 8 out of the 11 of non-profit platforms are promoting the involvement of people on low incomes, while just 3 out of the 9 for-profit platforms are doing so. Thirdly, 5 of the 9 commercial companies studied consider that they promote the involvement of people with just a basic education, while 7 out of 11 non-profit models were doing so.

Regarding environmental responsibility, 6 of the non-profit platforms are promoting the recycling and circularity of materials, compared to just 2 commercial platforms. Moreover, approximately the same proportion of platforms (2 of commercial companies studied and 2 alternative platforms), stated that their platforms are hosted on green energy servers. However, 4 of the non-profit platforms studied are offering a type of service or product improving energy efficiency, and 4 of the commercial platforms studied are doing so. Finally, regarding the provision of educational materials in order to raise awareness about sustainable consumption, 6 of the non-profit platforms are active in this area, compared to just 2 of commercial companies.

[12] Data Commons Manifesto, developed by Digital Democracy Data Commons pilot in the framework of Decentralized Citizen Owned Data Ecosystem (DECODE) project https://dddc.decodeproject.eu/processes/main/f/6/petitions/1

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In terms of concern towards economic responsibility, clear differences are observed. For example, regarding prioritising social responsibility when choosing service providers, it was found that 9 of the non-profit platforms studied were actively doing so, as opposed to only 2 of the commercial platforms. Perhaps not surprisingly 8 out of 9 commercial companies have designed or are using a system in order to control fake accounts, while just 3 out of 11 non-profit companies are taking similar measures. Finally, 4 commercial companies stated that they have asked permission to operate at city level, compared to only 1 of non-profit platforms.

The findings stated above contribute to previous research on cooperatives that suggest platform cooperatives could be a model for expansion in the sharing-oriented platform economy, particularly through labour platforms, which may create more positive impacts relating to social sustainability and equality, especially in cities with high unemployment.

Finally, in relation to the exercise of linking the indicators used by this research with the Sharing Cities Declaration (Barcelona, 2018) and Development Sustainable Goals (UN, 2015), the results show two demeanors. While, there is a holistic approach to Sharing Cities Declaration to the digital platform environment, there is a lack of focus in some areas of the SDG's principles. This difference can be attributed to the digital nature of the first one and the more global approach of the second, making clear that both the Star of Democratic Qualities of Platform Economy and the Sharing Cities Declaration are a step forward to aligning and shifting the Platform Economy towards the United Nations Sustainable Development Goals.

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8. RECOMMENDATIONS

These sintetic recommendations depart from the conclusions of the analysis performed and have the goal of providing some insights about the key elements to take into account regarding the socioeconomic perspective of the project:

8.1 A state of the art of the four PLUS' platform categories in the seven PLUS' cities

Despite the limited number of cases, this research gives an informed perspective of the four areas of PLUS (network hospitality business, taxi services, urban food delivery and on-demand home services and care) in the seven cities involved in the project: Barcelona, Berlin, Bologna, Lisbon, London, Paris and Tallinn. Thus, **this mapping could help to give a clear vision of the different platforms characterization in the context of PLUS**.

8.2 The relevance of the promotion of alternative platforms based on democratic governance

The platform economy cases studied are mainly digital based, business enterprises and Business to Consumer (B2C) models. Beyond reinforcing working conditions of platform workers, **PLUS should be an opportunity to promote digital based cooperatives, which should also promote P2P and C2C relations.** Taking into consideration the central role of governance in the characterisation of the different types of platforms, **PLUS should reinforce the promotion of alternative platforms based on democratic governance**. This means, platform cooperatives or open cooperatives.

8.3 The challenge of sustainability and the relevance of public policies

According to the results of this report, the majority of platforms, with independence at the core of their characterisation, are yet to achieve a positive economic balance. At the same time, especially alternative platforms, but also the more commercial oriented ones, depend on public funds in a very rich ecosystem of types of funding models. For this reason, **PLUS project should recommend the promotion of public policies to support the funding of alternative platforms**.

It also appears that platform cooperatives have a challenge in terms of their internationalisation. **PLUS could have a significant role in the international intercooperation of platform cooperatives**, especially promoting a better scalability and interaction among the three pilots involved (Katuma, Fairbnb and Smart).

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8.4 A contribution for improving Sustainable Development Goals (SDG)

According to the research results, SDG are embedded mainly in impact and responsibility dimensions, and, then, economic models. Governance and data dimensions are not considered as SDG and therefore, SDGs are lacking in digital considerations.

At the same time, a good connection between SDGs and Sharing Cities Declaration is observed. **This means that the Start of Democratic Qualities and Sharing Declaration is a step forward for shifting Sharing Economy towards the SDG**. It is important to analyse holistically each platform to distinguish between the different models of digital platforms regarding their functioning and impacts, in order to design public policies according to these differentiations. The Star of Democratic Qualities of the Platform Economy could be a useful tool for such analysis.

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10. ANNEXES

10.1 Sample strategy

In order to get in touch with the selected cases, several steps were taken. First, in case of platforms having an email direction or a contact form published on their website a message was sent. This was possible for 31 cases. Secondly, we tried to find online people working in top management positions - CEO'S, public policy managers, etc in the companies from the aggregate sample. This was done through both Linkedin and website search. In the case of having a Linkedin account, two things were done. In the first place, a "connection" request was sent with a message indicating very briefly our aim. In the second place, we made use of "Get Prospect" an email search extractor to try to obtain the email directions of the participants. In this regard, of the 29 cases for which this was done, only 19 gave us an email direction. To this tool limited results, we have to add the fact that these email directions could not be verified. This means that for some of the 19 directions that were given, the tool did not guarantee that they were the correct recipients or emails. The tool marked as verified mails for 12 of them.

Once we had managed to at least send them a Linkedin request we started a tracing process. In the first place, if they accepted the Linkedin request, we sent a message with the same contents as the email. In the case that they answered (also in the case of the email that we had sent), we replied and answered any doubts until they decided to participate or until they declined participation. In case it was convenient, we made a phone call or got in touch through WhatsApp to answer any doubts the potential participant might have.

Meanwhile, more traditional processes were taken. First, we asked PLUS partners in order to see if any of them had had previous contact with some of the cases we had the most difficulty with and could help us to reach them. This process just helped us to reach one case (Helpling). Secondly, we drown on Dimmons research group connections with the quadruple helix actors (civil society, research, public administration & business) that could help us to get in touch with some selected cases. This was worthwhile work since it helped us to reach 21 potential participants. Thirdly, we also took advantage of "Reshaping Work Regional Conference" where not just Dimmons research group was participating on September 25th-27th, but also several business leaders. This allowed us to reach two projects that we had not previously established contact with and meeting face-to-face with 6 other projects that we had managed to find contacts, but which whom connection was null or very weak.

All this process can be numerically summarised as 37 cases to whom we at least sent an email - but with 11 of them, there was an interchange of emails that led to their accepting to participate. Also, we tried to reach 22 cases by Linkedin, but we managed to

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establish a conversation with only 5 of them. Moreover, we tried to obtain the emails of these accounts in 21 cases, however, it gave verified results for just 12.

Obviously, reaching out to some of these cases was easier than with others. In short, it was easier to get participation from non-profit business models than from for-profit business models, who were more reluctant to participate. Another noticeable behaviour was that the bigger the business models (normally also for-profit) the more time they needed to make a decision. This led us to devote higher tracing efforts for these cases. Indeed, for 6 of them on 7th of October, they had still to make a decision as to whether to participate.

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10.2 Codebook

This is the link to the codebook used. This includes the description of Sharing Cities Declaration principles (SCD) and Sustainable Development Goals (SDG) and their connection with the indicators of the Star of Democratic Qualities of the Platform Economy.

http://dimmons.net/wp-content/uploads/2019/12/PLUS_CODEBOOK_WEB.ods

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10.3 List of cases

ID	Legal entity	Area of activity	Type of platform	Number of cities
1	SL, SA or SCP	Networked hospitality business	Unicorn	7
2	SL, SA or SCP	Networked hospitality business	Unicorn	7
3	SL, SA or SCP	Networked hospitality business	Unicorn	7
4	SL, SA or SCP	Networked hospitality business	Unicorn	7
5	Cooperative	Networked hospitality business	Alternative	3
6	Association	Networked hospitality business	Alternative	1
7	Cooperative	Networked hospitality business	Alternative	1
8	SL, SA or SCP	Taxi services	Unicorn	6
9	SL, SA or SCP	Taxi services	Unicorn	4
10	SL, SA or SCP	Taxi services	Unicorn	5
11	SL, SA or SCP	Taxi services	Unicorn	2
12	Cooperative	Taxi services	Alternative	1
13	SL, SA or SCP	Taxi services	Unicorn	1
14	Cooperative	Taxi services	Alternative	1
15	SL, SA or SCP	Taxi services	Alternative	1

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16	SL, SA or SCP	Urban food delivery	Unicorn	5
17	SL, SA or SCP	Urban food delivery	Unicorn	5
18	SL, SA or SCP	Urban food delivery	Unicorn	5
19	SL, SA or SCP	Urban food delivery	Unicorn	3
20	SL, SA or SCP	Urban food delivery	Unicorn	3
21	Cooperative	Urban food delivery	Alternative	3
22	SL, SA or SCP	Urban food delivery	Alternative	3
23	Cooperative	Urban food delivery	Alternative	3
24	SL, SA or SCP	Urban food delivery	Unicorn	1
25	SL, SA or SCP	Urban food delivery	Unicorn	1
26	Cooperative	Urban food delivery	Alternative	1
27	SL, SA or SCP	On-demand home services and caring	Unicorn	4
28	SL, SA or SCP	On-demand home services and caring	Unicorn	1
29	SL, SA or SCP	On-demand home services and caring	Unicorn	2
30	SL, SA or SCP	On-demand	Alternative	1

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		home services and caring		
31	SL, SA or SCP	On-demand home services and caring	Alternative	1
32	SL, SA or SCP	On-demand home services and caring	unicorn	1
33	SL, SA or SCP	On-demand home services and caring	Unicorn	1
34	Cooperative	On-demand home services and caring	Alternative	1
35	Cooperative	On-demand home services and caring	Alternative	1
36	SL, SA or SCP	On-demand home services and caring	Unicorn	1
37	SL, SA or SCP	On-demand home services and caring	Unicorn	1
38	SL, SA or SCP	On-demand home services and caring	Unicorn	1
39	SL, SA or SCP	On-demand home services and caring	Unicorn	1
40	SL, SA or SCP	On-demand home services and caring	Unicorn	1
41	SL, SA or SCP	Networked	Alternative	2

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		hospitality business		
43	SL, SA or SCP	On-demand home services and caring	Unicorn	2
45	SL, SA or SCP	Networked hospitality business	Unicorn	6
46	SL, SA or SCP	Networked hospitality business	Unicorn	7
47	SL, SA or SCP	Networked hospitality business	Unicorn	3
48	SL, SA or SCP	Networked hospitality business	Unicorn	7
49	Cooperative	Networked hospitality business	Unicorn	7
50	SL, SA or SCP	Networked hospitality business	Alternative	1
51	SL, SA or SCP	Taxi services	Unicorn	1
52	SL, SA or SCP	Taxi services	Unicorn	1
53	SL, SA or SCP	Taxi services	Unicorn	1
54	SL, SA or SCP	Taxi services	Unicorn	1
55	SL, SA or SCP	Taxi services	Unicorn	1
56	SL, SA or SCP	Taxi services	Unicorn	1
57	Association	Taxi services	Unicorn	1
59	Cooperative	Urban food delivery	Alternative	1

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60	Cooperative	Urban food delivery	Alternative	1
61	Association	Urban food delivery	Alternative	1
62	Association	Urban food delivery	Alternative	1
63	Foundation	Networked hospitality business	Alternative	7

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10.4 Correlations tables

10.4.1 Correlations among dimensions

		TYPE OF PLATFORM	GOVERNANCE	ECONOMIC MODEL	DATA & POLICY	TECH POLICY	IMPACTS & SOCIAL RESPONSIBILITY
TYPE OF PLATFORM	Correlation Coefficient	1,000	-0,089	0,021	-0,031	-0,145	0,210
	Sig. (2-tailed)	.	0,710	0,929	0,898	0,541	0,389
GOVERNANCE	Correlation Coefficient	-0,089	1,000	,566(**)	,545(*)	,687(**)	0,150
	Sig. (2-tailed)	0,710	.	0,009	0,013	0,001	0,541
ECONOMIC MODEL	Correlation Coefficient	0,021	,566(**)	1,000	,666(**)	,553(*)	0,100
	Sig. (2-tailed)	0,929	0,009	.	0,001	0,011	0,683
DATA & KNOWLEDGE POLICY	Correlation Coefficient	-0,031	,545(*)	,666(**)	1,000	,505(*)	0,010
	Sig. (2-tailed)	0,898	0,013	0,001	.	0,023	0,967
	N	20	20	20	20	20	19
TECHNOLOGY POLICY	Correlation Coefficient	-0,145	,687(**)	,553(*)	,505(*)	1,000	0,362
	Sig. (2-tailed)	0,541	0,001	0,011	0,023	.	0,128
IMPACTS AND SOCIAL RESPONSIBILITY	Correlation Coefficient	0,210	0,150	0,100	0,010	0,362	1,000
	Sig. (2-tailed)	0,389	0,541	0,683	0,967	0,128	.

Spearman's rho (n=20)

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

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10.4.2 Correlations between Sharing Cities declaration principles and Sustainable Development Goals

		SCD1	SCD2	SCD3	SCD4	SCD5	SCD7	SCD9	SCD10
SDG1	Pearson Correlation	-,359	,488*	-,231	,444	-,122	-,449	-,259	-,238
	Sig. (2-tailed)	,131	,034	,342	,057	,617	,054	,284	,327
	N	19	19	19	19	19	19	19	19
SDG2	Pearson Correlation	-,076	,035	-,300	-,028	,316	,069	,379	,229
	Sig. (2-tailed)	,751	,885	,199	,907	,175	,772	,100	,331
	N	20	20	20	20	20	20	20	20
SDG3	Pearson Correlation	,494*	-,100	,380	,000	,778**	,452*	,412	,055
	Sig. (2-tailed)	,027	,674	,098	1,000	,000	,045	,071	,816
	N	20	20	20	20	20	20	20	20
SDG5	Pearson Correlation	-,284	,547*	-,004	,666**	-,348	-,407	-,348	-,165
	Sig. (2-tailed)	,225	,013	,985	,001	,133	,075	,133	,487
	N	20	20	20	20	20	20	20	20
SDG7	Pearson Correlation	-,076	,035	-,300	-,028	,316	,069	,379	,229
	Sig. (2-tailed)	,751	,885	,199	,907	,175	,772	,100	,331
	N	20	20	20	20	20	20	20	20
SDG8	Pearson Correlation	,342	,296	,455	,409	,173	,130	-,091	-,089
	Sig. (2-tailed)	,152	,218	,051	,082	,479	,596	,711	,716

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	N	19	19	19	19	19	19	19	19
SDG9	Pearson Correlation	,437	-,274	-,025	-,043	,441	,617**	,823**	,572**
	Sig. (2-tailed)	,054	,243	,918	,856	,052	,004	,000	,008
	N	20	20	20	20	20	20	20	20
SDG10	Pearson Correlation	,346	-,208	-,097	,690**	-,168	,317	,379	,242
	Sig. (2-tailed)	,135	,380	,685	,001	,478	,173	,100	,304
	N	20	20	20	20	20	20	20	20
SDG11	Pearson Correlation	,000	-,056	-,333	,155	,181	,155	,612**	,426
	Sig. (2-tailed)	1,000	,815	,151	,515	,444	,513	,004	,061
	N	20	20	20	20	20	20	20	20
SDG12	Pearson Correlation	,421	-,261	,017	-,005	,249	,578**	,655**	,534*
	Sig. (2-tailed)	,065	,266	,943	,984	,289	,008	,002	,015
	N	20	20	20	20	20	20	20	20
SDG13	Pearson Correlation	,187	-,114	-,186	,076	,363	,341	,627**	,409
	Sig. (2-tailed)	,429	,632	,433	,750	,116	,141	,003	,074
	N	20	20	20	20	20	20	20	20
SDG14	Pearson Correlation	,202	-,143	-,056	-,147	,174	,357	,405	,386
	Sig. (2-tailed)	,392	,548	,815	,537	,464	,122	,076	,093
	N	20	20	20	20	20	20	20	20
SDG15	Pearson Correlation	,202	-,143	-,056	-,147	,174	,357	,405	,386

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	Sig. (2-tailed)	,392	,548	,815	,537	,464	,122	,076	,093
	N	20	20	20	20	20	20	20	20
SDG16	Pearson Correlation	-,017	,288	-,061	,877**	-,337	-,095	,035	,063
	Sig. (2-tailed)	,943	,217	,797	,000	,147	,691	,885	,793
	N	20	20	20	20	20	20	20	20
SDG17	Pearson Correlation	-,028	,120	-,189	,054	,029	,209	,638**	,669**
	Sig. (2-tailed)	,905	,615	,424	,820	,905	,377	,002	,001
	N	20	20	20	20	20	20	20	20

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